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EPA's brief in the CPP 111(d) litigation (copy attached) was filed yesterday.

Scott Jordan

Air and Radiation Law Office

Office of General Counsel

202-564-7508

ORAL ARGUMENT SCHEDULED ON JUNE 2, 2016

No. 15-1363
(and consolidated cases)

IN THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

STATE OF WEST VIRGINIA, ET AL.,

Petitioners,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, ET AL.,

Respondents.

On Petitions for Review of Final Action
by the United States Environmental Protection Agency

RESPONDENT EPA'S INITIAL BRIEF

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CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

Pursuant to D.C. Circuit Rule 28(a)(1), the undersigned counsel certifies as follows:

A. Parties and Amici.

The parties in these consolidated cases are:

Petitioners: No. 15-1363: the States of West Virginia, Texas, Alabama, Arkansas, Colorado, Florida, Georgia, Indiana, Kansas, Louisiana, Michigan, Missouri, Montana, Nebraska, New Jersey, Ohio, South Carolina, South Dakota, Utah, Wisconsin, Wyoming, and the Commonwealth of Kentucky, the Arizona Corporation Commission, the State of Louisiana Department of Environmental Quality, the State of North Carolina Department of Environmental Quality; No. 15-1364: the State of Oklahoma, ex rel. E. Scott Pruitt, in his official capacity as Attorney General of Oklahoma, and the Oklahoma Department of Environmental Quality; No. 15-1365: the International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers, AFLCIO; No. 15-1366: Murray Energy Corporation; No. 15-1367: the National Mining Association; No. 15-1368: the American Coalition for Clean Coal Electricity; No. 15-1370: the Utility Air Regulatory Group and the American Public Power Association; No. 15-1371: Alabama Power Company, Georgia Power Company, Gulf Power Company, and the Mississippi Power Company; No. 15-1372: the CO2 Task Force of the Florida Electric Power Coordinating Group, Inc.; No. 15-1373: Montana-Dakota Utilities Co., a Division of MDU Resources Group, Inc.; No. 15-1374: the Tri-State Generation and Transmission Association, Inc.; No. 15-1375: the United Mine Workers of America; No. 15-1376: the National Rural Electric Cooperative Association, Arizona Electric Power Cooperative, Inc., Associated Electric Cooperative, Inc., Big Rivers Electric Corporation, Brazos Electric Power Cooperative, Inc., Buckeye Power, Inc., Central Montana Electric Power Cooperative, Central Power Electric Cooperative, Inc., Corn Belt Power Cooperative, Dairyland Power Cooperative, Deseret Generation & Transmission Co-operative, Inc., East Kentucky Power Cooperative, Inc., East River Electric Power Cooperative, Inc., East Texas Electric Cooperative, Inc., Georgia Transmission Corporation, Golden Spread Electric Cooperative, Inc., Hoosier Energy Rural Electric Cooperative, Inc., Kansas Electric Power Cooperative, Inc., Minnkota Power Cooperative, Inc., North Carolina Electric Membership Corporation, Northeast Texas Electric Cooperative, Inc., Northwest Iowa Power Cooperative, Oglethorpe Power Corporation, Powersouth Energy Cooperative, Prairie Power, Inc., Rushmore Electric Power Cooperative, Inc., Sam Rayburn G&T Electric Cooperative,

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Inc., San Miguel Electric Cooperative, Inc., Seminole Electric Cooperative, Inc., South Mississippi Electric Power Association, South Texas Electric Cooperative, Inc., Southern Illinois Power Cooperative, Sunflower Electric Power Corporation, Tex-La Electric Cooperative of Texas, Inc., Upper Missouri G. & T. Electric Cooperative, Inc., Wabash Valley Power Association, Inc., Western Farmers Electric Cooperative, and Wolverine Power Supply Cooperative, Inc.; No. 15-1377: Westar Energy, Inc.; No. 15-1378: NorthWestern Corporation, doing business as NorthWestern Energy; No. 15-1379: the National Association of Home Builders; No. 15-1380: the State of North Dakota; No. 15-1382: the Chamber of Commerce of the United States of America, National Association of Manufacturers, American Fuel & Petrochemical Manufacturers, National Federation of Independent Business, American Chemistry Council, American Coke and Coal Chemicals Institute, American Foundry Society, American Forest & Paper Association, American Iron and Steel Institute, American Wood Council, Brick Industry Association, Electricity Consumers Resource Council, Lignite Energy Council, National Lime Association, National Oilseed Processors Association, and the Portland Cement Association; No. 15-1383: the Association of American Railroads; No. 15-1386: Luminant Generation Company, LLC, Oak Grove Management Company, LLC, Big Brown Power Company, LLC, Sandow Power Company, LLC, Big Brown Lignite Company, LLC, Luminant Mining Company, LLC, and Luminant Big Brown Mining Company, LLC; No. 15-1393: Basin Electric Power Cooperative, Inc.; No. 15-1398: Energy & Environment Legal Institute; No. 15-1409: Mississippi Department of Environmental Quality, State of Mississippi, and Mississippi Public Service Commission; No. 15-1410: International Brotherhood of Electrical Workers, AFL-CIO; No. 15-1413: Entergy Corporation; No. 15-1418: LG&E and KU Energy LLC; No. 15-1422: West Virginia Coal Association; No. 15-1432: Newmont Nevada Energy Investment, LLC, and Newmont USA Limited; No. 15-1442: the Kansas City Board of Public Utilities – Unified Government of Wyandotte County/Kansas City, Kansas; No. 15-1451: the North American Coal Corporation, Coteau Properties Company, Coyote Creek Mining Company, Falkirk Mining Company, Mississippi Lignite Mining Company, North American Coal Royalty Company, NODAK Energy Services, LLC, Otter Creek Mining Company, LLC, and Sabine Mining Company; No. 15-1459: Indiana Utility Group; No. 15-1464: Louisiana Public Service Commission; No. 15-1470: GenOn Mid-Atlantic, LLC, Indian River Power LLC, Louisiana Generating LLC, Midwest Generation, LLC, NRG Chalk Point LLC, NRG Power Midwest LP, NRG Rema LLC, NRG Texas Power LLC, NRG Wholesale Generation LP, and Vienna Power LLC; No. 15-1472: Prairie State Generating Company LLC; No. 15-1474: Minnesota Power, an operating division of ALLETE, Inc.; No. 15-1475: Denbury Onshore, LLC; No. 15-1477: Energy-Intensive Manufacturers' Working Group on Greenhouse Gas Regulation; No. 15-1483: Local Government Coalition for Renewable Energy; No. 15-1488: Competitive Enterprise Institute, Buckeye Institute for Public Policy Solutions,

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Independence Institute, Rio Grande Foundation, Sutherland Institute, Klaus J. Christoph, Samuel R. Damewood, Caterine C. Dellin, Joseph W. Luquire, Lisa R. Markham, Patrick T. Peterson, and Kristi Rosenquist;

Intervenor for Petitioners: Peabody Energy Corporation, Dixon Bros., Inc., Nelson Bros., Inc., Wesco International, Inc., Norfolk Southern Corporation, Joy Global Inc., Gulf Coast Lignite Coalition;

Respondents: The United States Environmental Protection Agency and Regina A. McCarthy, Administrator, United States Environmental Protection Agency;

Intervenors for Respondent: American Wind Energy Association, Advanced Energy Economy, American Lung Association, Center for Biological Diversity, Clean Air Council, Clean Wisconsin, Conservation Law Foundation, Environmental Defense Fund, Natural Resources Defense Council, Ohio Environmental Council, Sierra Club, Solar Energy Industries Association; the States of New York, California, Connecticut, Delaware, Hawaii, Illinois, Iowa, Maine, Maryland, Minnesota, New Hampshire, New Mexico, Oregon, Rhode Island, Vermont, and Washington; the Commonwealths of Massachusetts and Virginia; the District of Columbia; the Cities of Boulder, Chicago, New York, Philadelphia, Seattle, South Miami, and Broward County, Florida; City of Austin, doing business as Austin Energy, New York Power Authority, Sacramento Municipal Utility District, Southern California Edison Company, City of Los Angeles Department of Water and Power, Nextera Energy, Inc., Calpine Corporation, National Grid Generation, LLC, Pacific Gas and Electric Company, West Virginia Highlands Conservancy, Ohio Valley Environmental Coalition, Coal River Mountain Watch, Kanawha Forest Coalition, Mon Valley Clean Air Coalition, Keepers of the Mountains Foundation;

Amicus Curiae for Petitioner: Philip Zoebisch, Municipal Electric Authority of Georgia, Pacific Legal Foundation, Texas Public Policy Foundation, Morning Star Packing Company, Merit Oil Company, Loggers Association of Northern California, Norman R. Brown, Members of Congress[1], State of Nevada, Consumers' Research,

---

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(Footnote Continued …)

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[2] Congressman Kevin Cramer, David Armstrong, Randall Bynum, Charles Davidson, Jeff Davis, Mark David Goss, Robert Hix, Terry Jarrett, Larry Landis, Jon McKinney, Carl Miller, Polly Page, Anthony Rachal III, Dr. Edward Salmon, Joan Smith, Jim Sullivan, David Wright, and Tom Wright.

[3] Texas Association of Business, Pennsylvania Chamber of Business and Industry, Ohio Chamber of Commerce, Alaska Chamber of Commerce, Arizona Chamber of Commerce and Industry, Arkansas State Chamber of Commerce/Associated Industries of Arkansas, Associated Industries of Missouri,

(Footnote Continued …)

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Association of Commerce and Industry, Bakersfield Chamber of Commerce, Beaver Dam Chamber of Commerce, Billings Chamber of Commerce, Birmingham Business Alliance, Bismarck Mandan Chamber of Commerce, Blair County Chamber of Commerce, Bowling Green Area Chamber of Commerce, Bullitt County Chamber of Commerce, Business Council of Alabama, Campbell County Chamber of Commerce, Canton Regional Chamber of Commerce, Carbon County Chamber of Commerce, Carroll County Chamber of Commerce, Catawba Chamber of Commerce, Central Chamber of Commerce, Central Louisiana Chamber of Commerce, Chamber Southwest Louisiana, Chamber630, Chandler Chamber of Commerce, Colorado Association of Commerce and Industry, Colorado Business Roundtable, Columbus Area Chamber of Commerce, Dallas Regional Chamber, Davis Chamber of Commerce, Detroit Regional Chamber of Commerce, Eau Claire Area Chamber of Commerce, Erie Regional Chamber & Growth Partnership, Fall River Area Chamber of Commerce & Industry, Fremont Area Chamber of Commerce, Georgia Association of Manufacturers, Georgia Chamber of Commerce, Gibson County Chamber of Commerce, Gilbert Chamber of Commerce, Grand Junction Area Chamber, Grand Rapids Area Chamber of Commerce, Great Lakes Metro Chambers Coalition, Greater Flagstaff Chamber of Commerce, Greater Green Bay Chamber of Commerce, Greater Irving-Las Colinas Chamber of Commerce, Greater Lehigh Valley Chamber of Commerce, Greater Muhlenberg Chamber of Commerce, Greater North Dakota Chamber of Commerce, Greater Orange Area Chamber of Commerce, Greater Phoenix Chamber of Commerce, Greater Shreveport Chamber of Commerce, Greater Summerville/Dorchester County Chamber of Commerce, Greater Tulsa Hispanic Chamber of Commerce, Greater West Plains Area Chamber of Commerce, Hartford Area Chamber of Commerce, Hastings Area Chamber of Commerce, Hazard Perry County Chamber of Commerce, Illinois Manufacturers Association, Indiana Chamber of Commerce, Indiana County Chamber of Commerce, Iowa Association of Business and Industry, Jackson County Chamber, Jax Chamber of Commerce, Jeff Davis Chamber of Commerce, Johnson City Chamber of Commerce, Joplin Area Chamber of Commerce, Kalispell Chamber of Commerce, Kansas Chamber of Commerce, Kentucky Association of Manufacturers, Kentucky Chamber of Commerce, Kingsport Chamber of Commerce, Kyndle, Kentucky Network for Development, Leadership and Engagement, Latino Coalition, Lima - Allen County Chamber of Commerce, Lincoln Chamber of Commerce, Longview Chamber of Commerce, Loudoun Chamber of Commerce, Lubbock Chamber of Commerce, Madisonville-Hopkins County Chamber of Commerce, Maine State Chamber of Commerce, Manhattan Chamber of Commerce, McLean County Chamber of Commerce, Mercer Chamber of Commerce, Mesa Chamber of Commerce, Metro Atlanta Chamber of Commerce, Metropolitan Milwaukee Association of Commerce, Michigan Chamber of Commerce, Michigan Manufacturers Association, Midland Chamber of Commerce, Milbank Area Chamber of Commerce, Minot Area Chamber of Commerce, Mississippi Economic Council The State Chamber of Commerce, Mississippi Manufacturers Association, Missouri Chamber of Commerce, Mobile Area Chamber of Commerce, Montana Chamber of Commerce, Montgomery Area Chamber of Commerce, Morganfield Chamber of Commerce, Mount Pleasant/Titus County Chamber of Commerce, Myrtle Beach Chamber of Commerce, Naperville Area Chamber of Commerce, Nashville Area Chamber of Commerce, National Black Chamber of Commerce, Nebraska Chamber of Commerce and Industry, Nevada Manufacturers Association, New Jersey Business & Industry Association, New Jersey State Chamber of Commerce, New Mexico Business Coalition, Newcastle Area Chamber of Commerce, North Carolina Chamber of Commerce, North Country Chamber of Commerce, Northern Kentucky Chamber of Commerce, Ohio Manufacturers Association, Orrville Area Chamber of

(Footnote Continued …)

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Inc., Hispanic Leadership Fund, National Black Chamber of Commerce, Joseph S. D'Aleo, Harold H. Doiron, Don J. Easterbrook, Theodore R. Eck, Gordon J. Fulks, William M. Gray, Craig D. Idso, Richard A. Keen, Anthony P. Lupo, Thomas P. Sheahen, S. Fred Singer, James P. Wallace, III, George T. Wolff; and

Amicus Curiae for Respondent: William D. Ruckelshaus, William K. Reilly, Institute for Policy Integrity at New York University Law School, National League of Cities, United States Conference of Mayors; the Cities of Baltimore, Maryland; Coral Gables, Florida; Grand Rapids, Michigan; Houston, Texas; Jersey City, New Jersey; Los Angeles, California; Minneapolis, Minnesota; Pinecrest, Florida; Portland, Oregon; Providence, Rhode Island; Salt Lake City, Utah; San Francisco, California; West Palm Beach, Florida; Boulder County, Colorado; American Thoracic Society, American Medical Association, American College of Preventive Medicine, American College of Occupational and Environmental Medicine, Service Employees International Union, American Sustainable Business Council, South Carolina Small Business Chamber of Commerce.

Commerce, Oshkosh Chamber of Commerce, Paducah Area Chamber of Commerce, Paintsville/Johnson County Chamber of Commerce, Pennsylvania Manufacturers Association, Port Aransas Chamber of Commerce/Tourist Bureau, Powell Valley Chamber of Commerce, Putnam Chamber of Commerce, Rapid City Area Chamber of Commerce, Rapid City Economic Development Partnership, Redondo Beach Chamber of Commerce, Roanoke Valley Chamber of Commerce, Rock Springs Chamber of Commerce, Salt Lake Chamber of Commerce, San Diego East County Chamber of Commerce, San Gabriel Valley Economic Partnership, Savannah Area Chamber of Commerce, Schuylkill Chamber of Commerce, Shoals Chamber of Commerce, Silver City Grant County Chamber of Commerce, Somerset County Chamber of Commerce, South Bay Association of Chambers of Commerce, South Carolina Chamber of Commerce, South Dakota Chamber of Commerce, Southeast Kentucky Chamber of Commerce, Southwest Indiana Chamber, Springerville-Eagar Chamber of Commerce, Springfield Area Chamber of Commerce, St. Louis Regional Chamber, State Chamber of Oklahoma, Superior Arizona Chamber of Commerce, Tempe Chamber of Commerce, Tennessee Chamber of Commerce and Industry, Tucson Metro Chamber of Commerce, Tulsa Chamber of Commerce, Tyler Area Chamber of Commerce, Upper Sandusky Area Chamber of Commerce, Utah Valley Chamber, Victoria Chamber of Commerce, Virginia Chamber of Commerce, Wabash County Chamber of Commerce, West Virginia Chamber of Commerce, West Virginia Manufacturers Association, Westmoreland County Chamber of Commerce, White Pine Chamber of Commerce, Wichita Metro Chamber of Commerce, Williamsport/Lycoming Chamber of Commerce, Wisconsin Manufacturers & Commerce, Wyoming Business Alliance, Wyoming State Chamber of Commerce, Youngstown Warren Regional Chamber.

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Movant-Amicus Curiae for Respondent: Former State Energy and Environmental Officials.[4]

B. Rulings under Review.

This final agency action under review is: Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units; Final Rule, 80 Fed. Reg. 64,662 (October 23, 2015).

C. Related Cases.

This following consolidated cases pending before the Court challenge a related agency action: State of North Dakota v. EPA, No. 15-1381; Murray Energy Corporation v. EPA, et al., No. 15-1396; Energy & Environment Legal Institute v. EPA, No. 15-1397; State of West Virginia, et al., v. EPA, et al., No. 15-1399; International Brotherhood of Boilermakers v. EPA, No. 15-1434; Peabody Energy Corporation v. EPA, et al., No. 15-1438; Utility Air Regulatory Group, et al., v. EPA, No. 15-1448; National Mining Association v. EPA, No. 15-1456; Indiana Utility Group v. EPA, et al., No. 15-1458; United Mine Workers of America v. EPA, No. 15-1463; Alabama Power Company, et al., v. EPA, et al., No. 15-1468; Chamber of Commerce, et al., v. EPA, et al., No. 15-1469; Biogenic CO2 Coalition v. EPA, et al., No. 15-1480; American Coalition for Clean Coal Electricity v. EPA, No. 15-1481;

[4] Matt Baker, Janet Gail Besser, Ron Binz, Michael H. Dworkin, Jeanne Fox, Dian Grueneich, Roger Hamilton, Paul Hibbard, Karl Rábago, Barbara Roberts, Cheryl Roberto, Jim Roth, Kelly Speakes-Backman, Larry Soward, Sue Tierney, Jon Wellinghoff, and Kathy Watson.

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/s/ *Eric G. Hostetler*
ERIC G. HOSTETLER

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GLOSSARY

ADA	Americans with Disabilities Act
CAA	Clean Air Act
CO_2	Carbon Dioxide
DOE	Department of Energy
EIA	Energy Information Administration
EPA	Environmental Protection Agency
ERCOT	Electric Reliability Council of Texas
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
JA	Joint Appendix
NAAQS	National Ambient Air Quality Standards
NO_x	Nitrogen Oxide
NREL	National Renewable Energy Laboratory
RIA	Regulatory Impact Analysis
RTC	Response to Comments
SO_2	Sulfur Dioxide
TSD	Technical Support Document
UARG	Utility Air Regulatory Group

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INTRODUCTION

The Clean Power Plan ("the Rule") addresses the Nation's most important and urgent environmental challenge. The Rule will secure critically important reductions in carbon dioxide ("CO_2") emissions from what are by far the largest emitters in the United States—fossil-fuel-fired power plants. CO_2 and other heat-trapping greenhouse-gas emissions pose a monumental threat to Americans' health and welfare by driving long-lasting changes in our climate, leading to an array of severe negative effects, which will worsen over time. These effects include rising sea levels that could flood coastal population centers; increasingly frequent and intense weather events such as storms, heat waves, and droughts; impaired air and water quality; shrinking water supplies; the spread of infectious disease; species extinction; and national security threats.

The Clean Air Act ("the Act" or "the CAA") provides the Environmental Protection Agency ("EPA") well-established authority to abate threats to public health and welfare by limiting the amount of air pollution that power plants pump into the atmosphere. For decades, a host of CAA regulatory programs have limited various pollutants emitted by these plants.

The Supreme Court has clarified that EPA's duties under CAA Section 111(d), 42 U.S.C. § 7411(d), encompass the responsibility to limit power plants' CO_2 emissions to abate climate change threats. Am. Elec. Power Co. v. Connecticut

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("AEP"), 564 U.S. 410, 423 (2011). The Rule properly exercises the statutory authority recognized in AEP.

EPA has thoroughly and carefully applied—based on an extensive administrative record—the Section 111 criteria to the unique circumstances of CO_2 emissions from fossil-fuel-fired power plants. The Rule determines the "best system of emission reduction" ("Best System") for existing power plants and an achievable degree of cost-reasonable CO_2 emission limitation that reflects that system's application. 42 U.S.C. § 7411(a)(1).

To determine the Best System, EPA closely examined the strategies, technologies, and approaches that power plants and states are already using to reduce CO_2 emissions. Based on that analysis, the Best System applied by EPA includes highly cost-effective, flexible, and proven emission-reduction strategies premised on increased utilization of cleaner forms of power generation. These emission-reduction strategies—which EPA terms "generation-shifting"—are not only already widely used but have been previously incorporated into numerous CAA regulatory programs for the power industry. These strategies take advantage of the industry's unique characteristics, including the fact that power plants generate electricity within an interconnected electric grid using processes that have vastly different air-pollution impacts, with all sources' operations closely and constantly coordinated to keep supply and demand in balance.

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Under the Act's program of cooperative federalism, the Rule applies the Best System to calculate achievable emission-reduction targets for states to meet (or, if a state so chooses, for EPA to implement directly) through their subsequent establishment of specific emission standards for specific plants. The Rule gradually phases in emission standards from 2022 to 2030; provides states considerable flexibility to design standards tailored to their individual circumstances and preferences; and follows existing industry trends without resulting in any fundamental redirection of the energy sector.

Petitioners seek to thwart any federal limitation of power plants' voluminous CO_2 emissions, or at least limit the scope to negligible requirements that would fail to address the threats presented and fall far short of what is cost-effectively achievable. To these ends, Petitioners champion statutory constructions that are not required by the statutory text and would frustrate Congress's intent.

The Rule reflects the eminently reasonable exercise of EPA's recognized statutory authority. It will achieve cost-effective CO_2 reductions from an industry that has already demonstrated its ability to comply with robust pollution-control standards through the same measures and flexible approaches. The Rule fulfills both the letter and spirit of Congress's direction in the Act, and the petitions should be denied.

STATEMENT OF JURISDICTION

The consolidated petitions for review of the Rule were timely filed in this Court pursuant to 42 U.S.C. § 7607(b).

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STATEMENT OF THE ISSUES

Section 111(d)(1)(A) directs the regulation of existing sources of certain pollutants through a program of cooperative federalism. It authorizes EPA to set guidelines directing states to establish "standard[s] of performance" for sources, which must reflect the emission limitation achievable applying the "best system of emission reduction" EPA determines has been adequately demonstrated, taking into account cost and other factors. Against this background, this case presents the following issues:

1. Did EPA appropriately determine that the Best System of CO_2 emission reduction for fossil-fuel-fired power plants includes proven and cost-effective strategies to increase utilization of cleaner forms of power generation, given that power plants operate within an interconnected grid linking facilities that have vastly disparate CO_2 emissions, and given that alternative systems of emission reduction such as sequestering CO_2 underground would be far more expensive?
2. Did EPA reasonably conclude that the prior regulation of different pollutants emitted by power plants under a different statutory program (42 U.S.C. § 7412, the hazardous pollutant program) does not bar regulation of power-plant CO_2 emissions under Section 111(d)?
3. Does a regulatory program that permits states to choose between regulating power plants' CO_2 emissions themselves or declining to do so—in which

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case EPA would have full responsibility for directly regulating sources in that state—violate the Tenth Amendment, or is it a lawful exercise in "cooperative federalism"?

4. Does a procedural challenge alleging inadequate notice meet the requirements of 42 U.S.C. § 7607 where the identified provisions flow directly from EPA's proposals and where procedural challenges were not raised with reasonable specificity during the period for public comment?
5. Did EPA identify an achievable degree of emission limitation where EPA developed a robust record and applied conservative estimates for projecting feasible heat-rate improvements and increased use of cleaner production methods over the Rule's lengthy implementation period?
6. Did EPA properly consider, based on a robust record, the relevant statutory factors and reasonably determine that the performance standards will not compromise the reliability of the electricity system?
7. Did EPA properly calculate emission reduction goals for Wisconsin, Wyoming and Utah, and reasonably disallow compliance credits for existing generation that is already accounted for in a baseline level?

PERTINENT STATUTES AND REGULATIONS

The pertinent statutes and regulations are set forth in the addendum.

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STATEMENT OF THE CASE

I. Statutory and Regulatory Background.

The purpose of the CAA is to promote public health and welfare by addressing air pollution. 42 U.S.C. § 7401(b)(1). The Act establishes a comprehensive program for air-pollution control through a system of shared federal and state responsibility.

The CAA's regulatory program addresses three general categories of pollutants emitted from existing stationary sources: (1) criteria pollutants, which are addressed under the National Ambient Air Quality Standards ("NAAQS") program, see 42 U.S.C. §§ 7408-7410; (2) hazardous air pollutants, which are addressed under the National Emission Standards for Hazardous Air Pollutants program, see 42 U.S.C. § 7412; and (3) "pollutants that are (or may be) harmful to public health or welfare but are not or cannot be controlled under [42 U.S.C. §§ 7408-7410 or 7412]," which are addressed under the Section 111 "Standard of Performance" program, see 42 U.S.C. § 7411. 40 Fed. Reg. 53,340 (Nov. 17, 1975). Together, these three programs constitute a comprehensive framework to regulate air pollutants with "no gaps in control activities pertaining to stationary source emissions that pose any significant danger to public health or welfare." S. Rep. No. 91-1196, at 20 (1970); see 80 Fed. Reg. 64,662, 64,711 (Oct. 23, 2015).

Section 111 "speaks directly to emissions of [CO_2]" from the Nation's existing power plants. AEP, 564 U.S. at 424. Section 111 "directs the EPA Administrator to list 'categories of stationary sources' that 'in [her] judgment … caus[e], or contribut[e]

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significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare.'" Id. (quoting 42 U.S.C. § 7411(b)(1)(A)). For each category, EPA must prescribe federal "standards of performance" for emissions of pollutants from new or modified sources. 42 U.S.C. § 7411(b)(1)(B). In addition, EPA "shall prescribe regulations" under Section 111(d) with respect to existing sources for pollutants not covered under certain other programs. Id. § 7411(d). These regulations are not designed to regulate existing sources directly, but instead to guide "each State" in submitting to EPA a "satisfactory" plan that establishes "standards of performance" for any existing source of the relevant pollutant. Id.

A "standard of performance" is defined as:

> a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.

Id. § 7411(a)(1). Under that definition, the emission requirements imposed on particular sources must "reflect[]" an overarching, foundational determination that is made by EPA. Specifically, EPA identifies those "system[s] of emission reduction" that are "adequately demonstrated" for a particular source category; determines the "best" of these systems, based on the relevant criteria; and then derives from that system an "achievable" emission-performance level for sources. 80 Fed. Reg. at 64,720.

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EPA promulgates its determination in "emission guidelines." 40 C.F.R. Part 60, Subpart B. These guidelines also provide procedures for states to submit, and EPA to approve or disapprove, individualized state plans, which specify the specific emission standards applicable to particular sources within a state, along with implementation measures. 42 U.S.C. § 7411(d)(1). If a state elects not to submit a plan, or does not submit a "satisfactory" plan, EPA must promulgate a federal plan that directly limits emissions from the state's sources. Id. § 7411(d)(2).

II. Factual Background.

A. Greenhouse-Gas Emissions and Climate Change.

CO_2 and other greenhouse gases in the atmosphere have risen to unprecedented levels as a result of human activities, and these gases are the root cause of ongoing global climate change. 74 Fed. Reg. 66,496, 66,517 (Dec. 15, 2009). In Massachusetts v. EPA, 549 U.S. 497 (2007), the Supreme Court held that the "sweeping definition of 'air pollutant'" in the CAA unambiguously covers "greenhouse gases"—so named because they "act[] like the ceiling of a greenhouse, trapping solar energy and retarding the escape of reflected heat." Id. at 505, 528-29 (citing 42 U.S.C. § 7602(g)). On remand, EPA comprehensively assessed the effects of greenhouse-gas pollution, concluding that it endangers the public health and welfare of current and future generations and thus requires CAA regulation. 74 Fed. Reg. at 66,516-36. EPA determined, among other things, that the risks include sea level rise, extreme weather events, drought, and harm to agriculture and water

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resources; as well as sickness or mortality from reduced air quality, intensified heat waves, and increases in food- and water-borne pathogens. Id. at 66,497, 66,524-36.

Climate change is already occurring. Nineteen of the twenty warmest years on record have all occurred in the past twenty years, and 2015 was the hottest year ever recorded.[5] Recent scientific assessments have found that climate change is damaging every area of the country. 80 Fed. Reg. at 64,686-88. These assessments make clear that substantially reducing emissions now is necessary to avoid the worst impacts. Id.

In December 2015, 195 countries adopted the most ambitious climate change agreement in history, which establishes a long-term global framework to reduce greenhouse-gas emissions.[6] This agreement sets a goal of keeping warming well below two degrees Celsius and recognizes that to meet that goal countries will need to reduce their greenhouse-gas emissions as soon as possible.

B. Fossil-Fuel-Fired Power Plants.

Fossil-fuel-fired power plants are particularly large sources of numerous air pollutants. Since the CAA's passage in 1970, EPA has set emission requirements for these plants to fulfill the Act's primary objective to protect public health and the environment. Many CAA regulatory programs apply to these plants' emissions,

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[5] NOAA, Global Temperature Recap, available at https://www.climate.gov/news-features/videos/2014-global-temperature-recap; https://www.climate.gov/news-features/featured-images/no-surprise-2015-sets-new-global-temperature-record

[6] Paris Agreement, available at http://www.cop21.gouv.fr/en/195-countries-adopt-the-first-universal-climate-agreement/.

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including the NAAQS, Section 111, hazardous-pollutant, regional-haze, and acid-rain programs. To implement these programs, EPA has promulgated numerous rules limiting emissions from these plants in a manner that does not interfere with the reliable supply of electricity at a reasonable cost.[7]

Fossil-fuel-fired power plants are by far the highest-emitting stationary sources of CO_2, generating approximately 37% of all domestic man-made CO_2 emissions—almost three times as much as the next ten stationary-source categories combined.[8] No serious effort to address the monumental problem of climate change can succeed without meaningfully limiting these plants' CO_2 emissions.

The Supreme Court addressed the regulation of CO_2 from power plants in AEP. There, the utility industry used EPA's ability to regulate power-plant CO_2 emissions to oppose federal common law nuisance claims. Examining Section 111(d), the Court concluded that the Act provides a means for EPA to provide the "same relief" sought by the plaintiffs—that is, limitations on power-plant CO_2 emissions that would abate their contribution to climate change. The Court found that because the Act "'speaks directly' to emissions of [CO_2] from the defendants' plants," there was "no room for a parallel track." 564 U.S. at 424-25. The Court explained that EPA is an "altogether fitting" "expert agency" that is "best suited to serve as primary

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[7] 80 Fed. Reg. at 64,696-99.

[8] Id. at 64,689; EPA-HQ-OAR-2013-0602-36479, 3-14, JA___.

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regulator" of power-plant CO_2 emissions, and to determine "the appropriate amount of [CO_2] regulation." Id. at 427. The Court further explained that Congress, through Section 111(d), specifically entrusted EPA to engage in the "complex balancing" task of weighing "the environmental benefit potentially achievable" with "our Nation's energy needs and the possibility of economic disruption." Id. The Court added that "[t]he appropriate amount of regulation … cannot be prescribed in a vacuum: as with other questions of national or international policy, informed assessment of competing interests is required." Id.

C. Overview of the Clean Power Plan.

In 2014, EPA proposed CO_2 emission standards for new and existing fossil-fuel-fired power plants. See 79 Fed. Reg. 34,830 (June 18, 2014) (existing sources); 79 Fed. Reg. 34,960 (June 18, 2014) (modified sources); 79 Fed. Reg. 1430 (Jan. 8, 2014) (new sources). The existing source proposal ("the Proposal") proposed state-by-state emission-reduction goals. Later in 2014, after receiving extensive stakeholder input, EPA published a supplemental Notice of Data Availability ("Supplemental Notice") for the existing source rule, soliciting comment on stakeholders' suggestions. 79 Fed. Reg. 64,543 (Oct. 30, 2014).

On October 23, 2015, EPA published two final rules. One establishes CO_2 emission standards under Section 111(b) for new, modified, and reconstructed plants.

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80 Fed. Reg. 64,510.[9] The other, the Rule, establishes Section 111(d) emission guidelines for states to follow in developing plans limiting CO_2 from existing plants. 80 Fed. Reg. 64,662. EPA additionally proposed two approaches to a federal plan for states that do not submit an approvable plan and models for states to use in developing their own plans. 80 Fed. Reg. 64,966 (Oct. 23, 2015).

1. The Building Blocks and the best system of emission reduction.

In the Rule, based on an analysis of what power plants are already doing with the purpose or effect of reducing CO_2 emissions, EPA determined that the "best system of emission reduction" "adequately demonstrated" for existing plants is a combination of three general types of pollution-control measures, referred to as "Building Blocks":

> (1) improving heat rates[10] at coal-fired steam plants ("Building Block 1");
>
> (2) substituting generation from lower-emitting existing natural gas combined-cycle plants ("gas plants")[11] for generation from higher-emitting steam plants, which are primarily coal-fired ("Building Block 2");[12] and

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[9] This rule is the subject of a separate set of consolidated petitions in this Court (Case No. 15-1381 and consolidated cases).

[10] Heat rate represents the efficiency with which plants convert fuel to electricity.

[11] For simplicity, coal-, oil- and gas-fired steam plants collectively are referred to in this brief as "coal-fired" or "steam" plants or units. Accord 80 Fed. Reg. at 64,795. Natural gas combined-cycle units are referred to as "gas" or "gas-fired" plants or units.

[12] A typical gas-fired plant produces less than half as much CO_2 per megawatt-hour of electricity generated as a typical coal-fired plant. Id.

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> (3) substituting generation from new zero-emitting renewable-energy generating capacity for generation from existing fossil-fuel-fired plants, which are primarily coal- or gas-fired ("Building Block 3").[13]

80 Fed. Reg. at 64,666-67. EPA determined that these measures are collectively the Best System because plants can implement them to achieve substantial CO_2 reductions cost-effectively, without adverse energy reliability impacts. Id. at 64,744-51.

EPA evaluated a full range of alternatives, including available technological measures that can be integrated into the design and operation of individual plants, such as converting coal-fired plants to combust a combination of natural gas and coal ("co-firing") or capturing CO_2 and storing it securely underground ("carbon sequestration"). Id. at 64,724-28. EPA concluded that some co-firing and carbon-sequestration measures were "technically feasible and within price ranges that the EPA has found to be cost effective in the context of other [greenhouse-gas] rules, that a segment of the source category may implement these measures, and that the resulting emission reductions could be potentially significant." Id. at 64,727. EPA concluded, however, that Building Blocks 2 and 3 (generation-shifting) would be less expensive and otherwise better meet the relevant statutory factors, in part because

[13] Renewable-energy plants that emit no CO_2 include hydroelectric, wind, solar, and some geothermal plants.

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they are the prevalent approach states and companies are already taking to address CO_2 emissions. Id.

EPA explained that generation-shifting measures are well-established techniques for reducing power-plant emissions that have already been incorporated into many other CAA programs. Id. at 64,709, 64,725. Power generators produce a relatively fungible product—electricity—and they operate within an interconnected grid in which electricity generally cannot be stored in large volumes, so generation and use must be balanced in real time. Id. at 64,677. Because of their uniquely interconnected and interdependent operations, power plants shift generation in the normal course of business. For example, assuming demand is constant, when a power plant goes off-line for repairs, its generation is replaced by another plant's.

Generators can cost-effectively reduce pollution by shifting generation from higher- to lower-emitting plants, thereby achieving a degree of emission limitation that might otherwise have required more expensive investments in end-of-the-stack technologies at their particular plants. Id. at 64,782 n.604, 64,795-811. For example, shifting generation from a coal-fired plant to a gas-fired plant or renewable generation generally results in a 50% or 100%, respectively, emission reduction. Id. at 64,795.

EPA described in great detail the specific steps that particular sources may take to implement generation-shifting measures as a pollution-control strategy for purposes of complying with state-adopted emission standards. Id. at 64,731-33, 64,796, 64,804-06; Legal Memorandum Accompanying Clean Power Plan for Certain

Issues ("Legal Mem.") 137-48, EPA-HQ-OAR-2013-0602-36872, JA___. For example, if a state were to establish rate-based[14] limitations, a particular source might make direct investments in cleaner power generation, for which it could receive emission-rate credits (i.e., an adjustment to its actual emission rate for purposes of demonstrating compliance with a regulatory standard). Or the source might acquire emission-rate credits from other sources that have invested in eligible measures. 80 Fed. Reg. at 64,731-33.

If a state were to establish a mass-based trading program[15] (limiting the total mass of its sources' emissions), its higher-emitting sources would need more emission allowances, and thereby incur higher costs, than lower-emitting sources. In this manner, a mass-based approach provides market-based economic incentives for lower-emitting generation.

2. The uniform rates and state plans.

Having identified the "best" CO_2 reduction system, EPA quantified the degree of emission reduction achievable under that system for two subcategories of sources: steam units and gas-fired units. Id. at 64,663. To do so, EPA applied the Best System

[14] A rate-based standard is expressed in the form of a rate of emissions per unit of energy production (e.g., pounds per megawatt-hour).

[15] Trading-based emission programs can take different forms, but generally provide sources with an incentive to employ cost-effective emission-reduction strategies by enabling sources, through projects that reduce emissions, to earn or save credits or allowances, which can then be sold to other sources to meet emission requirements.

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to 2012 baseline data and quantified, in the form of CO_2 emission rates, the reductions achievable for each subcategory in 2030 in each of three regions, known as "Interconnections," in which electricity generation is managed.[16] Id. at 64,738. EPA then established the least stringent of the three calculated regional rates as nationally uniform performance rates ("uniform rates") for each subcategory: 771 pounds of CO_2 per megawatt-hour (lb. CO_2/MWh) for gas-fired units, and 1305 lb. CO_2/MWh for steam units. Id. at 64,742, 64,961 (Table 1). These uniform rates are effective emission rates, incorporating adjustments to actual rates to credit sources' ability to implement generation-shifting measures as a pollution-control strategy.

To enhance state planning flexibility, the Rule translates the uniform rates into equivalent state-specific emission goals for 2030, expressed in terms of both the rate of emissions per unit of energy production ("rate-based goals") and the total mass of emissions ("mass-based goals"). Id. at 64,820. The Rule then gives each state several options for its plan: simply apply the uniform rates to all sources within the state, or otherwise meet either the equivalent rate-based or mass-based state-specific goals. Id. at 64,832-37. Under the latter options, states can assign emission standards for particular plants that depart from the uniform rates, so long as the equivalent state

[16] Electricity across the continental United States is transmitted and distributed through three physically interconnected networks: the Eastern Interconnection, the Western Interconnection, and the Texas Interconnection, which each act like a single machine. 80 Fed. Reg. at 64,692.

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goals are met. The Rule thus does not require any particular amount of reductions by any particular source at any particular time.

The Rule does not limit states and sources to using the specific measures identified by EPA as the Best System. Id. at 64,710. Instead, states and sources have the flexibility to choose from a wide range of measures to achieve the emission limitations, including technological controls such as carbon sequestration or co-firing (which some sources are already undertaking). Id. at 64,756-57. The Rule also accommodates emission-trading programs and other compliance strategies that significantly enhance flexibility and cost-effectiveness. Id. at 64,834-35.

To further enhance state flexibility, the Rule authorizes a "state measures" approach, under which states may defer imposing Section 111(d) emission standards on plants by relying upon new or existing state-law-only measures applicable to entities other than fossil-fuel-fired power plants (e.g., programs that encourage more efficient energy use and thereby indirectly reduce power plants' emissions by lowering demand for power), provided the state goal is achieved. Id. at 64,835-37.[17]

While EPA's guidelines contemplate that the industry will gradually move towards cleaner production processes, the guidelines do not require any particular source to reduce its operations. Regardless of whether a state decides to apply the

[17] Demand-side energy efficiency refers to an extensive array of technologies, practices and measures that are applied to reduce energy demand while providing the same or better level and quality of service. 80 Fed. Reg. at 64,692 n.100.

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uniform rates or to meet the guidelines' equivalent state goals, each source may increase its own operations, so long as it obtains emission-rate credits (in the case of rate-based standards) or allowances (in the case of tradeable mass-based standards) as needed to meet its emission-reduction obligations. 80 Fed. Reg. at 64,779. Nor does the Rule require any reduction in overall electricity generation,[18] or require any plants to close.

The Rule's requirements phase in gradually, in a fairly even amount each year, through 2030.[19] No reductions are required from sources until 2022 at the earliest. In fact, all states may delay requiring emission reductions from sources until 2023, and most until 2024, and still meet the Rule's requirements. Id. at 64,785-86. When fully implemented in 2030, the Rule will reduce power-plant CO_2 emissions by approximately 16% from 2020 levels. Id. at 64,924, Tables 15 and 16. This amount of reduction follows existing industry trends and is not far from the amount of CO_2 reductions achieved from the power sector between 2002 and 2013, when no federal

[18] Contrary to Petitioners' assertion, Pet. Legal Br. 15, 21 n.18, the guidelines are premised entirely on the application of the Building Blocks, and not based on any assumed fall in demand for electricity. 80 Fed. Reg. at 64,778. Petitioners conflate EPA's regulatory impact analysis, which contains an assessment that many states will voluntarily elect to draw upon demand-side energy efficiency for purposes of *compliance* with the guidelines, with the manner in which the guidelines were set.

[19] Goal Computation Technical Support Document ("Computation TSD") 19, EPA-HQ-OAR-2013-0602-36850, JA___.

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guidelines were in place. Regulatory Impact Analysis ("RIA") 2-26, Table 2-6, EPA-HQ-OAR-2013-0602-37105 (Oct. 2015), JA___.

Under the Rule, States have until September 2018 to submit their plans. 80 Fed. Reg. at 64,669. States may also entirely decline to do so, in which case the only consequence is that EPA will promulgate a federal plan, which as proposed would institute a flexible emission-trading program for that state's plants. Id. at 64,881-82; 80 Fed. Reg. at 64,970.

3. The regulatory impact analysis.

When promulgating the Rule, EPA also released a detailed assessment of its likely economic impact. EPA concluded that the Rule would not result in any substantial increase in electricity costs to the public. 80 Fed. Reg. at 64,679-81, 64,748-51; RIA 3-35–3-40, JA___. EPA further explained that the Rule would not reduce the reliability of the electricity system and is consistent with long-term trends towards less coal-fired and more gas-fired and renewable generation. 80 Fed. Reg. at 64,671, 64,694-96, 64,709.

4. Public outreach and response to comments.

The Rule is the product of an extensive public engagement process. 80 Fed. Reg. at 64,672. The Proposal and Supplemental Notice together solicited comment on a broad range of options for quantifying and applying the Building Blocks. E.g., 79 Fed. Reg. at 64,548-53; 79 Fed. Reg. at 34,862, 34,865-71, 34,875-78, 34,882,

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34,888, 34,890, 34,892.[20] Given the diversity of options, EPA's proposal included a mechanism allowing states to compute how the options would change the draft state goals. See Goal Computation Technical Support Document (Proposal) 20, EPA-HQ-OAR-2013-0602-0460 (describing accompanying Excel workbook), JA___.

EPA received more than four million comments on the Proposal and Supplemental Notice, which led to numerous improvements to the Proposal. 80 Fed. Reg. at 64,672.[21] But these improvements did not change the fundamental design of the Rule. The final Rule, like the Proposal, establishes state-by-state emission targets based on the application of identified Building Blocks; places responsibility on states to develop plans to meet these emission-reduction targets; and allows states to rely on a broad set of measures, including trading programs and, at least initially, state-law-only measures that do not hold power plants directly responsible for reducing their emissions.

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[20] EPA also solicited comment on whether trading programs should be authorized. 79 Fed. Reg. at 34,927.

[21] For example, after requesting and considering comments on these issues, EPA in the final Rule applied the Building Blocks on a regional, as opposed to a state-by-state, basis, and updated its proposed alternative methodology for quantifying renewable-energy potential—premised on adding an annual growth component to a base case—to reflect the most relevant and recent data. 79 Fed. Reg. at 34,865, 34,869-70; 79 Fed. Reg. at 64,547; 80 Fed. Reg. at 64,738-39, 64,806-07.

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5. The stay applications.

Petitioners sought a stay of the Rule pending review. On January 21, 2016, this Court unanimously denied that request, and established an expedited briefing schedule. Dkt. No. 1594951. The Supreme Court granted applications for a stay by a 5-4 vote on February 9, 2016. Order, West Virginia v. EPA, No. 15A773.

SUMMARY OF ARGUMENT

Fossil-fuel-fired power plants emit vast amounts of CO_2 pollution, and this pollution poses grave threats to public health and welfare. The Supreme Court has confirmed that EPA has the authority to regulate this pollution, from these sources, under this statutory provision. AEP, 564 U.S. at 424. In the Rule, EPA has appropriately exercised this recognized statutory authority.

Section 111(d) identifies specific factors that EPA must consider in establishing emission guidelines for states to follow in setting emission standards for specific plants. EPA properly applied these factors in the Rule. The Rule reasonably applies the Best System for reducing CO_2 emissions from sources that operate by means of an interconnected electric generating system. The Rule is premised on flexible and cost-effective emission-reduction measures that are already widely employed by power plants and that have been used in numerous prior CAA and state regulatory programs.

Petitioners' assorted attacks on EPA's interpretations and analyses lack merit. EPA's interpretation that the Best System for reducing CO_2 may include emission reductions achieved through greater use of cleaner forms of generation is consistent

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with the statutory text and best fulfills Congress's intent to cost-effectively reduce pollution and protect public health and welfare. Indeed, even if EPA had premised the Best System on technological measures such as co-firing and carbon sequestration, few plants would likely elect to comply with their standards by actually using these technologies; rather, they would rely on lower-cost generation-shifting. EPA's interpretation does not impinge upon states' traditional authorities to regulate intrastate electricity sales and to license new power facilities.

Petitioners' argument that the text of Section 111(d) bars EPA from regulating power plants' CO_2 emissions because power plants' emissions of other pollutants are regulated under Section 112 also fails. Section 111(d) is ambiguous, and EPA reasonably resolved those ambiguities—and avoided creating an unnecessary conflict in enacted statutory text—by concluding that Congress did not intend to bar regulation of different pollutants under different programs.

Petitioners' claims that the Rule is unconstitutional also lack merit. The Rule is an exercise in cooperative federalism akin to numerous other court-approved regulatory programs, and it neither unlawfully coerces nor commandeers states given that states may opt to do nothing, in which case EPA will regulate sources directly. The fact that sources may ask state regulators to take ancillary action—e.g., modifying a permit—as an indirect result of a federal plan does not implicate the Tenth Amendment. To hold otherwise would break new ground, throwing the constitutionality of many other federal programs into question.

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With respect to Petitioners' "record-based" arguments, the Rule's requirements are lawful in all respects. The Rule was promulgated using proper procedures. The improvements made to the final rule were a logical outgrowth of EPA's Proposal and Supplemental Notice.

EPA identified an achievable degree of emission limitation applying the three Building Blocks comprising the Best System. EPA made reasonable projections based on extensive data and analyses, and in setting the required degree of limitation, EPA made numerous conservative assumptions so as to assure that standards would be achievable. The record supports EPA's determination that states are likely to establish trading programs that will facilitate compliance, but sources can achieve standards consistent with the guidelines without trading.

The Rule comports with the Act in all other respects. EPA reasonably performed its Congressionally assigned task to consider energy requirements and the reliability of electricity supply. EPA subcategorized appropriately and established reasonable requirements if carbon sequestration is employed. The Rule does not regulate new sources. EPA's limitations on compliance crediting were reasonable.

STANDARD OF REVIEW

The Rule can be overturned only if it is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law" or in excess of EPA's "statutory jurisdiction, authority, or limitations." 42 U.S.C. § 7607(d)(9). "The scope of review under the 'arbitrary and capricious' standard is narrow and a court is not to substitute

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its judgment for that of the agency." Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 43 (1983). The Court must "give an extreme degree of deference to the EPA's evaluation of scientific data within its technical expertise," especially where it reviews "EPA's administration of the complicated provisions of the [CAA]." Miss. Comm'n on Envtl. Quality v. EPA ("Miss. Comm'n"), 790 F.3d 138, 150 (D.C. Cir. 2015) (quotations omitted).

In interpreting statutory terms, the Court applies the familiar analysis of Chevron, U.S.A. v. Natural Res. Def. Council, Inc., 467 U.S. 837 (1984). The Court applies the language of the statute where it reflects "the unambiguously expressed intent of Congress," but where the statute is "silent or ambiguous with respect to the specific issue," the Court must defer to the agency's interpretation so long as it is "based on a permissible construction of the statute." Id. at 842-43. As the Supreme Court has explained, an administrative agency's power to administer a Congressionally created program "'necessarily requires the formulation of policy and the making of rules to fill any gap left, implicitly or explicitly, by Congress.'" Long Island Care at Home, Ltd. v. Coke, 551 U.S. 158, 165 (2007) (quoting Chevron, 467 U.S. at 843). Furthermore, under Chevron, the Court "presume[s] that when an agency-administered statute is ambiguous with respect to what it prescribes, Congress has empowered the agency to resolve the ambiguity." Natural Res. Def. Council v. EPA ("NRDC v. EPA"), 777 F.3d 456, 463 (D.C. Cir. 2014).

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Judicial review of procedural challenges is governed by 42 U.S.C. § 7607(d)(9)(D). Under Section 7607(d)(9)(D), a court may not reverse a CAA action for procedural error unless: (1) the error was arbitrary or capricious, (2) an objection to the procedure was raised with reasonable specificity during the public comment period, and (3) the error was so serious and related to matters of such central relevance that there is a substantial likelihood that the rule would have been significantly changed absent the error.

ARGUMENT

I. EPA Properly Exercised Its Section 111(d) Authority by Including Generation-Shifting Within the Selected Best System.

This critically important Rule marks a significant step forward in addressing the Nation's most urgent environmental threat. Fossil-fuel-fired power plants are, far and away, the largest stationary sources of CO_2 pollution, and no meaningful effort to abate climate change can fail to address them. EPA's authority and responsibility under Section 111(d) to control this pollution is well-established and was central to the Supreme Court's holding in AEP that "the [CAA] and the EPA actions it authorizes displace any federal common-law right to seek abatement of [CO_2] emissions from fossil-fuel fired power plants." 564 U.S. at 424. EPA has properly performed its Congressionally assigned task to limit this pollution.

The Rule's emission requirements are based on methods of cleaner electricity generation that are *already* prevalent in the industry and included within existing state

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programs. The requirements are gradually phased in over a period of fifteen years, are consistent with existing power sector trends, and can be readily implemented, without imposing excessive costs or adversely affecting energy reliability.

Petitioners' core legal arguments largely rest on hyperbolic mischaracterizations of this Rule as broadly regulating energy markets and generation. This Rule is an air-pollution rule specifically authorized by the CAA. It is not an energy rule. The Rule limits emissions of an exceptionally important air pollutant that is emitted in huge quantities by power plants, but it does not regulate any other aspect of energy generation, distribution, or sale. Like any pollution limits for the power industry, the Rule will indirectly impact energy markets, but those impacts do not mean EPA has overstepped its authority.

A. EPA Properly Applied the Statutory Factors.

Under Section 111(d)'s program of shared federal and state responsibility, EPA requires states to submit "satisfactory" state plans that "establish standards of performance for any existing source." 42 U.S.C. § 7411(d). The standards of performance must "reflect[]" the "degree of emission limitation" that is "achievable" through the application of the "best system of emission reduction" that "*the Administrator* determines has been adequately demonstrated." Id. § 7411(a)(1) (emphasis added). Thus, EPA has authority to determine the substantive criteria that will govern EPA's review of whether state plans are "satisfactory." The Rule contains such guidelines for CO_2.

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Breaking the definition of "standard of performance" into its component parts, EPA's task in establishing guidelines for states is straightforward. EPA's guidelines comport with the statutory scheme if they satisfy the following four criteria: (1) they are based on the application of a "system of emission reduction," (2) that is "adequately demonstrated," (3) that is the "best" available system considering, among other things, "costs" and "energy requirements," and (4) they "reflect[]" an "achievable" degree of emission limitation. Id. § 7411(a)(1); 80 Fed. Reg. at 64,720-22; see also 40 C.F.R. §§ 60.21(e), 60.22(a). As demonstrated next, the Rule meets each criterion.

1. Generation-shifting is a "system of emission reduction."

Congress's language—identifying the "best system of emission reduction" as the central determination in the standard-setting process—establishes that a broad scope of potential pollution-curbing measures can serve as the basis of guidelines. The plain meaning of the word "system" is expansive, encompassing "a set of things or parts forming a complex whole" or "a set of principles or procedures according to which something is done."[22] This broad statutory language shows that Congress was directing EPA to consider a wide range of measures to reduce emissions from sources. 80 Fed. Reg. at 64,762; see infra Argument I.A (addressing why generation-

[22] See Oxford Dictionary of English (3d ed. 2010), available at http://www.oxforddictionaries.com/us/definition/american_english/system; 80 Fed. Reg. at 64,762.

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shifting measures are the "best" "adequately demonstrated" measures for this industry and why contextual factors and legislative history also strongly support the inclusion of generation-shifting measures within the Best System). In the case of power plants, those can include on-site technology-based control measures, but they can also include measures through which power plants reduce emissions by replacing higher-emitting generation with lower-emitting generation. Id.

To be sure, the phrase "system of emission reduction" carries some significant constraints when read in context, and EPA identified and applied these constraints. First, because emission standards must apply to sources, actions taken by sources that do not result in emission reductions from sources (for example, planting forests to sequester CO_2) do not qualify. Id. at 64,776. Second, because sources must be able to attain their emission standards, the "system" must encompass actions the sources themselves can implement. Id. In addition, any "best system," as that phrase is construed by EPA, must target supply-side activities that allow continued production of a product through cleaner processes, rather than targeting consumer-oriented behavior (such as improvements in demand-side energy efficiency). Id. at 64,778-79.

Generation-shifting measures fit within the plain meaning of a "system of emission reduction" for power plants, while meeting these contextual constraints. Power plants can, and do, apply these measures to reduce their emissions, as discussed next.

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2. Generation-shifting is an "adequately demonstrated" system of emission reduction.

A robust record demonstrates that generation-shifting measures are an "adequately demonstrated" system of emission reduction for power plants. Indeed, these measures are already widely used by power plants for controlling pollution, including CO_2. Id. at 64,667, 64,724-26, 64,762 n.468, 64,768-73, 64,795-811.

These measures are successful because of the way power plants operate in a uniquely integrated system. Power generators produce a relatively fungible product—electricity—and they operate within "an interconnected 'grid' of near-nationwide scope." FERC v. Elec. Power Supply Ass'n ("FERC v. EPSA"), 136 S. Ct. 760, 768 (2016). Electricity generally cannot be stored in large volumes, so all generation and use must be balanced in real time. Id. Thus, unlike other industries, the operations of electric generators must be, and are, closely and constantly coordinated. 80 Fed. Reg. at 64,725. Assuming consumer demand is held constant, adding electricity to the grid from one generating plant will result in the instantaneous reduction in generation from other plants, and vice versa. Id. at 64,769. For this reason, the power system has been characterized as a "complex machine." Id. at 64,725. No other industry features these characteristics.

Accordingly, every time a power plant either increases or decreases operations, that has automatic implications not just for the amount of pollution emitted by *that plant*, but also for the overall amount of pollution emitted by *other* plants within the

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interconnected grid, because those other plants must commensurately decrease or increase their operations to balance supply with demand. As a result, by shifting some generation from higher-emitting to lower-emitting plants, sources can achieve an effective degree of emission limitation that might otherwise have required them to make much more expensive investments in end-of-the-stack technologies at their particular plants. Id. at 64,782 n.604, 64,795-811.

Power plants are able to, and do, employ these same generation-shifting techniques to reduce CO_2. Id. at 64,731. For example, a fossil-fuel-fired power plant may, through any of several methods, add zero-carbon renewable energy to the grid, which displaces generation elsewhere that is typically carbon-emitting (because supply and demand must remain balanced).[23] And because CO_2 is a global pollutant that poses the same degree of risk regardless of its source, it is of no consequence *where* particular CO_2 emissions occur. Id. at 64,725.

a. Existing sources are using generation-shifting to reduce CO_2 to meet state requirements and corporate objectives.

Power plants already have been using generation-shifting measures to reduce CO_2, either to meet CO_2-reduction requirements imposed by some states in recent years, or to meet corporate environmental objectives—confirming that generation-

[23] See id. at 64,693 (providing further background on mechanisms for dispatching electric generators to meet electricity demand).

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shifting is an "adequately demonstrated" system. Id. at 64,725, 64,769-72. Petitioners themselves acknowledge this. Petitioners' Brief on Procedural and Record-Based Issues ("Pet. Record Br.") 58 (acknowledging that before promulgation of the Rule, plants have "chose[n] to invest in zero- and lower-emission resources … to address the very problem EPA seeks to tackle").

Nine northeastern states have implemented a cap-and-trade program to reduce power plants' CO_2 emissions: the "Regional Greenhouse Gas Initiative." Legal Mem. 139 & n.380, JA___. California has implemented a similar program. 79 Fed. Reg. at 34,880. Both state programs rely on generation-shifting from dirtier to cleaner plants. Id. at 34,835.

In addition, many power generators have voluntarily lowered their CO_2 emissions by shifting to cleaner generation. See, e.g., Exelon Comments 18, EPA-HQ-OAR-2013-0602-23155, JA___; NextEra Energy Comments 2-4, EPA-HQ-OAR-2013-0602-22763, JA___; see also 80 Fed. Reg. at 64,725, 64,769 n.520. Further confirming that generation-shifting can successfully reduce CO_2 emissions, numerous power generators commented that EPA should promulgate guidelines authorizing generation-shifting for Section 111(d) compliance purposes. Legal Mem. 14-18, JA___.

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b. Other CAA programs or rules for the power sector have relied on generation-shifting.

Previous CAA programs and rules for the power sector have also drawn upon generation-shifting as one way for plants to cost-reasonably reduce air pollution, further demonstrating that generation-shifting is an adequately demonstrated system. 80 Fed. Reg. at 64,770-73. For example, generation-shifting has been an important component of three successive significant "transport" rules under 42 U.S.C. § 7410(a)(2)(D)(i)(I) addressing criteria pollutant precursor emissions. 80 Fed. Reg. at 64,772 & n.545; Legal Mem. 95-102, JA___. These rules have required power plants in upwind states to control emissions to avoid significantly polluting downwind states. Id. In the 2011 "Cross-State Rule," for example, EPA set statewide emissions budgets for power plant nitrogen oxide ("NO_x") and sulfur dioxide ("SO_2") emissions, and based those budgets in part on the ability of plants to cost-efficiently shift generation to lower-emitting plants. 80 Fed. Reg. at 64,772; 76 Fed. Reg. 48,208, 48,252 (Aug. 8, 2011); Legal Mem. 98-99, JA___.

As another example, in the acid rain program in CAA Title IV, 42 U.S.C. §§ 7651-7651o, Congress recognized power plants' ability to use generation-shifting as one available pollution-control strategy. See S. Rep. No. 101-228, at 316 (1989) (identifying strategies for power plants to reduce emissions to include "least-emissions dispatching," i.e., generation-shifting). Title IV established a nationwide cap on power-plant SO_2 emissions to harness the ability of plants to undertake a range of

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control actions, including shifting generation to renewable and other cleaner generation. 80 Fed. Reg. at 64,770-71; see 42 U.S.C. § 7651(b) (encouraging renewable energy as statutory purpose). Contrary to Petitioners' argument, Petitioners' Brief on Core Legal Issues ("Pet. Legal Br.") 56, Congress's creation of the Title IV cap-and-trade program strongly *supports* EPA's conclusion that generation-shifting is an "adequately demonstrated" and appropriate pollution-control strategy for power plants. Cf. Van Hollen v. FEC, 811 F.3d 486, 493 (D.C. Cir. 2016) (upholding FEC's interpretation of statute in part because FEC "simply opted for an approach already endorsed by Congress in a related context").

Further, in its recent rule regulating hazardous power-plant emissions, EPA interpreted the phrase "installation of controls" in 42 U.S.C. § 7412(i)(3) to include the construction of cleaner replacement generation off-site for purposes of considering compliance extension requests. 77 Fed. Reg. 9304, 9410 (Feb. 16, 2012); Legal Mem. 113-16, JA___. Many of the Petitioners here requested in comments that EPA adopt this interpretation. Legal Mem. 114-15, JA___.

Finally, in a prior Section 111(d) rulemaking for this very industry ("the Mercury Rule"), EPA determined the Best System for reducing mercury emissions as, in part, a cap-and-trade program, and based the level of the cap partly on the ability of sources to cost-effectively shift generation to lower-emitting plants. 70 Fed. Reg.

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28,606, 28,619 (May 18, 2005).[24] By identifying the cap-and-trade program as part of the Best System, EPA recognized that sources need not reduce emissions at their own plants using add-on controls, but could instead use other approaches to reduce emissions, including using "dispatch changes" (i.e., generation-shifting) or buying allowances from sources that had reduced emissions at their plants. 70 Fed. Reg. at 28,619. Significantly, many of the Petitioners here strongly supported the Mercury Rule. For example, in rulemaking comments, Petitioner Utility Air Regulatory Group ("UARG") agreed "that an interstate cap-and-trade program provides the 'best system' of mercury reduction for [power plants]." UARG Mercury Rule Comments ("UARG Mercury Rule Comments") 137, EPA-HQ-OAR-2002-0056-2922, JA___. Likewise, on judicial review, many of the same Petitioners here stated that EPA has "offered compelling legal justifications" for establishing a cap-and-trade program under Section 111(d).[25]

3. Generation-shifting is the "best" system of emission reduction for power-plant CO_2.

EPA reasonably concluded that the three Building Blocks collectively constitute the "best" system of emission reduction, applying the relevant considerations (including the degree of reductions achieved, costs, energy

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[24] The Mercury Rule was vacated on grounds immaterial to the interpretive issue presented here. New Jersey v. EPA, 517 F.3d 574, 583-84 (D.C. Cir. 2008).

[25] See Joint Brief of State Resp't-Intervenors, Indus. Resp't-Intervenors, and State Amicus, New Jersey v. EPA, 517 F.3d 574 (No. 05-1097), 2007 WL 3231261, at *25.

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requirements, and non-air quality health and environmental impacts). 80 Fed. Reg. at 64,744-51; see also id. at 64,801-02, 64,810-11 (cost considerations); id. at 64,670-71, 64,693-94, 64,800, 64,874-81 (energy considerations); id. at 64,746, 64,748 (non-air quality health and environmental impacts). The selected set of measures presents the most cost-effective available system for sources to meaningfully limit their voluminous CO_2 emissions. 80 Fed. Reg. at 64,751. See Sierra Club v. Costle, 657 F.2d 298, 321, 326 (D.C. Cir. 1981) (EPA has broad discretion in weighing different factors in selecting the Best System, and the amount of air pollution reduced is an important factor).

EPA appropriately rejected including as part of the Best System other technological measures, including co-firing and carbon sequestration, which can be integrated into the design and operation of individual plants. To be clear, EPA did conclude that some of these measures are feasible and could achieve potentially significant emission reductions, but EPA reasonably rejected them because they are more expensive than the selected Best System measures. 80 Fed. Reg. at 64,727-28.[26]

EPA further recognized that because its guidelines do not compel sources to implement the Best System measures, even if it were to include co-firing and carbon sequestration in the Best System, few plants would likely comply with their resulting

[26] Petitioners' assertion, Pet. Legal Br. 12-13, that large CO_2 emission reductions cannot be feasibly achieved using technological controls is incorrect and contradicted by the record.

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emission standards by actually using these technologies. Rather, they would rely on lower-cost generation-shifting. Id. at 64,746-51.

EPA further sensibly concluded that limiting the Best System to heat-rate improvements (Building Block 1) would have been a far inferior approach to the three-building-block approach. As EPA explained, implementing heat-rate improvements in isolation would, at best, have decreased sources' emissions by a few percentage points and might have actually *increased* emissions. Because heat-rate improvements lower higher-emitting plants' operating costs, their application in isolation could lead to greater reliance upon higher-emitting generation, increasing overall emissions from the industry. Id. at 64,745, 64,748.

4. EPA identified an "achievable" degree of emission limitation that "reflects" the application of generation-shifting measures.

EPA also reasonably determined that the guidelines "reflect[]" an "achievable" degree of emission limitation and therefore meet the fourth statutory criterion. EPA explained in detail the specific steps that particular sources may take to implement generation-shifting measures as a pollution-control strategy to comply with an emission standard that a state might adopt for that source. See supra Argument I.A.2.

EPA further determined that "all types and sizes of [fossil-fuel-fired power plants], in all locations are able to undertake [generation-shifting], including investor-owned utilities, merchant generators, rural cooperatives, municipally-owned utilities, and federal utilities." Id. at 64,735. Many companies already own coal-fired, gas-fired,

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and renewable plants, which facilitates their ability to reduce pollution through off-site crediting measures without transacting with third parties. Approximately 77% of coal-fired generation occurs at a plant affiliated with natural gas combined-cycle generation, and approximately 82% of fossil-fuel-fired generation occurs at a plant affiliated with renewable generation. Id. at 64,796, 64,805. EPA explained, moreover, that even those plants not presently affiliated with cleaner generation can implement generation-shifting through cross-investment measures, such as acquiring credits or allowances, or directly investing in cleaner power. Id. at 64,735.

A robust record also supports EPA's determination that there are sufficient amounts of unused existing natural gas-fired generation capacity and potential for new renewable-energy capacity to enable all sources to successfully employ clean-generation pollution-control strategies and achieve the degree of emission limitation required. Id. at 64,797-802, 64,806-11. Significantly, EPA did not set the guidelines to reflect the *maximum* possible degree of stringency that would be achievable. Id. at 64,718. Instead, EPA set more modest reduction goals so as to provide significant "compliance headroom," thereby easing power plants' ability to achieve their state-promulgated standards. Id. at 64,718. For example, EPA used conservative estimates for increased utilization of gas plants and construction of renewable resources (Building Blocks 2 and 3), and set the uniform rates at the least stringent of three calculated regional rates. Id. at 64,730, 64,735, 64,799, 64,801; 40 C.F.R. §§ 60.5800, 60.5880. To further facilitate sources' ability to comply with their

emission limits, EPA also authorized the use of measures for *compliance* purposes that are not part of the Best System, including, among many others, implementing readily available and cost-effective demand-side energy-efficiency measures. 80 Fed. Reg. at 64,724; Legal Mem. 150-52, JA___.

Petitioners miscast the nature of the guidelines in wrongly contending that they are not achievable. Pet. Legal Br. 14-17, 51. The guidelines are purposefully set in the form of *effective* emission rates for the two source subcategories. These effective emission rates are regulatory constructs intended to reflect adjustments to actual emission rates—for regulatory compliance purposes—with such adjustments crediting certain cost-effective generation-shifting pollution-reduction measures that can be successfully undertaken by sources. Because the effective rates *can* be achieved using the identified Best System, they "reflect[]" a "degree of emission limitation achievable," consistent with Congress's direction in Section 111(a)(1).[27]

5. The guidelines follow industry trends.

Contrary to Petitioners' hyperbolic mischaracterizations, Pet. Legal Br. 6, the degree of limitation contemplated by the guidelines will not result in any fundamental "restructuring" of the "electric grid."

[27] Accordingly, EPA does not "concede," Pet. Legal Br. 15, that sources cannot meet the uniform rates.

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The guidelines reduce CO_2 emissions. 80 Fed. Reg. at 64,663. While they rely on generation-shifting measures to do so, they follow industry trends towards greater use of renewable energy and gas-fired generation, and less use of coal-fired generation. These trends are due largely to falling prices for renewables and gas, as well as the aging of existing coal-fired plants. Id. at 64,678, 64,694-95, 64,795, 64,803-04. Notably, the use of renewable energy was already exploding prior to Rule promulgation; by 2013, renewable energy had increased five-fold in just fifteen years. Id. at 64,695. And while EPA projects that the Rule will reduce some coal-fired generation by the time the Rule is fully implemented in 2030, the amount of that reduction is projected to be less than, and to occur more gradually than, the reduction that already occurred from 2005 to 2014. Id. at 64,785.

EPA further projects that significant reductions in coal-fired generation would occur even in the Rule's absence, and that following full implementation of the Rule in 2030, the amount of coal-fired generation will be 27.4% of total generation—only 5.4% less than projected without the Rule. RIA 3-27 (Table 3-11), JA___.[28] Based on modeling analysis and other record evidence, EPA ultimately determined that the Rule

[28] Petitioners' citation, Pet. Legal Br. 22, to EPA's projection that coal-fired generating capacity will be cut in half by 2030 is highly misleading, as Petitioners fail to acknowledge that most of the projected capacity reduction (129,000 MW out of 162,000 MW in reduced capacity) is projected to occur even without this Rule. RIA 2-3, 3-31, JA___, ___. Likewise, the vast majority of growth in non-hydro renewable generation is projected to occur without the Rule. Id.

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is "fully consistent with the recent changes and current trends in electricity generation," and will by "no means entail fundamental redirection of the energy sector." 80 Fed. Reg. at 64,785. Accordingly, Petitioners' characterization of the Rule as radically transforming the industry, Pet. Legal Br. 22, contradicts EPA's record-based findings. 80 Fed. Reg. at 64,785.[29]

B. Petitioners Posit Limitations on EPA's Discretion That Are Not Compelled by the Statute, and Would Frustrate the Statutory Objective to Protect Public Health and Welfare.

Petitioners' chief legal argument is that EPA's guidelines must be premised exclusively on technological measures that individual sources can integrate into the design and operation of their plants. Pet. Legal. Br. 29-61. Under their view, even though states will likely facilitate cost-effective generation-shifting in their plans and sources will likely rely on generation-shifting to meet state standards, EPA cannot consider these same measures for purposes of setting the targets states must meet. Nothing in the text of the Act compels this counterintuitive outcome.

1. Petitioners apply an incorrect standard of review.

As a threshold matter, Petitioners' argument goes astray because they apply an incorrect standard of review. The statutory interpretations at issue here are reviewed under the familiar two-step Chevron standard. 467 U.S. at 842-43. Under that

[29] Petitioners rely improperly on extra-record material to support their mischaracterizations, including declarations prepared by Petitioners after Rule promulgation, Pet. Legal Br. 22. See 42 U.S.C. § 7607(d) (review limited to record).

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standard, the Court must uphold an expert agency's interpretations of a statute it administers unless those interpretations are either foreclosed by the text or are an unreasonable reading of ambiguous language. Id. This standard fully applies to the interpretation of ambiguity that concerns the scope of an agency's regulatory authority. City of Arlington v. FCC, 133 S. Ct. 1863 (2013).[30]

Petitioners, citing King v. Burwell, 135 S. Ct. 2480, 2489 (2015), Pet. Legal Br. 32-33, claim that Chevron does not apply. They are wrong. The CAA clearly delegates to EPA authority to fill gaps in the Act concerning the appropriate amount of pollution reduction that should be obtained from long-regulated major pollution sources. Indeed, Chevron *itself* involved major sources and EPA's construction of the Act. In Burwell, the Court found it "especially unlikely" that Congress delegated the ability to interpret a central health-care reform provision within the Affordable Care Act to the IRS—the agency that collects taxes but has "no expertise" in health-care policy. 135 S. Ct. at 2489. In contrast, EPA has decades of expertise addressing power-plant emissions. Unlike Burwell, this case involves EPA's construction of a statute that it has long administered and of provisions that go to the core of EPA's mission to protect public health and welfare.

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[30] Chevron applies even in cases where the agency's construction would purportedly result in a "fundamental change in the regulatory scheme" and "concerns about agency self-aggrandizement are at their apogee." City of Arlington, 133 S. Ct. at 1872.

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Beyond Burwell, Petitioners rely upon Utility Air Regulatory Group v. EPA ("UARG"), 134 S. Ct. 2427 (2014). Essentially, Petitioners construe UARG as obliterating the second step of Chevron in economically and politically significant cases. Under Petitioners' view, ambiguity in such cases must necessarily be resolved *against* the implementing agency's exercise of its regulatory authority, even if the agency's interpretation is wholly reasonable. But UARG does not nullify Chevron. UARG simply reflected one application of Chevron to particular facts, which are readily distinguishable from those here. UARG involved EPA interpretations that would have expanded two CAA permitting programs by sweeping in millions of small emitters (e.g., residential buildings), as well as EPA's effort to avoid that anomalous result by promulgating regulations to override unambiguous statutory numerical thresholds. Id. at 2448. The Supreme Court applied Chevron in the normal manner and concluded that EPA did not operate within the "bounds of reasonable interpretation." Id. at 2442 (quotation omitted).

This case bears no resemblance to the "singular situation" in UARG. Id. at 2444. First, EPA is not rewriting a clear numerical threshold or otherwise ignoring unambiguous statutory text. Second, EPA has not adopted an interpretation that would sweep millions of new sources into the Act's regulatory coverage absent modifications of clear numerical thresholds. Instead, EPA is regulating the very largest CO_2 polluters in the Nation, which have long been subject to extensive CAA regulation and which the Supreme Court recognized in AEP were subject to Section

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111(d) regulation. EPA is therefore not claiming any "enormous and transformative expansion" of power. Pet. Legal Br. 34 (citing UARG, 134 S. Ct. at 2444).

The interpretive question here is whether EPA may appropriately set pollution limitations for power plants by applying the most cost-effective measures (generation-shifting), or whether EPA, to obtain comparable limitations, is limited to applying much more expensive technology-based measures like carbon sequestration and co-firing. This interpretive issue falls squarely within EPA's authority and expertise, and the question, as always under Chevron, is whether EPA's interpretation is either unambiguously foreclosed or unreasonable. It is neither.

Indeed, this Court has routinely applied Chevron to EPA interpretations involving questions of "deep economic and political significance." See, e.g., Miss. Comm'n, 790 F.3d at 151 (considering whether nonattainment areas may encompass broad multi-state regions); NRDC v. EPA, 777 F.3d 456 (addressing ozone NAAQS implementation). Further, if there were any doubt as to Chevron's applicability, it has been removed by AEP. That case addressed EPA's authority to regulate the very same pollutant, under the very same provision, from the very same sources. The Court concluded that Congress had "delegated to EPA the decision whether and *how* to regulate [CO_2] emissions from power plants" (emphasis added). Citing Chevron, the Court added that EPA is an "altogether fitting" "expert agency" "best suited to serve as primary regulator of greenhouse gas emissions." 564 U.S. at 428.

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And even if Petitioners' purported "clear statement rule" applied, AEP confirms that Section 111 contains a sufficiently "clear statement." The term "system of emission reduction" plainly encompasses generation-shifting measures. As stated in AEP, EPA has authority under Section 111(d) to determine "the appropriate amount" of CO_2 regulation and to decide "how" to limit CO_2 emissions to abate climate change. Id.[31]

2. Applying Chevron, EPA's interpretation is reasonable and entitled to deference.

Applying the correct standard of review, EPA's interpretation is readily upheld as either consistent with the Act's plain meaning or as a reasonable construction of any ambiguous statutory language.[32] EPA's interpretation that a "best system of emission reduction" includes cost-effective generation-shifting for this industry and pollutant is eminently reasonable. The purpose of Section 111 is, after all, to protect public health and welfare through cost-effective measures that sources can implement, and EPA's interpretation best fulfills that purpose.

Indeed, as a matter of common sense, where interconnected sources operate in concert to produce the same product (electricity) using processes that have vastly

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[31] As AEP underscores, Section 111(d) is not an "obscure" or "unheralded" provision, Pet. Legal Br. 2, 3; it "speaks directly" to the problem at hand. 564 U.S. at 424.

[32] Petitioners' arguments, Pet. Legal Br. 41-45, 50-54, that Section 111 unambiguously forecloses the consideration of generation-shifting as a pollution-control strategy are addressed in Argument I.B.6.

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different air-pollution impacts, with supply and demand in constant balance, it is reasonable to consider that sources may cost-effectively address their emissions through arrangements that incorporate cleaner forms of power generation. This is particularly so where the sources already commonly engage in that practice on their own, where using generation-shifting for compliance will be far *less* costly than compelling sources to apply specific technologies (e.g., carbon sequestration) at their plants, and where sources would likely use generation-shifting measures to comply with standards *regardless* of what measures were selected for the Best System. 80 Fed. Reg. at 64,728.

Moreover, the premise of Petitioners' counter-interpretation—i.e., that generation-shifting fails to incorporate "*production processes* or control technologies" that can be integrated into a particular plant's "design and *operations*"—is false. See Pet. Legal Br. 54 (emphasis added). The Best System applied by EPA recognizes that a highly salient and unique attribute of power plants is that a network physically connects them and their customers. 80 Fed. Reg. at 64,728. As EPA explained, this physical interconnectedness largely determines any given plant's operations on a nearly moment-to-moment basis. Id. As a result, generation-shifting does incorporate changes in "production processes" or "operations" of an individual plant. For example, a particular plant may change its production process to increase or reduce its level of generation, and that action—in and of itself—accomplishes generation-shifting, because other sources must decrease or increase commensurately

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their operations to balance supply with demand. See 80 Fed. Reg. at 64,780 (noting reduced generation entails no significant disruption because of the integrated nature of the power sector).

It further bears emphasis that, regardless of whether a plant complies with an emission limitation by installing technologies or by shifting generation off-site, the source's compliance actions address the external harm to society caused by its *own* operations and pollution. In the case of technological controls, its compliance actions directly reduce the pollution generated at its plant. In the case of generation-shifting (or any kind of emission trading), its compliance actions achieve comparable pollution reduction by utilizing the lower-emitting generation capacity of other plants. But either way, the compliance actions reduce pollution and address the external harm caused by the source's *own* operations.

In sum, EPA's interpretation that the Best System includes generation-shifting for this industry and pollutant is eminently reasonable and comports with the Act.

3. Contextual considerations support EPA's interpretation of the phrase "best system of emission reduction."

Contextual considerations add considerable support to the conclusion that EPA's interpretation is reasonable.

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a. The flexibility states have under Section 111(d)'s cooperative federalism structure supports EPA's interpretation.

States have wide discretion in fashioning "standards of performance" under Section 111(d). This flexibility supports EPA's interpretation that the "best system of emission reduction" that underlies such standards also encompasses a wide range of pollution-reduction strategies, including generation-shifting.

Under the cooperative federalism principles underlying the CAA, 42 U.S.C. § 7401(a)(3), states may implement a range of standards to control emissions. The references in Sections 111(d)(1) and (d)(2) to Section 7410 and to the flexibility states have under the NAAQS program (see 42 U.S.C. § 7410(d)(2)(A)) further indicate that Congress intended that states be able to incorporate a broad range of emission-reduction mechanisms into their Section 111(d) "standards of performance," including having the ability to craft standards that authorize, incentivize, or compel generation-shifting.

Consistent with these cooperative federalism principles, it is well-established that states may adopt Section 111(d) standards of performance in the form of tradeable emission rates or mass limits. See 40 C.F.R. § 60.21(f); 80 Fed. Reg. at 64,840-41. In fact, numerous state and industry Petitioners agreed in comments that under Section 111(d), states have discretion to adopt standards in the form of trading programs intended to facilitate the ability of industry to rely on the very generation-shifting measures in Building Blocks 2 and 3. Id. at 64,733 n.380; Legal Mem. 14-18,

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JA___.[33] For example, lead state Petitioner West Virginia submitted comments before the Proposal clarifying its belief that it could permissibly adopt a "mass-based allowance system" for sources that would "account for … load shifting to lower CO_2-emitting generation, and the deployment of renewable (zero-emitting) energy sources." West Virginia Comments 14, EPA-HQ-OAR-2013-0602-24999, JA___.

Similarly, a group representing all state environmental regulators (including Petitioners), commented that EPA should design guidelines that "maximize" state flexibility and allow states "to allocate credit for zero-carbon resources" (i.e., facilitate implementation of Building Block 3). Envtl. Council of the States Comments 3, EPA-HQ-OAR-2013-0602-24059, JA___. Industry Petitioners agreed that states have authority to "allow sources to comply with [a] standard by purchasing allowances or credits representing emission reductions achieved outside their boundaries," which would include generation-shifting. See, e.g., UARG October 2013 Comments 4, EPA-HQ-OAR-2013-0602-0431, JA___.

In short, Petitioners seek to have it both ways. They agree *states* have discretion to promulgate "standards of performance" that authorize and incentivize sources to use generation-shifting measures to lower pollution. Yet they disagree that *EPA* can consider the same cost-efficient measures as part of the Best System that informs the

[33] Petitioners' comments contradict their representation that Section 111(d) does not authorize trading programs. Pet. Legal Br. 56.

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stringency of the standards. But if states can properly craft standards designed to accommodate and encourage the use of generation-shifting as a suitable pollution-control strategy, then EPA can likewise reasonably interpret the phrase "system of emission reduction" to encompass the same suitable strategy. Section 111 does not dictate the provision of maximum flexibility for the purpose of achieving the most minimal emission limitation.[34]

The inconsistencies in Petitioners' logic extend to their attempt to argue that, because the definition of "standard of performance" incorporates a "continuous" requirement under 42 U.S.C. § 7602(k), those standards cannot be based on generation-shifting measures. This argument is incorrect for many reasons, discussed below at Argument I.B.6.b. But if it were true, then it would likewise preclude *states* from exercising their conceded authority to adopt standards in the form of trading programs that authorize compliance through generation-shifting.

b. The phrase "best system of emission reduction" contrasts with more narrowly crafted language elsewhere in the statute.

The phrase "best system of emission reduction" in Section 111(a)(1) contrasts sharply with narrower language appearing elsewhere in the same statutory subsection.

[34] This is not to suggest that the scope of a Best System necessarily can include *any* measure a source could implement. As discussed above at Argument I.A.1, EPA's interpretation of Best System includes significant constraints, and Building Blocks 2 and 3 comport with those.

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This contrast shows that Congress purposefully granted EPA flexibility in Section 111(a)(1). In Section 111(a)(7), Congress defined the term "*technological* system of continuous emission reduction" (emphasis added) as meaning "a technological process for production or operation by any source which is inherently low-polluting or nonpolluting," or "a technological system for continuous reduction of the pollution generated by a source before such pollution is emitted into the ambient air, including precombustion cleaning or treatment of fuels." 42 U.S.C. § 7411(a)(7). Section 111(a)(7) has no application here, but its presence in the same section illustrates that Congress knew how to limit the scope of EPA's discretion to consideration of "technological" systems that might be applicable only on a plant-by-plant basis when it wished to do so. See Nat'l Fed'n of Indep. Bus. v. Sebelius ("NFIB"), 132 S. Ct. 2566, 2583 (2012) ("Where Congress uses certain language in one part of a statute and different language in another, it is generally presumed that Congress acts intentionally.").[35]

[35] The Act includes other examples where Congress used narrower language to cabin EPA's discretion. See, e.g., 42 U.S.C. § 7491(b)(2)(A) (providing that certain sources "shall procure, install, and operate … the best available retrofit technology … for controlling emissions"); 42 U.S.C. § 7521(a)(3)(A)(1)(i) ("[S]tandards [for mobile source pollutants must] reflect the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available…., giving appropriate consideration to cost, energy, and safety factors associated with the application of such technology.").

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In fact, Congress did temporarily narrow the scope of the Section 111(a)(1) Best System provision in the 1977 Amendments to require, among other restrictions, "technological" controls for new sources and "continuous" controls for new and existing sources. But in the 1990 Amendments, Congress repealed those restrictions and reinstated the broader provision it had enacted in 1970. See 80 Fed. Reg. at 64,765-67. This legislative sequence further indicates Congressional intent to provide EPA with broad flexibility in applying Section 111(d) to specific source categories and pollutants.[36]

That Congress used the broad phrase "best system of emission reduction" to provide EPA with such flexibility is unsurprising. Congressional use of "broad language" "reflects an intentional effort to confer [regulatory] flexibility," "without [which], changing circumstances and scientific developments would soon render the [CAA] obsolete." Massachusetts, 549 U.S. at 532; see also Pub. Citizen v. U.S. Dep't of Justice, 491 U.S. 440, 475 (1989) (Congress "usually does not legislate by specifying examples, but by identifying broad and general principles that must be applied to particular factual instances"); 80 Fed. Reg. at 64,766 (noting similarly broad flexibility in other CAA provisions adopted in 1970). Congress's decision to grant EPA broad

[36] Tellingly, in trying to persuade the Court to narrow the plain scope of the phrase "best system of emission reduction," Petitioners, Pet. Legal Br. 53, direct the Court's attention to a quotation from a 1978 case, ASARCO v. EPA, 578 F.2d 319 (D.C. Cir. 1978), that was, in fact, applying the materially different and narrower language then in effect for new sources.

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discretion in implementing the Section 111(d) program is a logical policy choice in view of the catch-all nature of the program. The program addresses threats posed by a potentially wide range of pollutants, including CO_2, that are not addressed elsewhere in the Act. 80 Fed. Reg. at 64,761 n.464.[37]

Petitioners' effort to cast doubt on Congress's intent by pointing to recent legislative proposals is unavailing. Pet. Legal Br. 2-3, 35. The fact that subsequent Congresses have considered and rejected different approaches to climate change says nothing about what Congress meant when it drafted Section 111's operative language. See Massachusetts, 549 U.S. at 529-30 (rejecting consideration of post-enactment legislative history in assessing whether CAA addresses climate change).

4. EPA has authority and expertise to make suitable judgments about CO_2 reductions and energy requirements in setting Section 111(d) guidelines.

Contrary to Petitioners' characterizations, Pet. Legal Br. 35-36, EPA has ample technical expertise to perform its Congressionally assigned task to consider "energy requirements," including issues pertaining to grid reliability, in setting Section 111(d) guidelines. Indeed, Congress specifically directed and entrusted EPA, as the "expert administrative agency," to determine the "appropriate amount of [CO_2] regulation"

[37] Section 111(d)'s important gap-filling role is not diminished by its infrequent use. See Pet. Legal Br. 34. Most CAA actions have addressed criteria or hazardous pollutants that Section 111(d) does not address. CO_2 has not been categorized as either a criteria or hazardous pollutant, but currently presents the Nation's most urgent air-pollution threat.

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from power plants by engaging in "complex balancing" that weighs "the environmental benefit potentially achievable" against "our Nation's energy needs and the possibility of economic disruption." AEP, 564 U.S. at 427. As the Supreme Court concluded, EPA is an "altogether fitting" "expert administrative agency" for this Congressionally assigned task. Id. at 427-28.

And this is hardly the first rule in which EPA has considered such issues in the context of setting pollution standards. Since the Act's inception, EPA has promulgated numerous rules setting significant emission limitations for the power sector, 80 Fed. Reg. at 64,696-99, and in doing so has considered issues related to grid reliability and energy markets, all without disrupting electricity availability. See e.g., 77 Fed. Reg. at 9406-11; 76 Fed. Reg. at 48,265-66. It has done so again here.

EPA has also not assumed any impermissible "central planning" role for the power sector. Pet. Legal Br. 33. EPA has simply performed its statutory duty to require a reasonable degree of CO_2 emission limitation for fossil-fuel-fired plants, while leaving states and sources with enormous flexibility to meet that requirement through virtually any means they choose. See Massachusetts, 549 U.S. at 512, 530-31 (distinguishing FDA v. Brown & Williamson Tobacco Corp., 529 U.S. 120 (2000), and noting that "there is nothing counterintuitive to the notion that EPA can curtail the emission of substances that are putting the global climate out of kilter").

Petitioners also overlook, that under EPA's own interpretation of Section 111, its authority is substantially constrained in important respects. See supra Argument

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I.A.1. In view of these acknowledged constraints, EPA does not claim, as Petitioners hyperbolically suggest, "unilateral authority to end the use in this country of certain kinds of energy generation." Pet. Legal Br. 33. The Rule specifies a cost-reasonable and feasible degree of pollution limitation for states to obtain from large polluters, consistent with industry trends, and comports with textual constraints.

Petitioners provide no support for their proposition that generation-shifting could qualify as the Best System for other industries. EPA developed a robust record and explained at length why, in the case of power plants, generation-shifting meets textual constraints on a Best System, in critical part because of the unique attributes of power-plant operations. 80 Fed. Reg. at 64,723-36, 64,744-55. See also Legal Mem. 120-127 (explaining why generation-shifting would not qualify as Best System for other industries), JA___.[38]

Petitioners further misconstrue this Court's decision in Delaware Department of Natural Resources v. EPA ("Delaware"), 785 F.3d 1, 18 (D.C. Cir. 2015). Pet.

[38] Having unsuccessfully identified in comments any source category that is similarly situated to the electricity sector, Petitioners now assert that the Best System for reducing municipal-landfill emissions could be "switching to recycling plants." Pet. Legal Br. 34. But Petitioners make no case that such a system is "adequately demonstrated" for landfills or meets other Best System criteria. For example, they do not acknowledge that EPA's recently proposed revised guidelines for municipal landfills expressly rejected requiring materials separation—a prerequisite for recycling—for emission-causing organic waste. See 80 Fed. Reg. 42,100, 42,116 (Aug. 27, 2015) (identifying significant "technical barriers" precluding any requirement for landfills to separate organic waste).

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Legal Br. 36. In that case, the Court perceived that EPA relaxed Section 112 environmental controls for the *specific purpose* of furthering grid reliability, but in the Court's view, failed to respond to public comments raising reliability concerns or consult with the Federal Energy Regulatory Commission ("FERC"). Here, EPA performed its core function of limiting pollution to protect human health and the environment and properly considered, among other things, "energy requirements," as Congress instructed it to do. 42 U.S.C. § 7411(a)(1). Unlike in Delaware, EPA engaged in extensive consultation with FERC, grid operators, utilities and others prior to making any judgments relating to "energy requirements"; responded to their comments; and set up a process to work with FERC to continue to monitor reliability issues. 80 Fed. Reg. at 64,671, 64,693-94, 64,706-07, 64,800, 64,874-81.

5. EPA's interpretation does not invade states' regulatory domain.

The Rule, like prior nationwide CAA rules for this industry, appropriately limits pollution, consistent with the central objectives of the Act. In doing so, the Rule does not impinge upon states' sovereign rights or invade traditional state authorities. See Pet. Legal Br. 3, 36-41.

Petitioners ignore the important distinction between (1) regulation of pollution, as authorized by the Act, which indirectly affects energy prices and markets, and (2) direct regulation of energy markets. This Rule is the former. As is the case with *any* pollution limitations for power plants (which, given the amount of these plants'

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emissions, are commonplace under the Act), the Rule will entail compliance costs that will necessarily indirectly affect energy markets.[39] That does not mean EPA lacks authority to establish guidelines for pollution limitations for the industry or that establishing such guidelines will impermissibly interfere with states' traditional responsibilities in the field of electricity regulation. See FERC v. EPSA, 136 S. Ct. at 784 (distinguishing between federal regulations that "inevitably[] influenc[e]" areas of state control, and those that "intrude on the States' power"); Conn. Dep't of Pub. Util. Control v. FERC, 569 F.3d 477, 479-83 (D.C. Cir. 2009) (same).

Indeed, taken to its logical extension, Petitioners' sovereignty argument would absurdly preclude EPA from implementing *any* Section 111(d) guidelines, or any limitation for power plants under any other CAA provision. Any "system of emission reduction" that EPA might apply to the power sector under Section 111(d)—including Petitioners' preferred technological controls—would require generators that emit more pollution to bear higher compliance costs than generators that emit less, and thereby would indirectly influence electricity rates and the relative utilization of plants.

Petitioners essentially point to two types of state police power they believe the Rule implicates: the power to (1) regulate retail sales of electric power in intrastate

[39] Petitioners suggest that the Rule is impermissible if it might impair a regulated party's market share. Pet. Legal Br. 4, 33. Any air-pollution standard, however, has competitive implications for plants that need to do more to comply.

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markets and (2) license new electric generating capacity. Pet. Legal Br. 3, 36-41. But the Rule does not impinge upon either.

With respect to retail-sales regulation, the Rule leaves states with precisely the same power they have always had—the authority to decide the rates that state ratepayers should bear and to otherwise condition the terms of sale. Power plants may need to incur costs to comply with new CO_2 standards, as they do for *any* air-pollution standards, but state regulators will continue to decide rates, and can elect whether or not to reflect CO_2-control costs in those rates. The Rule is no different in this regard from any other rule EPA has ever promulgated for this industry.[40]

Nor will the Rule affect state "renewable portfolio standards." Pet. Legal Br. 39.[41] Nothing in the Rule precludes states with such standards from amending or terminating them or requires states without such standards to enact them. Indeed, the Rule is designed to allow states to rely on renewable portfolio standards, should they

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[40] Title IV demonstrates that a mass-based trading program can be successfully implemented for power plants without any invasion of state police power. Title IV specifically provides that it should not be construed as "requiring a change of any kind in any State law regulating electric utility rates and charges," but that qualification has not in any way impeded the successful implementation of the acid rain program. 42 U.S.C. § 7651b(f).

[41] A renewable portfolio standard generally obligates retail sellers of electricity to include certain minimum amounts of electricity from renewable-energy sources in the collection of resources from which the retailer obtains electric power.

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so wish, for purposes of meeting emission-reduction targets, but the Rule can be implemented independently of those programs. 80 Fed. Reg. at 64,836-37, 64,908.[42]

The Rule likewise does not affect states' power to license new electric generating capacity. States will continue to have the same authority over licensing decisions that they have always had. The Rule's CO_2 emission standards might indirectly affect the types of projects that power generators propose (e.g., encourage more renewable-energy projects), but that does not usurp state authority to determine whether to license those projects. If a state decides to reject new renewable capacity, it is free to do so. While the Rule leaves each state with this choice, overwhelming record evidence supports EPA's conclusion that the Nation, as a whole, will continue to be able to draw upon an ever-increasing supply of lower-emitting power, consistent with existing market trends.

Petitioners' assertions that states will need to "restructure[] their power systems," "fundamentally alter electricity generation," and "reverse countless decisions" are specious. Pet. Legal Br. 3, 22, 40. States do not have to engage in any particular legislative or regulatory activities to implement the Rule.[43] In fact, states can elect to have EPA implement the Act's required reductions through a federal plan. 80

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[42] The same is true for state energy-efficiency standards. See Pet. Record Br. 81.

[43] Petitioners fail to rely on record evidence to support their contrary position, relying solely on post-promulgation declarations. See Pet. Legal Br. 40; 42 U.S.C. § 7607(d)(7)(B).

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Fed. Reg. at 64,882. For those states that elect to prepare state plans, the Rule provides expansive flexibility. While the Best System informs the stringency of emission-reduction targets, the Rule grants states almost complete flexibility to decide *how* to meet those targets. For example, if a state prefers a plant-by-plant command-and-control technological approach to reducing emissions, it could compel its coal plants to switch their fuel to natural gas, or require carbon sequestration where feasible. Alternatively, under the "states measures" approach, a state could obtain the required degree of reduction through demand-side energy-efficiency programs that would not impose any direct requirements on power plants (provided the state meets its emission target), or affect the state's present generation mix.

For similar reasons, the Rule does not intrude on FERC's power under the Federal Power Act, 16 U.S.C. §§ 791a, et seq. See Pet. Legal Br. 38-39. The Rule appropriately limits air pollution under the CAA. It does not regulate any kind of electricity sales or rates—interstate or intrastate. Thus, the dividing line between interstate and intrastate rate regulation addressed in the cases cited by Petitioners has no relevance here.

Finally, there is no basis for New Jersey's claim that the Rule requires states that have deregulated electricity markets to change their regulatory approach. Pet. Record Br. 80-82. The Rule gives states considerable flexibility in developing their plans and provides that states may, if they wish, simply require plants within the state to meet the uniform rates, while allowing crediting.

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6. Assorted textual snippets relied on by Petitioners do not unambiguously foreclose EPA's reasonable interpretation of the Best System.

Petitioners try to conjure from a grab bag of textual snippets an argument that the Act unambiguously precludes utilization of generation-shifting as a pollution-control strategy. See Pet. Legal Br. 41-45, 50-54. This effort fails. Even if the text they point to could be read to create some arguable degree of ambiguity, that ambiguity must be resolved in favor of EPA's reasonable interpretation. Chevron, 467 U.S. at 842-43.

a. The guidelines call for standards "for" and "applicable to" each source.

First, Petitioners assert that EPA's guidelines fail to call for the promulgation of emission standards "for" and "applicable to" each regulated "source." See Pet. Legal Br. 41-43 (quoting 42 U.S.C. § 7411(d)(1), (a)(2)). This is wrong. As under any Section 111(d) rule, each source will have its own CO_2 emission standard that will be set by its state. Such standards will be "for" that source and "applicable to" that source.

Essentially, Petitioners' argument conflates the future emission standards that states will set for particular sources with the "best of system of emission reduction" used to establish the degree of emission limitation those standards must collectively achieve. While the Best System informs the *stringency* of the emission standards, the nature of the Best System (here, including generation-shifting measures) does not

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somehow prevent states from setting standards "for" and "applicable to" sources. These standards will be "for" and "applicable to" "sources" for the simple reason that they will impose emission limits to which the sources will be subject. See 40 C.F.R. § 60.5740(a)(2)(i) (state plan required to "impose[] emission standards on [sources]"); 80 Fed. Reg. at 64,826. Section 111 requires only that emission standards "reflect[] the degree of emission limitation achievable through the application of the best system of emission reduction," as they will here.

Thus, the fact that states set standards "for" or "applicable to" any existing source does not itself place any limits on the scope of measures that can be considered as part of the Best System, much less limit the scope to only measures that could be implemented under the presumption that each and every source is hermetically sealed off from the rest of the world. Certainly it does not do so unambiguously, as would be required for Petitioners to prevail under Chevron.

Next, Petitioners point to the fact that the term "source" is defined as a "building, structure, facility or installation." Pet. Legal Br. 44. This definition simply makes clear that the entities to which standards must apply are stationary sources, and not, for example, mobile sources, which the Act regulates elsewhere. But this definition does nothing to limit the scope of measures that can be considered as part of the "best system of emission reduction" for sources. See 80 Fed. Reg. at 64,767.

Petitioners mistakenly suggest that EPA's guidelines impermissibly conflate a "source" with its "owner or operator." Pet. Legal Br. 44-45. Section 111 specifies

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that the "owner or operator" of a new "source" bears the legal obligation to "operate" such "source" in compliance with the "standards of performance" applicable to it. 42 U.S.C. § 7411(e). The Rule provides the same for existing sources. See 40 C.F.R. § 60.5825(a). To make clear that the emission-performance levels within the guidelines are achievable by sources through generation-shifting, EPA made the unremarkable observation that it is the owner or operator of a source that will implement generation-shifting measures, as facilities are inanimate objects. See 80 Fed. Reg. at 64,762 (stating that "[a]s a practical matter, the 'source' includes the 'owner or operator' of [the source]" in the sense that the owner or operator implements measures to achieve the source's emission limit). But EPA's guidelines do not thereby conflate the terms "source" and "owner or operator." The "source" is the entity subject to the emission limit, 60 C.F.R. § 60.5740(a)(2)(i), not the "owner or operator." If the Rule actually conflated "sources" with their "owners or operators," then it would direct states to set a single standard for the CO_2 emissions from all of a particular *company's* power operations. The Rule does not do that. It directs states to establish standards for particular "sources." Id.

Petitioners contend that it is "one thing" for an owner or operator to take actions reducing emissions at the source (e.g., installing new equipment) and "another" for the owner or operator to rely on emission reductions obtained through clean-power-generation off-site. Pet. Legal Br. 45. But that contention does not mean that the emission standards are not "for" the sources and, in any event,

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Petitioners fail to reconcile their contention with the fact that power plants and other sources routinely rely on emissions-trading programs to meet a range of CAA requirements. 80 Fed. Reg. at 64,773. Under those programs, a particular source complies with an emission limitation when its owner or operator acquires credits from *other* sources that have reduced their emissions, rather than taking action to reduce the source's own emissions. Consequently, the balkanized construct that Petitioners assert as a textually mandated limiting principle cannot be squared with real-world practice and would undermine Petitioners' own requests for compliance flexibility.

Petitioners' reliance on ASARCO is also misplaced. Pet. Legal Br. 46-47. ASARCO did not address the meaning of "standard of performance" or "best system of emission reduction," much less hold that the latter phrase requires EPA to view individual sources as if they were sealed off from the rest of the world. That case instead rejected an EPA regulation that expressly redefined the statutory term "stationary source" to include "any … combination of … facilities." 578 F.2d at 326 (quotation omitted). EPA had promulgated that regulation to allow a plant operator who increased emissions from some structures within a facility to avoid complying with Section 111(b)'s new source standards by offsetting those increases with emission decreases from other structures within that facility. In rejecting the regulation, the Court emphasized that it would thwart the Act's air-quality objectives. Here, of course, it is Petitioner's interpretation that would thwart those objectives. ASARCO is of questionable validity anyway because it was decided before Chevron,

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which endorsed a more flexible approach to interpreting the scope of the term "source" within the Act. 467 U.S. at 842-66 (reversing D.C. Circuit decision, which was based on ASARCO).

In any event, EPA's guidelines do not require states to establish standards for "multiple sources," or "at the level of the entire source category." See Pet. Legal Br. 47. The guidelines instead require states to apply standards to individual sources.[44] 40 C.F.R. § 60.5745(a)(4). Those guidelines appropriately "reflect[]" a degree of emission limitation that individual sources can achieve applying the Best System. 42 U.S.C. § 7411(a)(1).

Further, it is entirely appropriate for EPA to consider the total amount of emission reductions that will accrue across a source category in choosing the *best* "system of emission reduction" for that source category, just as it is appropriate for EPA to consider total costs across a source category. To ignore total air-quality benefits as a relevant factor in selecting the *best* "system of emission reduction" for a source category would be wholly inconsistent with the statute's objectives, and particularly irresponsible given the magnitude of the threats here.

[44] Petitioners incorrectly suggest that this Rule regulates renewable plants. Pet. Legal Br. 47-48. While a regulated fossil-fuel-fired source may comply with its emission standard by obtaining credits associated with a new renewable plant, that plant itself has no emission standard and remains unregulated.

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b. EPA's guidelines enable the promulgation of "standards of performance," as that term is defined.

Petitioners next try to cobble together two theories for why the Rule does not respect the definition of "standard of performance." Pet. Legal Br. 50-54. Neither has merit.

First, without disputing that the guidelines apply a "system of emission reduction," Petitioners claim that the Rule gives no meaning to the word "performance" in "standard of performance." That argument fails as a threshold matter because the phrase "standard of performance" is a statutorily defined term, and the Rule comports with each and every element of the term as defined, supra Argument I.A. See Stenberg v. Carhart, 530 U.S. 914, 942 (2000) ("When a statute includes an explicit definition, we must follow that definition, even if it varies from that term's ordinary meaning"). In any event, the statutory context makes clear that the word "performance" refers to *emissions* performance, not *production* performance. See Section 111(a)(1) ("standard of performance" is a "standard for emissions" that reflects a "degree of emission limitation" determined in a specified manner). And regardless of whether a source complies with its emissions performance standard by installing in-plant technologies or shifting generation off-site, its compliance

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obligations address the external harm caused by its *own* operations, and its compliance obligations—reducing emissions—therefore are closely tied to those operations.[45]

Petitioners next point to Section 7602(k)'s definition of "emission limitation," 42 U.S.C. § 7602(k), contending that the guidelines do not call for emission reduction on a "continuous basis." Pet. Legal Br. 52-53. But they again conflate the emission standards to be set by states with the Best System to be identified by EPA. In the 1990 Amendments, Congress specifically amended the Section 111(a) definition of "standard of performance" to remove the word "continuous" from the phrase "best system of emission reduction." 80 Fed. Reg. at 64,765. Thus, the "system of emission reduction" selected by EPA as a foundational determination for purposes of determining the stringency of the guidelines need not itself entail "continuous" reduction.

Regardless, EPA's guidelines do call for emission standards that will require "continuous" emission reduction by sources. Under EPA's guidelines, there is never a time when sources may emit without needing to comply with the state-established standards of performance. 80 Fed. Reg. at 64,841; 40 C.F.R. § 60.5770; see also Sierra Club v. Johnson, 551 F.3d 1019, 1027-28 (D.C. Cir. 2008) (interpreting Section

[45] Petitioners' reliance, Pet. Legal Br. 51, on Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, 531 U.S. 159 (2001), is misplaced. This is not a case where the word "performance" in "standard of performance" is "given no effect whatever." Id. at 172.

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7602(k) to require that emission standards apply at all times). Even if the state adopts a trading program, the emission rate or mass limit "applies continuously" because it imposes an uninterrupted obligation on the source to meet the rate or assure that its emissions will not exceed its allowances. 80 Fed. Reg. at 64,841. Moreover, the generation-shifting measures in the Best System allow sources to achieve these continuous emission limits. See supra Argument I.A.4. This understanding of "continuous" is consistent with the usage of the term "emission limitation" appearing elsewhere in the Act. For example, in Title IV, Congress used the same term "emission limitation" in describing the standards encompassed in that Title's cap-and-trade program. See 42 U.S.C. § 7651c(a)(1).

In a fruitless attempt to show that Section 7602(k) precludes generation-shifting measures, Petitioners also mischaracterize the 1977 legislative history related to that provision's enactment. Pet. Legal Br. 30, 52. The cited 1977 House Report reflects Congress's concern with control measures that simply disperse pollutants away from higher concentration areas and towards lower concentration areas—for example, "load switching from one power plant *where dispersion is poor* to another *where dispersion is favorable*"). H.R. Rep. No. 95-294, at 81-89 (1977) (emphasis added). Congress was concerned that this kind of weather-related dispersion strategy would not "decrease the total amount of [pollution] in the regional atmosphere." Id. at 83. The generation-shifting measures that are part of the Best System do not involve any such weather-related dispersion strategy, and *will* decrease the total

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amount of CO_2 in the atmosphere on a continuous basis. Notably, the cited history also reflects Congress's specific concern with "the possibility of effects on weather and climate"—the very threats the Rule addresses. Id. at 86.

Petitioners' effort to rely on distinctions between air-quality-based programs and performance-based programs also fails. See Pet. Legal Br. 54-56. While there are some distinctions between programs like the NAAQS, which are focused on attaining a particular level of air quality, and programs like Section 111(d), which are focused on establishing emission standards for categories of sources, they are not distinctions that speak to whether the "best system of emission reduction" for interconnected power plants can include a reasonable amount of cost-effective generation-shifting. Contrary to Petitioners' argument, performance-based programs under the CAA, like air-quality-based programs, commonly utilize trading mechanisms. See, e.g., 40 C.F.R. § 60.21(f) (authorizing trading programs under Section 111(d)); 40 C.F.R. § 86.1865-12(k) (authorizing trading for purpose of motor vehicle CO_2 emission standards under 42 U.S.C. § 7521(a)(2)). Petitioners agree power plants may rely on generation-shifting to meet the requirements of trading programs. See supra Argument I.B.3.a.

7. EPA's interpretation is consistent with preexisting implementing regulations and past practice.

Petitioners' effort to contest the reasonableness of EPA's interpretation by suggesting that it is "novel" also fails. Pet. Legal Br. 48-50. As an initial matter, even

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if the Rule entailed a different interpretation of Section 111, an agency is perfectly free to change its interpretation of a statute that it administers so long as it has a principled basis for doing so. Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs., 545 U.S. 967, 981 (2005). EPA has explained in depth why the interpretation set forth in the Rule is consistent with the statutory text and is sensible.

But EPA's interpretation has *not* changed. In the Rule, EPA explained that it was taking the same approach it took in prior Section 111 rules, which was to develop the Best System based on what was appropriate for the particular industry and air pollutant. 80 Fed. Reg. at 64,724-26. In other Section 111 rules for this industry, the fact that power plants "are part of the integrated grid" likewise has "informed some of the regulatory requirements." Legal Mem. 7-9, JA___.

Additionally, EPA implementing regulations put in place prior to the Rule already clarified that Section 111(d) standards may include trading programs like those authorized here (i.e., programs that allow a source to avoid applying controls to its own facilities by paying others to control their facilities). See 40 C.F.R. § 60.21(f) (defining an "emission standard" under Section 111(d) as encompassing "an allowance system").[46]

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[46] Petitioners mistakenly characterize other portions of EPA's Subpart B regulations, 40 C.F.R. §§ 60.21(b) and (e), as requiring that the Best System be limited to plant-level technological controls. Pet. Legal Br. 49-50. EPA's regulations say no such thing. They provide, consistent with the Section 111(a)(1) definition of "standard of performance," that EPA will set guidelines based on the Best System adequately

(Footnote Continued …)

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8. EPA's guidelines for existing sources are not inconsistent with EPA's regulation of new sources.

Finally, Petitioners' effort to challenge EPA's interpretation by depicting the Rule's guidelines as incompatible with EPA's separate regulation of new (including modified and reconstructed) sources is misplaced. Pet. Legal Br. 56-61. EPA addressed this issue at length. 80 Fed. Reg. at 64,785-87; Legal Mem. 1-5, JA___.

First, EPA did not adopt a "conflicting interpretation" of "standard of performance" in the new source rule. Pet. Legal Br. 58. As EPA explained, the "same" systems of emission reduction can be considered for purposes of setting either new or existing source standards, and EPA applied the same statutory factors to new and existing sources. Legal Mem. 1, JA___. But applying the same factors does not dictate that both cases will have identical "systems." EPA selected different systems for new and existing sources not based on any different "definition" or "reading" of the statute, Pet. Legal Br. 57, but because the relevant factual circumstances were different. Legal Mem. 1, JA___.

Several considerations led EPA to decline to include generation-shifting within the Best System for new sources, unrelated to the issue of statutory interpretation presented here. For example, EPA recognized that new sources would need to incur

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demonstrated that sources can implement or apply to reduce their emissions, as EPA did here. See also Auer v. Robbins, 519 U.S. 452, 462 (1997) (an agency's interpretation of its own regulations commands substantial deference).

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capital and operational costs to meet and maintain their emission limits (e.g., coal-fired plants may need to install partial-carbon-sequestration systems), and EPA reasonably concluded it was not appropriate to impose the additional costs of implementing generation-shifting. 80 Fed. Reg. at 64,627.[47] EPA also considered that because new source standards are effective immediately, new sources would not have the benefit of lead time to implement generation-shifting measures, and therefore some of the least-cost compliance options for these measures may not be available to them. Legal Mem. 4, JA___.

Next, Petitioners' focus on the relative stringencies of the existing and new source standards is unavailing. The stringency of the two rules cannot be directly compared. The new source standards became effective immediately. 80 Fed. Reg. at 64,538. However, under the Rule, existing sources will not be subject to CO_2 performance standards until 2022 at the earliest—in fact, states may delay imposing requirements until 2023 or, in most cases, 2024—and the standards are then gradually phased in through 2030. 80 Fed. Reg. at 64,785-86. Meanwhile, EPA is required to review and, if appropriate, revise the stringency of new source standards no less frequently than every eight years—i.e., by 2023. Thus, the stringency of the limits that

[47] As EPA explained, new construction is the preferred time to drive new investment in technological controls that will make a source inherently low-emitting (without any need to obtain offsets), since new sources will have long operating lives over which initial substantial capital costs can be amortized. 80 Fed. Reg. at 64,626.

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will apply to new sources when the existing source standards actually go into effect (2022 or later) and become fully effective (2030) is not yet known.

Moreover, the new source standards apply directly to each new source individually and are expressed in the form of a rate that each source must meet in practice without reliance on emission-rate credits. In contrast, states have great flexibility in fashioning requirements for existing sources consistent with EPA's guidelines, and existing sources are expected to be able to access cost-effective crediting measures to meet their eventual state standards.

In any event, as EPA noted, "[n]o provision in [S]ection 111, nor any statement in the legislative history, nor any of its case law, indicates that the standards for new sources must be more stringent than the standards for existing sources." Id. at 64,787. To support their position that new source standards must be more stringent, Petitioners principally point to EPA's 1975 implementing regulations, Pet. Legal Br. 58, in which EPA noted that existing source guidelines will "*ordinarily* be less stringent." 40 Fed. Reg. at 53,344 (emphasis added). But EPA's use of the word "ordinarily" itself clarifies that there may be instances where existing source guidelines *are* more stringent.

The Primary Aluminum Guidelines cited by Petitioners are one such instance and refute Petitioners' proposition that EPA has "never" adopted more stringent existing source guidelines. Pet. Legal Br. 59 n.30. As EPA noted in those guidelines, an "occasional old [aluminum] plant may have a [more stringent] guideline fluoride

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emission rate than a new plant subject to [a new source standard]; but such a rate will not be unreasonable to attain." 45 Fed. Reg. 26,294, 26,295 (Apr. 17, 1980).

Ultimately, the relevant question for review—in either the case of new source standards or existing source guidelines—is whether EPA has identified a suitable system of emission reduction, and has reasonably explained the decisions made.[48] EPA has done so here. No more is required.

C. The Rule Is Consistent with the Discretion Given to States by Section 111(d) and EPA's Regulations.

Petitioners argue that, by setting guidelines expressed as "uniform performance rates," EPA has expropriated states' right to establish specific emission standards for sources themselves. Pet. Legal Br. 74-76. They are mistaken.

Under Section 111(d) and longstanding regulations (40 C.F.R. Part 60, Subpart B), the agency promulgates "guidelines" for states to follow when submitting "satisfactory" plans establishing emission standards for existing sources. While it is the states' job to establish such standards, those standards must "reflect[]" the "degree of emission limitation achievable through the application of the best system of

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[48] As explained below at Argument VI.D, the Rule's "leakage" provisions, see Pet. Legal Br. 60-61, have nothing to do with the relative stringency of the emission *rates* in the new and existing source standards. Rather, they are necessary to eliminate perverse incentives that would undermine the integrity of the *mass* cap in states that choose the option of a mass-based trading plan, and would be needed regardless of whether the rates in the new source standards are more or less stringent than the existing source standards. If states adopt rate-based emission limits, these "leakage" requirements do not apply. See 80 Fed. Reg. at 64,822-23.

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emission reduction … *the Administrator determines* has been adequately demonstrated." 42 U.S.C. § 7411(a)(1) (emphasis added). Thus, it is *EPA's* job to determine the best system of emission reduction and the degree of emission limitation achievable through that system—i.e., to establish a minimum level of stringency—which then enables states to create "satisfactory" plans.[49] EPA regulations have so stated since 1975,[50] making Petitioners' argument untimely. See 42 U.S.C. § 7607(b)(1).

Here, EPA expressed the degree of emission limitation achievable through application of the Best System in the form of uniform CO_2 emission rates, and then translated those rates into state-specific rate- and mass-based goals. 80 Fed. Reg. at 64,667. But EPA left it to each state to set particular standards for particular sources, taking advantage of the Rule's menu of options. Id. at 64,707, 64,823-24. Thus, "state[s] may apply a standard of performance that is either more stringent or less stringent than the performance level in the emission guidelines, as long as, in total, the state's sources achieve at least the same degree of emission limitation as included in

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[49] Petitioner UARG previously recognized EPA's role in this regard. See UARG Mercury Rule Comments, 133-34 ("[S]tate plans must be consistent with EPA's regulatory determination. … Nothing in the Act … gives states the ability to choose not to follow the guidelines that EPA establishes under § 111 based on the Administrator's 'best system' determination."), JA___.

[50] See 40 Fed. Reg. at 53,342-43 (rejecting argument that it was inappropriate for EPA to determine minimum stringency); 40 C.F.R. § 60.24(c) (requiring that state "emission standards shall be no less stringent than the [EPA] guidelines"). Petitioners cite instances where EPA approved state plans addressing pollutants that endanger welfare but not health. Pet. Legal Br. 75 n.39. CO_2, however, endangers both health and welfare, 80 Fed. Reg. at 64,682, so 60.24(c), not 60.24(d), applies here.

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the EPA's emission guidelines." Id. at 64,719. This division of responsibilities is consistent with Section 111(d) and cooperative federalism principles.

Petitioners also mistakenly argue that EPA has unlawfully encroached on states' authority to consider sources' remaining useful lives. Pet. Legal Br. 76-78. But the statute requires only that EPA "*permit* the State in applying a standard of performance *to a particular source* … to take into consideration, among other factors, the remaining useful life of the existing source." 42 U.S.C. § 7411(d)(1) (emphasis added). EPA did so here by allowing states to decide, *inter alia*, whether to enable trading,[51] what interim steps to meet, and whether to impose varying emission standards. 80 Fed. Reg. at 64,871-72; Legal Mem. 41-42, JA___.[52]

Petitioners do not argue that this range of choices is insufficient. Instead, they claim that the Act requires EPA to allow states to "relax" *the overall degree of emission limitation*. Pet. Legal Br. 77. The Act says no such thing. Rather, it is silent—and thus gives EPA discretion—regarding *how* EPA should "permit"[53] states to consider

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[51] Trading alone gives sources with shorter remaining useful lives proportionately lower total costs of compliance; thus states can account for remaining useful life even if they adopt the uniform rates. 80 Fed. Reg. at 64,871.

[52] Petitioners suggest that Kansas sources that have installed expensive technology to meet other requirements will be forced to retire early. Pet. Legal Br. 77-78 nn.40-41. This is speculation, and ignores that Kansas has a wide range of options; it can avoid premature retirements by, e.g., allowing trading. See id. at 64,872.

[53] To "permit" means "to allow or give consent" and is commonly understood as granting authority that may be subject to conditions. See Legal Mem. 37 (citing the

(Footnote Continued …)

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remaining useful life and other factors. Legal Mem. 41, JA___.[54] Here, EPA permits states to consider such factors by giving them numerous tools for achieving their mass- or rate-based goals, and allowing them to determine the appropriate means and level of control for any particular source.

II. Regulation of Hazardous Pollutant Emissions under CAA Section 112 Does Not Bar Regulation of CO_2 Emissions under Section 111(d).

Consistent with the Supreme Court's holding in AEP that Section 111 "speaks directly" to the emission of CO_2 from existing power plants, 564 U.S. at 424, EPA has authority to regulate such plants' CO_2 emissions under that provision. Petitioners argue that, in 1990, Congress eviscerated EPA's authority under Section 111(d), barring it from using that provision to regulate any source category that is also regulated under Section 112, even in regard to different pollutants. But EPA's regulation of different pollutants under a different statutory program does not nullify its authority under Section 111(d). Rather, EPA reasonably interpreted Section 111(d)

Oxford English Dictionary and noting that "the law permits the sale of drugs" is understood to mean that the law may set conditions on such sales), JA___.

[54] Petitioners mistakenly claim, Pet. Legal Br. 77, that, in 1977, Congress "codified" the variance provision set forth in 40 C.F.R. § 60.24(f), which is not applicable here. But Congress knew how to create an explicit variance when it desired, and the statute does not contain such language. See Legal Mem. 34, 45-46, JA___, ___. Nor does the statute "provide an unmitigated ability for States to exempt their sources from standards." Id. at 35-37, JA___. Rather, it requires states to "apply[]a standard of performance" to each "particular source." 42 U.S.C. § 7411(d)(1).

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—which is ambiguous in several respects—consistent with the Act's purpose, the statutory context, and the legislative history.

A. Congress Amended the Act in 1990, Adding the Text at Issue.

Before 1990, Section 111(d) undisputedly directed EPA to regulate existing sources' emissions of a pollutant regulated under Section 111(b) so long as that pollutant was not a criteria or hazardous pollutant. Congress accomplished this by cross-referencing the listing provisions of the criteria and hazardous pollutant programs, Sections 108(a) and 112(b)(1)(A) respectively:

> The Administrator shall prescribe regulations … under which each State shall submit to the Administrator a plan which (A) establishes standards of performance for any existing source for any air pollutant (i) for which air quality criteria have not been issued or *which is not included on a list published under section 7408(a) or 7412(b)(1)(A)* of this title ….

42 U.S.C. § 7411(d)(1)(A) (1988) (emphasis added).

In 1990, Congress amended the Act to, *inter alia*, accelerate EPA's regulation of hazardous pollutants under Section 112, compelling EPA to regulate more pollutants more quickly.[55] In doing so, Congress eliminated Section 112(b)(1)(A), which described a process for identifying hazardous pollutants, and replaced it with a list of 189 hazardous pollutants that EPA must regulate. See 42 U.S.C. § 7412(b). To address that change, Congress enacted two amendments to Section 111(d) that replaced the prior cross-reference to Section 112(b)(1)(A), but in different ways.

[55] See 80 Fed. Reg. at 64,711; S. Rep. No. 101-228, at 133.

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Section 108(g), drafted by the House, replaced the obsolete cross-reference with the phrase "emitted from a source category which is regulated under section 112."[56] Section 302(a), drafted by the Senate, replaced the old cross-reference with a cross-reference to new Section 112(b).[57] When the 1990 Amendments were codified, the Law Revision Counsel updated 42 U.S.C. § 7411(d) by incorporating section 108(g), but not section 302(a). Congress has not enacted the codified version as positive law.

B. EPA Reasonably Read Section 111(d) To Allow CO_2 Regulation.

Petitioners argue that once a source category's emissions of hazardous pollutants have been regulated under Section 112,[58] that source category cannot be regulated under Section 111(d), even in regard to a pollutant not listed as hazardous. Pet. Legal Br. 61-64. Petitioners' interpretation of Section 111(d)—which would strip that provision of nearly all effect—is not reasonable, let alone mandatory. Section 302(a) of the 1990 Amendments (the Senate-drafted amendment) plainly permits regulation of power plants' emissions of CO_2 and other dangerous, but

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[56] Pub. L. No. 101-549, § 108(g), 104 Stat. 2467 (1990).

[57] Id. § 302(a), 104 Stat. 2574.

[58] EPA regulated power plants' emissions of certain hazardous pollutants in 2012. 77 Fed. Reg. 9304 ("Mercury and Air Toxics Rule"). This rule was upheld by this Court, reversed in part by the Supreme Court, and remains in place on remand. See Michigan v. EPA, 135 S. Ct. 2699 (2015), stay of rule denied March 3, 2016; White Stallion Energy Ctr. v. EPA, 748 F.3d 1222 (D.C. Cir. 2014) (No. 12-1100), Dkt. No. 1588459.

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non-hazardous pollutants under Section 111(d). The text of Section 111(d) as amended by the House only is ambiguous, and EPA reasonably interpreted it to allow regulation of dangerous emissions not regulated under Section 112. EPA's reasonable interpretation is entitled to deference. See Chevron, 467 U.S. at 837.

1. Read literally, the House-amended text of Section 111(d) allows regulation of any non-criteria pollutant.

As set forth in the U.S. Code, the House-amended text of Section 111(d) reads:

> The Administrator shall prescribe regulations which shall establish a procedure similar to that provided by section 7410 of this title under which each State shall submit to the Administrator a plan which (A) establishes standards of performance for any existing source for any air pollutant (i) for which air quality criteria have not been issued or which is not included on a list published under section 7408(a) of this title or emitted from a source category which is regulated under section 7412 of this title but (ii) to which a standard of performance under this section would apply if such existing source were a new source ....

42 U.S.C. § 7411(d)(1).

Petitioners characterize their interpretation as the "literal meaning" of this convoluted text. Pet. Legal Br. 64. It is not. Rather, if this text is read literally, it directs EPA to regulate a source category's emission of *any pollutant that is not a criteria pollutant.* This is because Congress used "or" rather than "and" between the clauses delineating the scope of the provision:

> The Administrator shall prescribe regulations ... under which each State shall submit to the Administrator a plan ... for any existing source for any air pollutant for which air quality criteria have not been issued **or** which is not

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> included on a list published under section 7408(a) of this title **or** emitted from a source category which is regulated under section 7412 ….

42 U.S.C. § 7411(d)(1) (emphasis added). If "or" is given its literal meaning, those clauses are alternatives,[59] meaning that EPA must regulate so long as *either* air quality criteria have not been established for the pollutant at issue *or* one of the remaining criteria is met. Air quality criteria have not been issued for CO_2.

Although this literal reading would authorize CO_2 regulation, EPA reasonably rejected it because it "gives little or no meaning to the limitation covering [hazardous pollutants] that are regulated under CAA section 112," 80 Fed. Reg. at 64,713, and Petitioners do not advance it. The critical point, rather, is that the text that Petitioners claim has one "literal" meaning cannot be read literally, but rather is ambiguous and must be interpreted in light of the statute's purpose, scheme, and legislative history.

2. EPA reasonably interpreted the ambiguous House-amended text of Section 111(d).

Having explained that the House-amended text of Section 111(d), as set forth in the U.S. Code, cannot be read literally, EPA reasonably interpreted that provision, addressing several other ambiguities in that text along the way. 80 Fed. Reg. at 64,711-15.

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[59] "Or" "indicate[s] an alternative <coffee *or* tea> <sink *or* swim>." Merriam-Webster Dictionary, available at http://www.merriam-webster.com/.

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Petitioners argue that the phrase introduced by section 108(g) of the 1990 Amendments—"emitted from a source category which is regulated under section 7412 of this title," 42 U.S.C. § 7411(d)—is plain, citing a broad dictionary definition of "regulated." Pet. Legal Br. 62. But when construing that term in a particular statutory context, one must take a "commonsense" approach, and ask not only "who" is regulated under Section 112 (i.e., source categories including power plants), but also "what." See Rush Prudential HMO v. Moran, 536 U.S. 355, 366 (2002).[60] Here, the "what" that is "regulated under section 7412" is power plants' emission of specific pollutants: hazardous pollutants listed under Section 112. Therefore, EPA reasonably interpreted the phrase "any air pollutant … emitted from a source category which is regulated under section 7412" as identifying, and thus excluding from the scope of regulation under Section 111(d), only a source category's emissions of *hazardous pollutants regulated under Section 112.* 80 Fed. Reg. at 64,713.

Moreover, EPA also reasonably considered that the phrase "emitted from a source category regulated under section 7412" modifies "any air pollutant," 42 U.S.C. § 7411(d), an ambiguous term that the Supreme Court has instructed must be given a "reasonable, context-appropriate meaning." UARG, 134 S. Ct. at 2440. Here, context suggests that "any air pollutant" "emitted from a source category which is

[60] See also UNUM Life Ins. Co. of Am. v. Ward, 526 U.S. 358, 363 (1999) ("'regulates insurance' … require[s] interpretation, for [its] meaning is not 'plain'").

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regulated under section 7412" is most reasonably interpreted to mean *hazardous* pollutants, because only source categories' hazardous pollutant emissions are "regulated under section 7412."

Petitioners ignore these ambiguities, accusing EPA of attempting to "evade a literal reading of the CAA." Pet. Legal Br. 66 (quoting UARG, 134 S. Ct. at 2446). But as discussed above, the "literal reading" of 42 U.S.C. § 7411(d) authorizes regulation of CO_2 because it is not a criteria pollutant. All parties agree that this literal reading is not what Congress intended, so the question then is whether EPA has reasonably resolved the ambiguities in the provision. EPA has done so, employing traditional "tools of statutory interpretation, including text, structure, purpose, and legislative history," Loving v. IRS, 742 F.3d 1013, 1016 (D.C. Cir. 2014) (quotation omitted), to conclude that Congress did not intend to bar regulation of all emissions—whether otherwise regulated or not—from most major industrial sources under Section 111(d).

Statutory purpose: The Act's purpose is to protect "public health and welfare," 42 U.S.C. § 7401(b)(1), and Congress's purpose in enacting the 1990 Amendments was to *strengthen*, not undermine, the Act's core programs.[61]

[61] See S. Rep. No. 101-228, at 14, 133; H.R. Rep. No. 101-952, at 336, 340, 345 & 347 (1989).

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Petitioners' interpretation of section 108(g) of the 1990 Amendments (the House-drafted language), however, would practically nullify the Section 111(d) program. Section 112 *mandates* that EPA regulate each major source category emitting any of the almost 190 pollutants listed under Section 112(b).[62] 42 U.S.C. § 7412(d)(1). EPA has accordingly regulated over 140 source categories under Section 112. Petitioners' interpretation would preclude regulation of any of those source categories—even in regard to dangerous pollutants not regulated under Section 112. Given the Act's and the 1990 Amendment's stated purposes, the idea that Congress, in 1990, intended to disable EPA from regulating virtually any significant category of major industrial sources under Section 111(d) makes no sense.

Statutory context: EPA's interpretation also best accounts for statutory context. See UARG 134 S. Ct. at 2442 (a "reasonable statutory interpretation must account for … the broader context of the statute as a whole") (quotation omitted). Here, the "broader context" is that Section 111(d) was designed to work in tandem with the criteria and hazardous pollutant programs to collectively cover the full range

[62] The only exception is power plants, in regard to which Congress instructed EPA to first consider whether regulation is "appropriate and necessary." See 42 U.S.C. § 7412(n)(1). Thus, insofar as Petitioners argue that EPA can choose between regulating a source category's emissions of hazardous pollutants under Section 112 or other dangerous pollutants under Section 111(d)—a "pick your poison" approach that is antithetical to the Act's goals—that is only true in regard to power plants.

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of dangerous emissions from stationary sources, leaving no gaps.[63] But under Petitioner's reading, there would be a gaping hole in the Act's coverage, allowing the unregulated emission of pollutants not listed as "hazardous" or "criteria," but nonetheless dangerous to public health or welfare. Such a result cannot be squared with the Act's scheme. See Burwell, 135 S. Ct. at 2492 ("A provision that may seem ambiguous in isolation is often clarified by the remainder of the statutory scheme … because only one of the permissible meanings produces a substantive effect that is compatible with the rest of the law." (citations omitted)).

Furthermore, where the Court is "charged with understanding the relationship between two different provisions within the same statute," it "must analyze the language of each to make sense of the whole." Bell Atl. Tel. Cos. v. FCC, 131 F.3d 1044, 1047 (D.C. Cir. 1997). Here, Petitioners' view of Section 111(d) is inconsistent with Section 112(d)(7), which states:

> No emission standard or other requirement promulgated under this section [112] shall be interpreted … to diminish or replace the requirements of a more stringent emission limitation or other applicable requirement established pursuant to section [1]11 ….

42 U.S.C. § 7412(d)(7). This text strongly indicates that Congress anticipated that the Section 111 and 112 programs would apply to the same sources simultaneously.

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[63] See S. Rep. No. 91-1196, at 20.

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Thus, like the lower court's reading of the phrase "regulations applicable solely to public lands" in Sturgeon v. Frost, No. 14-1209, Slip Op. at 13 (S. Ct. Mar. 22, 2016), Petitioners' reading of Section 111(d) "may be plausible in the abstract, but it is ultimately inconsistent with both the text and context of the statute as a whole."

Legislative history: Petitioners have not identified a single statement indicating that, in 1990, Congress sought to restrict EPA's authority under Section 111(d).[64] Petitioners would have the Court believe that Congress cut the heart out of Section 111(d) without uttering a word to that effect. "It would have been extraordinary for Congress to make such an important change in the law without any mention of that possible effect," Sale v. Haitian Ctrs. Council, 509 U.S. 155, 176 (1993), and it is particularly unreasonable to think that Congress did so when simply replacing an obsolete cross-reference. See Whitman v. Am. Trucking Ass'ns, 531 U.S. 457, 468 (2001) ("Congress … does not alter the fundamental details of a regulatory scheme in vague terms or ancillary provisions.").

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[64] Petitioners point to a Senate Managers' "Statement" noting that the Senate "recede[d]" to the House regarding section 108 of the 1990 Amendments. Pet. Legal Br. 73 (citing 136 CONG. REC. 36,067 (Oct. 27, 1990)). But "recedes" means simply that a chamber is withdrawing an objection, and that term was used here only in regard to section 108, and thus tells us nothing about Congress's intent for section 302 (containing the Senate's amendment). Regardless, this Statement was "not reviewed or approved by all of the conferees," 136 CONG. REC. 36,067, and "cannot undermine the statute's language." Envtl. Def. Fund v. EPA, 82 F.3d 451, 460 n.11 (D.C. Cir. 1996).

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Rather, the reasonable conclusion is that, like the Senate, the House intended only to update Section 111(d) to reflect the structural changes made to Section 112, not dramatically change its scope.[65] Indeed, the Congressional Research Service characterized the two amendments as "duplicative" edits that "change the reference to section 112" using "different language" shortly after their enactment.[66]

Lacking legislative history supporting their contrary interpretation of section 108(g) of the 1990 Amendments, Petitioners theorize that Congress sought to prevent "double regulation." Pet. Legal Br. 68. This theory does not survive examination. Sections 112 and 111 regulate different air pollutants: "hazardous" versus other dangerous pollutants. There is no "double regulation" when the programs at issue address different pollutants. Indeed, sources are often subject to multiple CAA

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[65] Section 108(g) appears to be a vestige of an earlier bill that would have barred from regulation *under Section 112* "[a]ny air pollutant … which is regulated for a source category under section 111(d)." See 80 Fed. Reg. at 64,711, n.289 (citing H.R. 4, § 2 (Jan. 3, 1989)). In other words, "the Section 112 Exclusion in section 111(d) … was originally crafted as what might be called a 'Section 111(d) Exclusion' in section 112." Id. In that context, the "source category" phrasing was plainly pollutant-specific. Furthermore, when the House subsequently introduced its initial draft of the 1990 Amendments, it proposed that Section 112 regulation be discretionary. See H.R. 3030, 101st Cong. § 301 (July 1989), reprinted in 2 Leg. History of the Clean Air Act Amends. of 1990 (Comm. Print 1993) ("1990 Leg. Hist."), at 3937. The use of the "source category" phrasing in section 108(g) of that early bill may have been intended to convey that EPA could regulate a source category's emissions of hazardous pollutants under Section 111(d) where it chose not to regulate those emissions under Section 112, and then inadvertently retained after the House amended the bill to adopt the Senate's mandatory approach to Section 112 regulation.

[66] 1 1990 Legis. Hist. at 46 n.1.

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programs addressing different pollutants—or even the same pollutants for different purposes—simultaneously. For example, Congress made power plants subject to at least four different CAA programs (not counting Section 111(d)),[67] as well as state regulation.[68] And even under Petitioners' interpretation, EPA could regulate a source category under both Section 111(d) and 112 *so long as it regulated under Section 111(d) first*, which only underscores the absurdity of that interpretation.

Finally, Petitioners' theory that section 108(g) of the 1990 Amendments reflects Congress's intent to bar most Section 111(d) regulation ignores "the most telling evidence of congressional intent": section 302(a), the contemporaneous Senate amendment, which plainly preserved the preexisting scope of Section 111(d). CBS v. FCC, 453 U.S. 367, 381 (1981).

3. The Senate's amendment plainly permits CO_2 regulation.

While section 108(g) of the 1990 Amendments is ambiguous, section 302(a) (the Senate's amendment) is not. It plainly authorizes EPA to regulate power plants' CO_2 emissions under Section 111(d) regardless of whether other power-plant emissions are regulated under Section 112. EPA properly considered this clear indication of congressional intent when interpreting Section 111(d).

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[67] 80 Fed. Reg. at 64,696-98 (describing the Acid Rain Program, the "Good Neighbor Provision," the hazardous pollutant program, and the Regional Haze Program).

[68] See 42 U.S.C. § 7416.

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Section 302(a) is straightforward. It substitutes "section 112(b)" for the prior cross-reference to "section 112(b)(1)(A)." Pub. L. No. 101-549, § 302(a), 104 Stat. at 2574. So amended, Section 111(d) mandates that EPA require states to establish standards "for any existing source for any air pollutant … which is not included on a list published under section [1]08(a) or section [1]12(b)." See id. CO_2 is not listed as a criteria pollutant under Section 108(a) or as a hazardous pollutant under Section 112(b); therefore, as amended by the Senate, Section 111(d) instructs EPA to regulate CO_2 emissions from power plants.

It is black-letter law that "the [U.S.] Code cannot prevail over the Statutes at Large when the two are inconsistent." Stephan v. United States, 319 U.S. 423, 426 (1943); Five Flags Pipe Line Co. v. Dep't of Transp., 854 F.2d 1438, 1440 (D.C. Cir. 1988) ("[W]here the language of the Statutes at Large conflicts with the language in the United States Code that has not been enacted into positive law, the language of the Statutes at Large controls.").[69] Thus, EPA properly considered both sections 108(g) and 302(a) of the 1990 Amendments when interpreting Section 111(d).

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[69] Intervenors charge that EPA has "interfere[ed]" with an ongoing attempt to enact the Act into positive law. Intervenors' Brief Supporting Petitioners ("Int. Br.") 15. But EPA's concerns with the restatement drafted by the Office of Law Revision Counsel go well beyond Section 111(d). While purporting not to change the meaning of the statutory text, the draft in fact makes many wording and organizational changes. EPA therefore informed Congress that reviewing such proposed legislation would be an enormous undertaking and that its enactment would only complicate interpretation of the statute. See Nov. 18, 2015 Letter from EPA Gen. Counsel Avi S. Garbow, JA___.

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Petitioners nonetheless claim that section 302(a) should be ignored. They argue that the Office of Law Revision Counsel ("the Office") properly disregarded it as "conforming" in favor of the "substantive" House-drafted amendment. Pet. Legal Br. 69-72. To begin with, a decision "made by a codifier without the approval of Congress … should be given no weight."[70] United States v. Welden, 377 U.S. 95, 98 n.4 (1964). EPA does not "contend[] that [the Office] erred," Pet. Legal Br. 72; rather, the Office's handling of the amendments is simply not instructive, as it tells us nothing about their comparative import or meaning. The Office is a functionary of the House; its job is to "prepare[] and publish[] the United States Code."[71] While it may *recommend* revisions, the Statutes at Large control until Congress enacts a revised version of the statute into positive law. The Office's own website so states.[72]

Moreover, the idea that the House's amendment is "substantive" while the Senate's amendment is "conforming" is a fallacy. Petitioners define "conforming" amendments as those "necessitated by the substantive amendments." Pet. Legal Br. 69 (quoting Senate Legislative Drafting Manual § 126(b)(2)). Here, both amendments

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[70] EPA does not dispute that there are numerous instances in which an amendment has not been executed in the U.S. Code. See Pet. Legal Br. n.36. But Petitioners miss the point. While most unexecuted amendments are trivial or duplicative, in the rare instances where unexecuted text has substantive import, it must be considered.

[71] See Office website, at http://uscode.house.gov/about/info.shtml.

[72] See http://uscode.house.gov/c odification/legislation.shtml ("The text of the law appearing in the Statutes at Large prevails over the text of the law appearing in a non-positive law title.").

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were necessitated by Congress's substantive change to Section 112 (the replacement of listing procedures with a list of 189 pollutants to be regulated), and thus both are "conforming." Indeed, the "Miscellaneous Guidance" heading above section 108(g) of the 1990 Amendments no more indicates substance than the "Conforming Amendments" heading above section 302(a). See Burgess v. United States, 553 U.S. 124, 135 (2008) (parties should not "place[] more weight on the 'Conforming Amendments' caption than it can bear").

In any event, this Court gives full effect to conforming amendments. See Wash. Hosp. Ctr. v. Bowen, 795 F.2d 139, 149 (D.C. Cir. 1986). Petitioners cite American Petroleum Institute v. SEC ("API"), 714 F.3d 1329, 1336 (D.C. Cir. 2013), as suggesting otherwise. Pet. Legal Br. 73. But the Court did not ignore a conforming amendment in API; rather, it refused to presume that Congress intended to give it original jurisdiction over certain agency action but forgot to enact a conforming amendment doing so. 714 F.3d at 1336-37. And the Court reiterated that "a statute should be construed so that effect is given to all its provisions." Id. at 1334 (quotation omitted). Here, the statutory text includes both section 108(g) and 302(a) of the 1990 Amendments, and both must be given effect.

4. EPA's interpretation properly avoids creating an unnecessary conflict within enacted statutory text.

Unlike Petitioners, who interpret sections 108(g) and 302(a) of the 1990 Amendments to be in conflict and then simply disregard the latter to resolve that

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conflict, EPA has complied with the canon that "provisions in a statute should be read to be consistent, rather than conflicting, if possible." 80 Fed. Reg. at 64,713 (citing Scialabba v. Cuellar De Osorio, 134 S. Ct. 2191, 2219-20 (2014) (plurality op.)); see also Scialabba, 134 S. Ct. at 2228 (Sotomayor, J., dissenting) ("before concluding that Congress has legislated in conflicting and unintelligible terms," "traditional tools of statutory construction" should be used to "allow [the statute] to function as a coherent whole") & 2214 (Roberts, C.J., concurring) (statute should be read "as a symmetrical and coherent regulatory scheme," "fit[ting], if possible, all parts into a harmonious whole" (quotation omitted)).

Moreover, this Court has opined that where Congress "drew upon two bills originating in different Houses and containing provisions that, when combined, were inconsistent in respects never reconciled in conference," "it was the greater wisdom for [EPA] to devise a middle course." Citizens to Save Spencer Cnty. v. EPA, 600 F.2d 844, 872 (D.C. Cir. 1979). That is exactly what EPA did here: it gave meaning to both sections 108(g) and 302(a) of the 1990 Amendments, resulting in a reading that excludes a substantial set of emissions from the scope of Section 111(d)—hazardous emissions already regulated under Section 112—but leaves Section 111(d) with a meaningful role in the statutory scheme.

Petitioners argue that, if both amendments have effect, they should be applied cumulatively, excluding from Section 111(d)'s scope (1) all source categories regulated under Section 112 (per Petitioners' interpretation of section 108(g)) *and* (2) all

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hazardous pollutants (per section 302(a)). Pet. Legal Br. 48-50; Int. Br. 14. But if the effects of the two amendments are combined, the result would clearly be to authorize regulation where *either* the pollutant is not listed as hazardous, *or* the source category is not regulated under Section 112. Section 111(d) is framed as an affirmative mandate: EPA "shall prescribe regulations" unless a particular restriction applies. 42 U.S.C. § 7411(d)(1). Thus, if both amendments are given full effect, EPA has authority to regulate pursuant to either affirmative grant of authority. Petitioners' approach, in contrast, would render section 302(a) of the 1990 Amendments a nullity and leave an even bigger gap in the Act's coverage. This is no reasonable "middle course," Spencer Cnty., 600 F.2d at 872, and does not "fit[] best with, and make[] [the] most sense of, the statutory scheme," Scialabba, 134 S. Ct. at 2203.

In any event, if this Court concludes that the two amendments have the irreconcilable meanings Petitioners ascribe to them, then the appropriate course is to disregard *both*. See ANTONIN SCALIA & BRYAN A. GARNER, READING LAW: THE INTERPRETATION OF LEGAL TEXTS 189 (2012) ("if a text contains truly irreconcilable provisions … and they have been simultaneously adopted, neither provision should be given effect"), JA___.[73] Under that approach, Section 111(d) would revert to its pre-1990 text, and EPA would have authority to regulate CO_2.

[73] Alternatively, this Court has held that "if there exists a conflict in the provisions of the same act, the last provision in point of arrangement must control." Lodge 1858,

(Footnote Continued …)

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Intervenors argue that if both amendments are effective, it is not for EPA to resolve the conflict between them. Int. Br. 11-13.[74] But Chevron does not go out the window at the first sign of potential statutory inconsistency. Rather, where "internal tension" in a statute "makes possible alternative reasonable constructions," "Chevron dictates that a court defer to the agency's … expert judgment about which interpretation fits best with, and makes the most sense of, the statutory scheme." Scialabba, 134 S. Ct. at 2203. And Chevron is equally applicable when the scope of an agency's authority is at issue. See City of Arlington, 133 S. Ct. at 1871. EPA's interpretation of Section 111(d) is therefore entitled to deference.

5. EPA's interpretation is consistent with AEP.

The holding of AEP—that Section 111 "speaks directly to emissions of [CO_2] from the defendants' [existing power] plants," and therefore leaves "no room" for federal common law claims seeking to limit such emissions, 564 U.S. at 424-25—severely undercuts Petitioners' arguments. It is difficult to see how one can

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Am. Fed'n of Gov't Emps. v. Webb, 580 F.2d 496, 510 (D.C. Cir. 1978). Section 302(a) (the Senate's amendment) follows section 108(g).

[74] Intervenors cite Whitman, 531 U.S. at 457, for the proposition that EPA may not choose between "versions" of a statute. Int. Br. 12. But that case concerned whether Congress's command that EPA set air quality standards "requisite to protect public health" and "allowing an adequate margin of safety" was unlawfully broad, and it was in that context that the Court noted that an agency could not overcome such a deficiency by declining to exercise some portion of the authority granted. The Court noted that it has found this to be the case only twice, whereas it has routinely upheld agencies' authority to execute vaguely drafted commands. Whitman, 531 U.S. at 472-74.

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reasonably assert that a provision that "speaks directly" to power plants' CO_2 emissions is in fact entirely off the table as a tool for addressing them.

To try to make that argument, Petitioners point to a footnote in AEP stating that "EPA may not employ § 7411(d) if existing stationary sources of the pollutant in question are regulated under the national ambient air quality standard program, §§ 7408-7410, or the 'hazardous air pollutants' program, § 7412." Pet. Legal Br. 62 (citing 564 U.S. at 424 n.7). But this dictum cannot fairly be read to endorse Petitioners' interpretation of Section 111(d).

First, the question of whether Section 111(d) bars regulation of *all* emissions from a source category once *hazardous* emissions from that category have been regulated under Section 112 was not raised or briefed in AEP.

Second, the Court's use of the phrase "of the pollutant in question" suggests that it understood the regulatory bar to be pollutant-specific (consistent with EPA's interpretation), as does the structure of that statement. The Court references the Section 108 and 112 carve-outs as functioning identically, and the Section 108 restriction is plainly and undisputedly criteria-pollutant specific. Thus, if the AEP footnote means what Petitioners believe, it is at least half wrong.

Finally, the fact that both Section 111 and 112 regulation of existing power plants were ongoing during AEP strongly suggests that neither the Court nor the parties in that case (including states and utilities) thought that the latter barred the

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former. EPA listed coal-fired power plants under Section 112 a decade before AEP,[75] became subject to a consent decree requiring it to promulgate Section 112 standards for power plants a year before AEP,[76] and signed the proposed Mercury and Air Toxics Rule a month before oral argument.[77] Petitioners in AEP nonetheless asserted in briefing that "EPA may … require States to submit plans to control" existing power plants' greenhouse-gas emissions, citing Section 111(d),[78] and reiterated at argument that "EPA can consider, as it's undertaking to do, regulating existing [power plants] under section 111."[79] The Court accordingly noted that such regulatory action was underway when opining that EPA's authority over power plants' CO_2 emissions preempted federal common law.[80] The absence of any suggestion that the ongoing regulation of power plants under Section 112 deprived EPA of its authority to regulate those sources' CO_2 emissions under Section 111(d) is telling.

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[75] 65 Fed. Reg. 79,825, 79,827 (Dec. 20, 2000).

[76] See Am. Nurses Ass'n v. Jackson, No. 08-2198, 2010 WL 1506913 (D.D.C. Apr. 15, 2010) (Dkt. No. 33).

[77] See 76 Fed. Reg. 24,976, 25,091 (May 3, 2011) (signed Mar. 16, 2011).

[78] Brief for Pet.'s, AEP, 564 U.S. 410 (No. 10-174), 2011 WL 334707, at *6-7.

[79] Oral Argument Transcript, id., 2011 WL 1480855, at *16-17.

[80] 564 U.S. at 417-18 ("EPA commenced a rulemaking under § 111 of the Act … to set limits on greenhouse gas emissions from new, modified, and existing fossil-fuel fired power plants").

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6. EPA's interpretation is consistent with past rulemakings.

Petitioners and Intervenors also claim that EPA has previously read Section 111(d) as they do, pointing to the 2005 Mercury Rule as well as a 1995 background report on municipal solid waste landfills. Pet. Legal Br. 62-63; Int. Br. 6-7. To begin with, the agency is free to change its interpretation of a statute that it administers. See Nat'l Cable & Telecomms. Ass'n, 545 U.S. at 981. Indeed, Chevron itself addressed EPA's "changed [] interpretation" of the statutory term "source," and the Court rejected the assertion that deference was therefore unwarranted. See 467 U.S. at 863-64 ("An initial agency interpretation is not instantly carved in stone. On the contrary, the agency, to engage in informed rulemaking, must consider varying interpretations and the wisdom of its policy on a continuing basis."). In any event, in the past rulemaking proceedings cited by Petitioners here, EPA reached the same conclusion that it reached in the Rule: Section 111(d) permits regulation unless *the same source category's emissions of the same pollutant* are regulated under Section 112.

In 2005, EPA addressed whether Section 111(d) bars regulation of emissions of a pollutant listed under Section 112, but not actually regulated under that section, and concluded that it did not. 70 Fed. Reg. 15,994, 16,032 (Mar. 29, 2005). EPA "note[d]" that "*a* literal reading" of the House-amended text is the one now advanced by Petitioners. Id. at 16,031 (emphasis added). But EPA concluded that this interpretation was not reasonable because it "would be inconsistent with the general thrust of the 1990 amendments which, on balance, reflects Congress's desire to

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require EPA to regulate more substances, not to eliminate EPA's ability to regulate large categories of pollutants like non-[hazardous pollutants]." Id. at 16,032.[81] State and industry intervenors in litigation challenging the Mercury Rule— many of which are Petitioners here—agreed, opining that EPA had "developed a reasoned way to reconcile" section 108(g) and 302(a) of the 1990 Amendments, to which "the Court should defer."[82] See also UARG Mercury Rule Comments, 131 ("Where there are conflicting provisions in a statute, a federal agency must try to harmonize the conflicting provisions and adopt a reading that gives some effect to both provisions … UARG believes that EPA's reconciliation of the differing language is reasonable"), JA___.[83] Thus, it is Petitioners that advance an interpretation of Section 111(d) inconsistent with their prior conclusion.

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[81] Similarly, in the 1995 municipal landfill report, EPA noted that the House-amended text could be read as Petitioners advocate, but concluded that regulation under Section 111(d) was authorized where the source category's emissions of the pollutant at issue (landfill gas) were not actually regulated under Section 112. EPA, Air Emissions from Municipal Solid Waste Landfills—Background Info. for Final Standards and Guidelines, Pub. No. EPA-453/R-94-021, 1-5–1-6 (1995), JA___. In other words, regulation could proceed because EPA had not regulated the same source category's emissions of the same pollutant. Indeed, EPA explained that even *after* municipal landfills were regulated under Section 112, it would still be able to regulate the *non-hazardous* components of landfill gas. Id.

[82] Joint Brief of State Resp't-Intervenors, Indus. Resp't-Intervenors, and State Amicus, New Jersey v. EPA, 517 F.3d 574 (No. 05-1097), 2007 WL 3231261, at *5 n.4 & 25.

[83] Even the CAA Handbook written by UARG's counsel states: "Section 111(d) … governs the regulation of emissions from existing sources of air pollutants that are not … listed as hazardous air pollutants under section 112." HUNTON & WILLIAMS, CLEAN AIR HANDBOOK (4th ed. 2015) at 211.

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In summary, EPA's interpretation of the relevant portion of Section 111(d) as mandating regulation of dangerous pollutants except where the same sources' emissions of the same pollutant are regulated under Section 112 is a reasonable reading of ambiguous statutory text.

III. The Rule Poses No Constitutional Issues.

This case presents routine issues of statutory interpretation, not a constitutional dilemma. Courts have consistently approved cooperative federalism regimes like the Rule. Accepting Petitioners and Intervenors' argument that the Rule violates the Tenth Amendment would break new ground, implicating the constitutionality of numerous other regulatory regimes and federal programs.

A. The Rule Is a Textbook Example of Cooperative Federalism.

"[T]he power conferred by the Commerce Clause [is] broad enough to permit congressional regulation of activities causing air or water pollution … that may have effects in more than one State." Hodel v. Va. Surface Mining & Reclamation Ass'n, 452 U.S. 264, 282 (1981). Congress often exercises this power in statutes that "allow States to administer [the] federal program[] but provide for direct federal administration if a State chooses not to administer it." Miss. Comm'n, 790 F.3d at 175 (quotation omitted). The Supreme Court has "repeatedly affirm[ed]" the constitutionality of these "cooperative federalism" programs. Id.

In Hodel, the Court unanimously upheld an environmental statute offering states the option of regulating surface mining according to minimum federal standards

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or being preempted in that area by direct federal regulation. 452 U.S. at 268-72. Rejecting the argument that the government was "usurp[ing]" the state's traditional authority over land use, the Court found no Tenth Amendment issue because "the States are not compelled to enforce the [] standards, to expend any state funds, or to participate in the federal regulatory program." Hodel, 452 U.S. at 288-89.

New York v. United States, 505 U.S. 144, 167-68 (1992), is another example of the Supreme Court's approval of cooperative federalism. While striking down a provision of the Low-Level Radioactive Waste Policy Act that would have required states to affirmatively take title to radioactive waste, the Court upheld a provision that offered states the choice between regulating such waste themselves and direct federal regulation. Id. at 173-175. The Court again "recognized the ability of Congress to offer States the choice of regulating … to federal standards or having state law pre-empted," noting that such "program[s] of cooperative federalism" are "replicated in numerous federal statutory schemes." Id. at 167, 173-74. The Court found no Tenth Amendment issue where "any burden caused by a State's refusal to regulate will fall on those who generate waste … rather than on the State as a sovereign." Id. at 174.

Finally, this Court recently rejected Texas' Tenth Amendment challenge to the CAA's criteria pollutant program—upon which Section 111(d) is patterned—holding that provisions allowing EPA to designate areas "nonattainment" despite a state's objection, and then requiring the state to submit a plan for that area, did not violate the Tenth Amendment. Miss. Comm'n, 790 F.3d at 174-80. Responding to Texas'

argument that states could not be compelled to implement a federal emissions-reduction program, the Court explained: "But the [CAA] does not do that. Instead, the statutory scheme authorizes the EPA to promulgate and administer a federal implementation plan of its own if the State fails to submit an adequate state implementation plan … Under these circumstances, 'there can be no suggestion that the Act commandeers … the States.'" Id. at 175 (citing Hodel, 452 U.S. at 288).

The Rule cannot be meaningfully distinguished from the examples of cooperative federalism discussed above. States are given a choice: they can take advantage of the Rule's flexibility to develop their own plans to reduce power plants' CO_2 emissions, or they can decline to do so and EPA will directly regulate those sources' CO_2 emissions instead. See 80 Fed. Reg. at 64,986. There is no constitutionally significant distinction in this regard between the Rule and the regulatory frameworks approved in Hodel, New York, and Miss. Comm'n.

Petitioners argue there is a "mismatch" here between EPA's authority and what the Rule requires because EPA lacks the authority to "decarbonize … the U.S. economy." Pet. Legal Br. 80. But, under the Rule "EPA would only *regulate* emissions" of specific pollutants from specific sources. Massachusetts, 549 U.S. at 531. "[T]here is nothing counterintuitive to the notion that EPA can curtail the emission of substances that are putting the global climate out of kilter." Id. As discussed in Argument I.B.5, the Rule's effects on energy production are indirect,

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resulting from EPA's congressional mandate to regulate dangerous emissions with interstate effects.

B. The Rule Does Not Unlawfully Coerce or Commandeer States.

Petitioners and Intervenors argue that the Rule unlawfully coerces and commandeers states. Pet. Legal Br. 81-86; Int. Br. 31-37. It does not. Rather, the Rule shows a deep respect for states' sovereignty by giving them the opportunity to design an emissions-reduction plan that makes sense for their citizens. If states choose not to avail themselves of that opportunity, they face no sanctions and they are not compelled to take action to implement the resulting federal standards. There is no constitutional issue where states may "defend their prerogatives by adopting 'the simple expedient of not yielding' … when they do not want to embrace the federal policies as their own." NFIB, 132 S. Ct. at 2603 (quotation omitted).

Petitioners and Intervenors rely on NFIB to argue instead that the Rule impermissibly coerces states. See Pet. Legal Br. 84-85; Int. Br. 38. But unlike in NFIB, where states could lose preexisting funding representing significant portions of their budgets if they declined to implement the program, see 132 S. Ct. at 2604-05, the Rule expressly *prohibits* EPA from withholding "any existing federal funds" from

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states. 40 C.F.R. § 60.5736. Indeed, a state that does not submit a Section 111(d) plan faces *no penalties at all.* 80 Fed. Reg. at 64,882; 80 Fed. Reg. at 64,968.[84]

Petitioners argue that the Rule coerces states because the consequences of declining to regulate (and the resulting federal plan) supposedly are dire: disruption of electricity services. Pet. Legal Br. 85; Int. Br. 35 (states will have to ensure "the power stays on"). But claims of impending blackouts have no basis in the record. Rather, EPA addressed stakeholders' "disruption" concerns in both the Rule[85] and the proposed federal plan.[86] Moreover, the reasonableness of any final federal plan will be subject to judicial review. See 42 U.S.C. § 7607(b)(1), (d)(9).

In regard to Petitioners' claims of commandeering, the Rule does not "directly compel[]" states "to enact and enforce a federal regulatory program." New York, 505 U.S. at 176. Rather, if a state chooses not to submit a plan, EPA itself will promulgate emission standards directly "on affected [power plants]" through a federal plan. 80 Fed. Reg. at 65,054. Analyzing the lawfulness of the *proposed* federal plan is plainly premature and, for that reason alone, Petitioners cannot meet their burden of

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[84] Intervenors' passing invocation of the "unconstitutional conditions doctrine" in a footnote is off-base for the same reasons. See Int. Br. 38 n.36. Regardless, the Court "need not consider cursory arguments made only in a footnote." Hutchins v. Dist. of Columbia, 188 F.3d 531, 539 n.3 (D.C. Cir. 1999).

[85] E.g., the Rule made available a "reliability safety valve" in the unlikely event that an unanticipated emergency causes substantial reliability issues. 80 Fed. Reg. at 64,671.

[86] See, e.g., 80 Fed. Reg. at 64,981-82.

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demonstrating that states have been offered an unconstitutional choice. But in any event, a program that "regulate[s] individuals, not States" poses no Tenth Amendment issue. 505 U.S. at 166.

Petitioners cite District of Columbia v. Train, 521 F.2d 971 (D.C. Cir. 1975), vacated and remanded sub nom. EPA v. Brown, 431 U.S. 99 (1977), to support their commandeering argument. Pet. Legal Br. 84. But the illuminating aspect of that case is the contrast it provides. In Train, EPA attempted to require states to *establish and implement* vehicle retrofit and inspection programs. 521 F.2d at 992. In concluding that was unlawful, this Court explained that "where [state] cooperation [with a federal objective] is not forthcoming, we believe that the recourse contemplated by the commerce clause is direct federal regulation of the offending activity." Id. at 993. Here, if states decline to cooperate with the federal objective of reducing CO_2 emissions from power plants, the result will be direct federal regulation. Unlike in Train, states are not required to establish and implement anything.

Petitioners argue that, even under a federal plan, state utility regulators will "have to take regulatory action" or "be involved in decommissioning coal-fired plants, addressing replacement capacity … undertaking all manner of related regulatory proceedings." Pet. Legal Br. 83, 85; see also Int. Br. 35 ("state government will have to … issue permits"). Not true. If a state wishes to refuse, for example, to grant a power plant's request for a permit modification for an action the plant wants to take to comply with a federal plan, the state may do so. The full compliance burden then

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rests with the plant, which will have to pursue an alternative compliance method that is agreeable to state regulators or does not require approval.[87]

Petitioners and Intervenors seem to think that a constitutional impediment arises from the fact that private entities may ask state regulators to take routine regulatory actions—e.g., to grant or modify a permit, adjust rates, or decommission plants—to facilitate their compliance with federal requirements. It plainly does not. If it did, then many other CAA programs,[88] regulatory programs addressing utilities,[89] and generally applicable federal laws[90] would arguably be similarly infirm. Indeed,

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[87] For example, if a federal plan provided for interstate trading, a plant might prefer to comply by purchasing credits, and then recouping costs from ratepayers. But the state would be free to decline to allow recovery from ratepayers, in which case the plant would have to draw from different funds or pursue a different compliance option.

[88] For example, the CAA's Acid Rain Trading Program—a Congressionally enacted program for power plants that is materially indistinguishable from the proposed Federal Plan, 80 Fed. Reg. at 64,970—would be unconstitutional, as would the Cross-State Rule upheld in EPA v. EME Homer City Generation, L.P., 134 S. Ct. 1584 (2014), and the NO_x SIP Call upheld in Michigan v. EPA, 213 F.3d 663 (D.C. Cir. 2000), because both establish trading programs partially premised on power plants' ability to shift from coal to lower-emitting generation, which implicate the same state regulatory processes. Legal Mem. 95-99, JA___. The same fate would befall the Mercury and Air Toxics Rule given that some power plants have retired rather than comply, triggering decommissioning processes implicating state regulators.

[89] Under the Federal Power Act, FERC may require "[a]ll users, owners and operators of the bulk-power system" to comply with federal reliability standards. 16 U.S.C. § 824o(b)(1). Those standards are not unconstitutional simply because an entity may seek to comply through actions for which state law requires approval.

[90] Under Petitioners' view of the Tenth Amendment, raising the federal minimum wage would be problematic because utilities might initiate state ratemaking proceedings to recover increased salary costs. Even the Americans with Disabilities

(Footnote Continued …)

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such a holding would suggest that Congress could never legislate to address power plants' greenhouse-gas emissions, or any other aspects of their operations. This cannot be squared with the existing case law. See, e.g., FERC v. Mississippi, 456 U.S. 742, 759, 765 (1982) (rejecting Tenth Amendment challenge to federal utility regulation that "use[d] state regulatory machinery to advance federal goals," but did not "directly compel[]" states to promulgate or enforce laws). As a constitutional matter, the state's only legal responsibilities are those it has voluntarily assumed under state law.[91] Accordingly, the Court should reaffirm that there is "no Tenth Amendment impediment" to federal regulation of "private persons and businesses," who are "necessarily subject to [] dual sovereignty." Hodel, 452 U.S. at 286-87 (quotation omitted).

Act ("ADA") could be unconstitutional insofar as private entities must obtain state or local building permits to install ADA-required ramps and elevators.

[91] Petitioners argue that EPA relies on states exercising "responsibility to maintain a reliable electricity system." Pet. Legal Br. 80, 85 (quoting 80 Fed. Reg. at 64,678). But that section of the Rule (titled "Additional Context") merely recognizes that power plants operate in an "integrated system" with "numerous" federal, state, and nongovernmental entities regulating reliability," and that EPA promulgates power-sector rules with an "awareness of the importance of the efficient and continuous, uninterrupted operation of the interconnected electricity system." 80 Fed. Reg. at 64,677-78. The quoted statements do not suggest that state grid regulators must take action in order for sources to comply with a federal plan, much less that EPA will impose draconian standards on sources and expect states to "clean up its mess." Pet. Legal Br. 80. At a minimum, such claims are premature, because the federal plan is not final. See In re Murray Energy Corp., 788 F.3d 330, 334 (D.C. Cir. 2015) (noting "a proposed rule is just a proposal" and rejecting challenges as premature).

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The possibility that state officials may choose to act on requests from private entities that are indirectly prompted by federal regulations does not make those regulations—much less the alternative offer to allow states to promulgate regulations themselves—unlawful. See FERC v. EPSA, 136 S. Ct. at 784 (distinguishing between federal regulations that "(inevitably) influenc[e]" areas of state control and those that actually "intrude on the States' power"). To hold otherwise would expand the Tenth Amendment light-years beyond its traditional bounds.

C. The Constitutional Avoidance Canon Has No Application Here.

Petitioners' constitutional claims appear to be designed less to succeed on their merits than as an excuse to invoke the constitutional avoidance canon in support of their statutory arguments and avoid Chevron.[92] See Pet. Legal Br. 79; Int. Br. 35 ("the serious constitutional questions raised by the Rule eliminate any agency claim to Chevron deference"). This attempt to put a thumb on the scales of this Court's statutory analysis should be rebuffed.

"[T]he burden of establishing unconstitutionality is on the challenger." Miss. Comm'n, 790 F.3d at 178. Applying the avoidance canon here would lift that burden

[92] Intervenors hypothesize that the Rule "may give rise to" regulatory takings issues, which the Court should construe Section 111(d) to avoid. Int. Br. 41 n.40 (citing Bell Atl. Tel. Cos. v. FCC, 24 F.3d 1441 (D.C. Cir. 1994)). EPA correctly concluded that such arguments are meritless and unripe, Legal Mem. 57-62, JA___, and Bell applies only to "*per se* physical takings," Cellco P'ship v. FCC, 700 F.3d 534, 549 (D.C. Cir. 2012). In any event, a constitutional argument raised in a footnote merits no attention. Hutchins, 188 F.3d at 539 n.3.

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from Petitioners, turning spurious claims of unconstitutionality into a weapon to be wielded in support of other arguments. The Supreme Court rejected a similar attempt in Rust v. Sullivan, explaining that the avoidance canon "will not be pressed to the point of disingenuous evasion." 500 U.S. 173, 191 (1991) (quotation omitted). Thus, while the Court believed that the constitutional challenges raised in Rust had "some force," it declined to apply the avoidance canon because it did not believe those arguments "raised … grave and doubtful constitutional questions that would lead us to assume Congress did not authorize" the regulatory actions at issue, and instead upheld them under Chevron. Id.

Petitioners' and Intervenors' constitutional arguments here are similarly lacking, to say the least. These arguments should not weigh in their favor—or indeed be considered at all—when analyzing the statutory issues that lie at the heart of this case.

IV. Petitioners Do Not Establish Procedural Error under Section 7607 of the Act.

Petitioners' assertions of procedural error are meritless. See Pet. Record Br. 13-17. The CAA specifies unique statutory requirements that govern judicial review of procedural challenges. 42 U.S.C. § 7607(d)(9)(D). As this Court has long recognized, a court may not reverse a CAA action for procedural error unless three elements are satisfied. See Util. Air Regulatory Grp. v. EPA, 744 F.3d 741, 747 (D.C. Cir. 2014). *First*, petitioners must demonstrate that the procedural error, if it occurred, was "arbitrary or capricious." 42 U.S.C. § 7607(d)(9)(D)(i). *Second*,

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petitioners must show that they have met the requirements of Section 7607(d)(7)(B)—in particular, that their "objection to a rule or procedure [] was raised with reasonable specificity during the period for public comment." Id. § 7607(d)(7)(B), (d)(9)(D)(ii).[93] *Third*, petitioners must prove, consistent with Section 7607(d)(8), that "the errors were so serious and related to matters of such central relevance to the rule that there is a substantial likelihood that the rule would have been significantly changed" absent the error. Id. § 7607(d)(8), (d)(9)(D)(iii).

Thus, petitioners raising procedural claims under the CAA must make an "unusually strong showing" (compared to claims of procedural error under the Administrative Procedure Act), see U.S. Steel Corp. v. EPA, 444 U.S. 1035, 1035 (1980) (Rehnquist, C.J., dissenting from denial of certiorari), and, therefore, "[r]eversal for procedural defaults under the Act will be rare." Am. Petroleum Inst. v. Costle, 665 F.2d 1176, 1184 (D.C. Cir. 1981). Petitioners claim that EPA failed to provide adequate notice regarding: (1) the establishment of uniform rates, (2) the entities ultimately responsible for achieving the emission reductions, and (3) minor changes to the applicability criteria.[94] Petitioners fail to carry their burden under the statutory

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[93] New objections may be raised in petitions for administrative reconsideration, but are not ripe for judicial review until reconsideration is completed or denied. Id. § 7607(d)(7)(B). A subset of Petitioners have petitioned EPA for administrative reconsideration, but those petitions are still under consideration.

[94] Petitioners also state, without further explanation, that EPA "applied an entirely different methodology with new data in establishing [uniform] rates." Pet. Record Br.

(Footnote Continued …)

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standard, relying instead on rhetoric and broad generalities. In any event, Petitioners' assertions are incorrect.

A. Petitioners Cannot Demonstrate Arbitrary or Capricious Error Because the Changes to the Rule Were Noticed or Are the Logical Outgrowth of the Proposal.

"An agency may promulgate a rule that differs from a proposed rule," provided "the final rule is a 'logical outgrowth' of the proposed rule." Allina Health Servs. v. Sebelius, 746 F.3d 1102, 1107 (D.C. Cir. 2014) (citation omitted). A final rule is a logical outgrowth "if affected parties should have anticipated that the relevant modification was possible," id., or if additional notice and comment "would not provide commenters with their first occasion to offer new and different criticisms." Fertilizer Inst. v. EPA, 935 F.2d 1303, 1311 (D.C. Cir. 1991) (quotation omitted). Here, EPA's modifications to the Rule were foreseeable and the subject of extensive comment, including by Petitioners, so there is no procedural error. Petitioners thus not only fail to acknowledge their burden under Section 7607(d)(9)(D)(i), they cannot meet it.

Petitioners first contend that EPA's Proposal "rejected the option of setting uniform rates," so their adoption in the Rule was not foreseeable. Pet. Record Br. 13-14. Petitioners are mistaken. EPA initially proposed state-specific goals

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16. This conclusory allegation is too vague to address and plainly fails to meet Petitioners' burden under Section 7607(d)(9)(D). See also Bd. of Regents of Univ. of Wash. v. EPA, 86 F.3d 1214, 1221 (D.C. Cir. 1996).

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established by applying the Building Blocks to each state. Stakeholders pointed out that this approach created wide disparities among states' goals and was disconnected from the reality of the electricity system, in which electricity flows across state lines. See 79 Fed. Reg. at 64,545, 64,549. Accordingly, in the Supplemental Notice (which Petitioners fail to mention), EPA took comment on reducing those disparities by applying Building Blocks on a regional basis, which would more accurately reflect the interconnected, interstate electricity market. See id. at 64,547, 64,550-52; see also 79 Fed. Reg. at 34,865, 34,899.

The uniform rates are a logical outgrowth of the noticed regional approach. EPA applied the Building Blocks across three regions, resulting in uniform rates within each region for each subcategory. But rather than setting different rates for different regions, EPA gave *all* regions—and thus all states and sources—the benefit of the *least-stringent* rates calculated in *any* region. 80 Fed. Reg. at 64,738. Thus, the uniform nationwide rate was simply a more lenient application of the regional approach, and one that further reduces disparities between comparable units in different regions—addressing EPA's and commenters' concerns. Id. at 64,736-37. It also effectuates the Proposal's commitment to flexible, cost-effective compliance, see, e.g., 79 Fed. Reg. at 34,859; 79 Fed. Reg. at 64,549, by creating a surplus of achievable emission-reduction opportunities available for all states and sources. 80 Fed. Reg. at 64,742. The uniform rates thus fall squarely within this Court's recognition "that an agency must be able to respond flexibly to comments and need not provide a new

round of notice and comment every time it modifies a proposed rule." Fertilizer Inst., 935 F.2d at 1311; see Pers. Watercraft Indus. Ass'n v. Dep't of Commerce, 48 F.3d 540, 543 (D.C. Cir. 1995).

Furthermore, the Rule's subcategory-specific uniform rates are consistent with longstanding practice under Section 111. See 80 Fed. Reg. at 64,737; 79 Fed. Reg. at 34,894 (noting that the Proposal varied from EPA's typical practice by using state-specific rates "rather than nationally uniform emission rates"); compare, e.g., 42 Fed. Reg. 55,796 (Oct. 18, 1977) (111(d) rulemaking for sulfuric acid production units); 61 Fed. Reg. 9905 (Mar. 12, 1996) (111(d) rulemaking for municipal solid waste landfills). EPA's proposal to set state-specific goals based on a single, blended rate for both coal- and gas-fired units was a *departure* from previous rulemakings. This alone made it foreseeable that EPA might modify its novel proposed approach in response to comments and revert to more traditional source- and subcategory-specific uniform rates.

This is a critical distinction between this case and those relied on by Petitioners, where the Court found procedural error because the proposal would have *affirmed* an agency's longstanding interpretation, but the final rule unexpectedly reversed that interpretation. Envtl. Integrity Project v. EPA, 425 F.3d 992, 993-95 (D.C. Cir. 2005); accord Kooritzky v. Reich, 17 F.3d 1509, 1513 (D.C. Cir 1994). Indeed, the Court has frequently recognized that in choosing the form of a standard, the agency necessarily invites comments on foreseeable alternative, and even opposite, forms for that

standard. See Ne. Md. Waste Disposal Auth. v. EPA, 358 F.3d 936, 952 (D.C. Cir. 2004); Ariz. Pub. Serv. Co. v. EPA, 211 F.3d 1280, 1299-300 (D.C. Cir. 2000); see also Long Island Care at Home, Ltd. v. Coke, 551 U.S. at 175 (citing Ariz. Pub. Serv.).

Here, the fact that EPA might return to its traditional approach to the emission guidelines was entirely foreseeable, especially because EPA "invite[d] comment on all aspects of the proposed form of the goals," 79 Fed. Reg. at 34,895, and specifically sought comment on regional approaches, 79 Fed. Reg. at 64,547, 64,550-52. In fact, numerous stakeholders, including many Petitioners, urged uniform rates. See, e.g., Int'l Bhd. of Boilermakers Comments 3, 8-12, EPA-HQ-OAR-2013-0602-22562, JA___, ___; State of New Jersey Technical Comments 3-4, 7, EPA-HQ-OAR-2013-0602-22758, JA___, ___; Texas Comm'n on Envtl. Quality Comments 15-16, EPA-HQ-OAR-2013-0602-23305, JA___. "[I]nsightful comments may be reflective of notice and may be adduced as evidence of its adequacy." Horsehead Res. Dev. Co. v. Browner, 16 F.3d 1246, 1268 (D.C. Cir. 1994).

Petitioners also incorrectly assert that EPA failed to "signal" that the Rule might place "responsibility for implementation" of emission reductions solely on power plants. See Pet. Record Br. 14. While EPA proposed to *allow* (but not require) states to place responsibility on other entities as well as power plants, 79 Fed. Reg. at 34,853, 34,901 (describing the "portfolio approach"), EPA specifically requested comment on the merit and legality of this approach and whether "responsibility … must be assigned solely to affected [sources]." Id. at 34,902-03. Petitioners thus had

notice and an opportunity to comment on whether legal responsibility for reducing power-plant emissions should fall on other entities or only on power plants, and a number contended Section 111 required the latter. See, e.g., UARG December 2014 Comments 44-50, EPA-HQ-OAR-2013-0602-22768, JA___; Nat'l Ass'n of Home Builders Comments 8, EPA-HQ-OAR-2013-0602-23572, JA___.

Petitioners' assertion that EPA unlawfully expanded the applicability criteria without notice is likewise unproven and incorrect. Pet. Record Br. 14-15. EPA proposed the applicability criteria in the "new source" rule, and explicitly "incorporate[d] that discussion by reference [in the existing source rule]." 79 Fed. Reg. at 34,854; cf. Portland Cement Ass'n v. EPA, 665 F.3d 177, 192 (D.C. Cir. 2011) (rejecting procedural error claims where an associated rulemaking provided notice). The new source proposal discussed whether applicability should be determined based on a source's "purpose" when constructed or on other criteria, see 79 Fed. Reg. at 1459-61, and included in the docket for comment alternative criteria that did not require that a source be "constructed for the purpose of" supplying a specific amount of electricity to the grid, see Office of Air Quality Planning & Standards Memorandum 23, 37-38, EPA-HQ-OAR-2013-0495-0062, JA___, ___. EPA's decision to delete that phrase was a logical outgrowth of the proposed new source

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rule and reflected comments EPA received from Petitioners and others.[95] See, e.g., Am. Fuel & Petrochemical Mfrs. Comments 5, EPA-HQ-OAR-2013-0495-10098-A1, JA___; Duke Energy Comments 52, EPA-HQ-OAR-2013-0495-9426, JA___.

All three changes were thus actually proposed or a logical outgrowth of the Proposal. Petitioners fail to make any demonstration to the contrary—let alone a persuasive and specific offer of proof that EPA's procedures were arbitrary and capricious under Section 7607(d)(9)(D). Their arguments must therefore be rejected.

B. Petitioners Have Not Established a "Substantial Likelihood" That Different Procedures Would Have "Significantly Changed" the Rule.

Even assuming, *arguendo*, that Petitioners had established procedural error, Petitioners fail to demonstrate that the alleged errors are "so serious" that there is a "substantial likelihood that the rule would have been significantly changed" absent the errors. 42 U.S.C. § 7607(d)(8). As noted above, Petitioners have not identified any specific objections to EPA's decision to adopt subcategory-specific uniform rates based on the least-stringent regional rates—let alone "new and different criticisms which the agency might find convincing." Fertilizer Inst., 935 F.2d at 1311 (quotation omitted). Nor could they. Petitioners supported the establishment of source-specific rates, and EPA's decision to apply the *least*-stringent regional rate to all sources inures

[95] The other change noted by Petitioners, Pet. Record Br. 15, is one of form, not function: "219,000 MWh net sales … is functionally equivalent to the 25 MW net sales language." 79 Fed. Reg. at 1446.

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to Petitioners' benefit. Thus, there is no prejudice to Petitioners and no "serious" error. Cf. Am. Coke & Coal Chems. Inst. v. EPA, 452 F.3d 930, 939, 941 (D.C. Cir. 2006) (finding no prejudice under the Administrative Procedure Act where an unnoticed change "resulted in a less stringent limitation").

Likewise, Petitioners cannot demonstrate that an additional round of comment would "significantly change[]" EPA's conclusion that Section 111(d) requires sources to bear responsibility for meeting the standards. 80 Fed. Reg. at 64,843. As noted above, Petitioners advanced this same legal interpretation in their comments, and so, unsurprisingly, they fail now to identify fault with it. See Pet. Record Br. 14. In any event, states may rely on a broad set of measures to meet the Rule's emission targets, including measures achieved by other entities, provided that ultimate responsibility for reducing emissions rests with the sources. 80 Fed. Reg. at 64,835.

Finally, Petitioners do not identify "new and different," let alone convincing, criticisms of EPA's final applicability criteria, Pet. Record Br. 14-15, which were amply explained in the final new source rule. 80 Fed. Reg. at 64,544. Indeed, the final applicability criteria are functionally equivalent to the proposed criteria in most respects. Compare EPA-HQ-OAR-2013-0602-36849 (final list of likely sources), JA___, with EPA-HQ-OAR-2013-0602-0256 (proposed list of likely sources), JA___; see EPA-HQ-OAR-2013-0602-36741 (explaining list changes), JA___. Moreover, Petitioners have failed to identify a single facility affected by the changes they describe.

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C. Section 7607(d)(7)(B) Bars Petitioners' Challenges.

Finally, even if Petitioners had raised colorable procedural claims, they do not satisfy the second statutory element of Section 7607(d)(9)(D). Petitioners' procedural challenges were not "raised with reasonable specificity during the period for public comment," and so they may not be raised in this proceeding. 42 U.S.C. § 7607(d)(7)(B). "This court enforces [Section 7607(d)(7)(B)] strictly." Appalachian Power Co. v. EPA, 249 F.3d 1032, 1055 (D.C. Cir. 2001) (quotation omitted). Accordingly, this Court has routinely refused to consider notice arguments raised for the first time in a petition for review, even though such arguments cannot logically be raised during public comment. See Mexichem Specialty Resins v. EPA, 787 F.3d 544, 553 (D.C. Cir. 2015). In Utility Air Regulatory Group, the petitioner tested these limits, arguing that "even if it cannot obtain judicial review of substantive challenges raised for the first time in a still-pending petition for reconsideration, it can obtain judicial review of procedural challenges raised for the first time in such a petition." 744 F.3d at 747. But this Court held that this argument was "foreclose[d]" by the plain language of the Act. Id. at 746-47. Petitioners do not, and cannot, argue that Section 7607(d)(7)(B) does not apply here, so their procedural challenges, even if valid, are barred.

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V. EPA Identified an Achievable Degree of Emission Limitation Applying the Best System.

Turning to Petitioners' challenges to EPA's record-based determinations, EPA identified an achievable degree of emission limitation applying the Best System that is firmly supported by the record. This Court gives an "extreme degree of deference" to EPA's record-based determinations. Miss. Comm'n, 790 F.3d at 150 (citation omitted).

A. Building Block 1 Is Achievable.

Building Block 1 reflects an achievable degree of emission limitation applying heat-rate-improvement measures, which are operating practices and equipment upgrades that coal-fired plants can implement to more efficiently convert fuel to electricity (i.e., lowering heat rate)—reducing the amount of CO_2 emitted per kilowatt-hour of generated electricity. 80 Fed. Reg. at 64,787. EPA identified dozens of such practices and upgrades to improve or maintain heat rate. Greenhouse-Gas Mitigation Measures Technical Support Document ("Mitigation TSD"), 2-11–2-15, EPA-HQ-OAR-2013-0602-37115, JA___. Although some of these measures may be "already widely adopted," Pet. Record Br. 25, extensive technical literature indicates there remains substantial opportunity for cost-effective heat-rate improvement across the industry. Mitigation TSD, 2-16–2-22, JA___.

To project the potential for heat-rate improvement, EPA used three kinds of statistical analyses, all based on the reasonable premise that coal-fired units can

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achieve heat rates approximating what they have demonstrated and achieved in the recent past. Id. at 2-22, JA___. These analyses were grounded in a robust and representative dataset of nearly 62 million hours of operating data submitted by 884 coal-fired units over an eleven-year period. Id. at 2-28, 2-32, JA___, ___.

While each of the three analytical approaches EPA used provides an independently reasonable way to estimate Building Block 1, EPA conservatively applied the approach yielding the *lowest* degree of potential improvement. Id. at 2-50, JA___. Under that approach, EPA performed unit-by-unit statistical analyses to determine the overall efficiency improvements that would result if coal-fired units "operat[ed] more consistently" with some of the better heat rates they demonstrated under similar operating conditions. Id. at 2-45–2-49, JA___. Specifically, EPA assumed that a unit could have improved some of its less-efficient hours by a modest percentage (37.1-38.4% depending on the region) to be closer to its efficiency "benchmark" (i.e., its 10th-percentile best heat rate) demonstrated under similar conditions.[96] Id. The approach also controlled for two variables that can affect a

[96] Contrary to Petitioners' assertion, this approach did not "assum[e] that the best historical efficiency *ever achieved* can be achieved every year in the future." Pet. Record Br. 26 (emphasis added).

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unit's heat rate: capacity factor and ambient temperature.[97] Id. at 2-33–2-42, JA___. And it also applied a number of conservative assumptions.[98]

Petitioners argue that EPA: (1) erred in making projections based on statistical modeling instead of the application of specific measures, (2) did not sufficiently account for uncontrollable factors or other circumstances, and (3) provided inadequate notice. Pet. Record Br. 22-26. All of these claims are meritless.

EPA has "undoubted power to use predictive models," West Virginia v. EPA, 362 F.3d 861, 868 (D.C. Cir. 2004) (quotation omitted), and it was reasonable to do so here. See Appalachian Power Co. v. EPA, 135 F.3d 791, 802 (D.C. Cir. 1998) (upholding EPA's use of a model to set "best system" emission limits, and noting that "perhaps the prime example" of the kind of technical judgment warranting deference is EPA's use of "[s]tatistical analysis," which "does not easily lend itself to judicial review"). Because conducting independent engineering assessments for each coal-fired unit throughout the country was impractical and unnecessary, EPA sensibly performed predictive modeling premised on real-world operating data to set

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[97] To do so, EPA grouped each unit's hourly heat-rate values into unit-specific "capacity temperature bins," allowing comparison under similar operating conditions. Mitigation TSD, 2-40, JA___. Where a single unit's heat rates under similar operating conditions nevertheless varied from one hour to another, EPA reasonably concluded that the difference was partially due to inconsistent application of efficiency measures.

[98] See, e.g., Mitigation TSD, 2-24 (assuming most costly measures), 2-25 (assuming units cannot improve beyond benchmark), 2-33 (using gross heat rate), 2-41 (assuming capacity factor is outside operator's control), 2-45 (using 10th percentile benchmark), 2-50 (using two-year averages), JA___, ___, ___, ___, ___, ___.

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historically derived levels of improvement potential. 80 Fed. Reg. at 64,793. In doing so, EPA's model reflects heat rates that are "demonstrated and achievable" by individual units using available efficiency measures and accords with extensive technical literature showing similar or even better results. Mitigation TSD, 2-22–2-25, JA___.

Next, EPA's modeling accounted for the "uncontrollable factors" and circumstances that Petitioners allege were overlooked. Pet. Record Br. 26. First, because the model analyzes past performance, it neither assumes that all units can implement every measure nor adds together benefits from specific combinations. Mitigation TSD, 2-10, JA___. See Pet. Record Br. 26. Comparing each unit's past performance against itself also controls "for many design characteristics that vary among [units] but are constant or nearly constant over time at individual [units]." Mitigation TSD, 2-22, JA___. See Pet. Record Br. 23. Second, EPA's representative dataset of operations over an eleven-year operating period fairly accounts for a "range of relevant conditions," id. at 24-25, plants may face in the future. See Mitigation TSD, 2-32, JA___.[99] Third, the model *did* control for capacity factor and temperature, see supra n.93, and Petitioners fail to explain how EPA's approach is remotely

[99] Regardless, EPA's power sector modeling for the Rule projects that future operating conditions will generally not lead to lower capacity factors, negating Petitioners' concerns about coal-fired units increasingly serving peak loads. Id. at 2-56–2-58, JA___; see infra n.98, n.114.

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arbitrary or capricious. See Pet. Record Br. 24. Fourth, EPA's assessment recognizes that certain improvements can degrade over time, see Pet. Record Br. 26, and EPA explained that these degradations can be mitigated or avoided at reasonable cost. Mitigation TSD, 2-61–2-62, JA___. Fifth, EPA analyzed *gross* heat rate, which is not affected by auxiliary power requirements, and the impact of post-2012 controls, Pet. Record Br. 25, on regional *net* heat rates is negligible. Mitigation TSD, 2-52–2-55, JA___.

And even if EPA's model did not account for every imaginable variable, Petitioners "cannot undermine" EPA's model simply by "'pointing to variables not taken into account that might conceivably have pulled the analysis's sting.'" Appalachian Power v. EPA, 135 F.3d at 805 (citations omitted). They must show how that failure "would have a significant effect" on the outcome. Id. But Petitioners merely offer bald speculation. Pet. Record Br. 24 (using *if* and *could*). "That the model does not fit every application perfectly is no criticism; a model is meant to simplify reality in order to make it tractable." Chem. Mfrs. Ass'n v. EPA, 28 F.3d 1259, 1264 (D.C. Cir. 1994).

Lastly, EPA adequately noticed Building Block 1. EPA's model applies the same dataset noticed in the Proposal and its most conservative statistical approach was "discussed at length in the proposal." 80 Fed. Reg. at 64,788. Petitioners' own comments belie their assertion that EPA provided "no opportunity to comment" "on incorrect 2012 data," Pet. Record Br. 26. See, e.g., Southern Co. Comments 83, EPA-

HQ-OAR-2013-0602-22907 (discussing the 2002-2012 study period), JA___. In any event, they fail to carry their burden under 42 U.S.C. § 7607(d). See supra Argument IV.

B. Building Block 2 Is Achievable.

As part of determining the Best System, EPA conducted a thorough analysis of the measures referred to as "Building Block 2." These generally involve substituting electric-power generation from lower-emitting gas units for generation from higher-emitting steam plants. E.g., 80 Fed. Reg. at 64,728-29.

EPA comprehensively considered factors relevant to determining whether Building Block 2 constitutes part of the Best System, such as: (1) the availability of mechanisms to shift generation between steam and gas units, and the feasibility of increasing gas utilization to EPA's assumed rates; (2) the amount and timing of generation shift from existing steam to gas units that is reasonable; (3) reliability, infrastructure, natural gas supply, and transmission planning concerns; and (4) costs. See generally 80 Fed. Reg. at 64,795-803; Mitigation TSD, Chapter 3, JA___; Response to Comments ("RTC") 3.2, EPA-HQ-OAR-2013-0602-37106, JA___; compare with 80 Fed. Reg. at 64,720-22 (factors Court has identified as generally relevant to Best System determination). After thoroughly examining these factors, EPA adopted a conservative rate of gas utilization in comparison to its analysis. The

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record supports EPA's analytical approach and conclusions concerning the degree of emission limitation that can be obtained through Building Block 2 measures.[100]

1. Increasing existing gas units' utilization is technically feasible and relies on a conservative estimate of their capabilities.

EPA did not rely on unduly "speculative assumptions" about the existing gas-fired fleet's potential to increase its rate of power generation. Pet. Record Br. 27-30. Instead, EPA's analysis was supported by a robust record regarding the existing fleet's design capabilities, the technical feasibility of increased generation levels, and other relevant data.

To estimate the potential magnitude of emission reductions obtainable by increasing gas utilization, EPA closely examined such units' design capabilities and historic utilization, including their "availability and capacity factors." Mitigation TSD 3-5, JA___; 80 Fed. Reg. at 64,799. "Availability" refers to the annual percentage of hours that a plant is available to generate (i.e., not in a planned or forced outage), while "capacity factor" refers to the plant's actual annual utilization. Mitigation TSD 3-5–3-6, JA___. EPA found that national-average capacity factors for gas units historically range from 40-50%, id. at 3-5 & nn.11-12, JA___, but their availability "generally exceeds 85[%], and can exceed 90[%] for some groups." 80 Fed. Reg. at

[100] EPA's consideration of resource adequacy, reliability and costs is addressed in Arguments VI.A and B.

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64,799. Thus, existing gas units are largely underutilized relative to their design potential. This underutilization is primarily due to dispatch practices and does not reflect actual limits on design capability or technical feasibility. Mitigation TSD 3-5, JA___.

Petitioners appear to contend that EPA should only consider a generation rate "demonstrated" if the entire existing fleet has attained that level. See Pet. Record Br. 28. But an "adequately demonstrated" Best System is not limited to measures "in actual routine use somewhere"; rather, EPA may make a reasonable "projection based on existing technology" and may "hold the industry to a standard of improved design and operation advances, so long as there is substantial evidence that such improvements are feasible." 80 Fed. Reg. at 64,720; see Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375, 391 (D.C. Cir. 1973); Sierra Club v. Costle, 657 F.2d at 364. Here, EPA found that existing gas units "are designed for, and are demonstrably capable of, reliable and efficient operation at much higher annual capacity factors, as shown in observed historical data for particular units and their design and engineering specifications." Mitigation TSD 3-5, JA___; see also id. at 3-5–3-6 & nn.15-18, JA___; 80 Fed. Reg. at 64,799.

Petitioners also claim EPA should have disregarded 2012 gas-fired generation data because natural gas prices were "historically low." Pet. Record Br. 28; see Mitigation TSD 3-11–3-12 (the fleet-wide capacity factor increased by 15% in 2012), JA___. Those data, however, are evidence that existing gas-fired generation can

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rapidly increase in response to market drivers, and, thus, are relevant to determining the technical feasibility of the rate of generation shift assumed in Building Block 2. Mitigation TSD 3-11, JA___. Moreover, EPA did not look solely at 2012; rather, it conducted a robust analysis including data from other years and historical trends. E.g., id. at 3-5 nn.11-12 (citing sources), 3-11–3-12, JA___, ___.

Ample data support EPA's determination that existing gas units can achieve, by 2030, an annual utilization rate of 75% on a "net-summer" capacity basis.[101] 80 Fed. Reg. at 64,799. For example, EPA found that 88% of such units operated at capacities equaling or exceeding 70% of nameplate capacity—approximately equivalent to 75% of net-summer capacity—for at least one day in the summer of 2012. Mitigation TSD 3-10, JA___. Although Petitioners question the value of daily usage rates in determining whether the average unit can be operated at that rate indefinitely, Pet. Record Br. 28, they ignore the fact that EPA did not rely on such data *in isolation*; it also considered existing gas units' long-term performance. EPA found that roughly 15% of such units operated at *annual* utilization rates of 75% or

[101] "Net-summer" generating capacity reflects a reduction from a power plant's "nameplate" capacity during the summer peak demand period "due to on-site electricity use (e.g., station service or auxiliaries) and local temperature conditions." Mitigation TSD 3-6, JA___; see also RTC 4.4.2, 238 (Comment 9) (nameplate capacity is "the nominal maximum output of a generator, assuming a particular set of ideal, often location-specific, operating conditions"), JA___; 80 Fed. Reg. at 64,799 (comments stated that net-summer capacity is "a more meaningful and reliable metric than nameplate capacity"); id. at nn.665-66.

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higher on a net-summer basis. 80 Fed. Reg. at 64,799; Mitigation TSD 3-8–3-10, JA___. Many more gas units operated at such capacities "during certain periods of time, in response to higher demand"—e.g., on a seasonal basis. Id. at 3-10, JA___; 80 Fed. Reg. at 64,799. Based on this complete analysis, EPA concluded that 75% is "*below* the maximum levels at which some units have demonstrated the capability to operate" and, therefore, conservatively "offer[s] sources additional compliance flexibility, given that the extent to which they realize a utilization level beyond 75[%] will reduce their need to rely on other emission reduction measures or building blocks." 80 Fed. Reg. at 64,799, 64,803 (emphasis added).[102]

Petitioners attack a straw man by arguing that external constraints such as permit limits may prevent gas units from operating at "available" levels. Pet. Record Br. 29. As shown above, EPA's assumptions are well below the ceiling established by existing units' availability. In addition, the record shows very few air permits that could limit such units' utilization. See Clean Air Task Force Comments 70-75, EPA-HQ-OAR-2013-0602-22612, JA___. Petitioners have not demonstrated that these limitations create a barrier to the fleet-wide average level of generation-shift assumed

[102] EPA's approach is also conservative because EPA computed performance rates for each of the three interconnections and then used the least stringent as the national uniform rate, creating headroom in the other two interconnections and ensuring achievability in all three. See 80 Fed. Reg. at 64,802 ("[T]here is substantial [B]uilding [B]lock 2 potential in the Western Interconnection and Texas Interconnection that is not actually captured in the source category performance rates.").

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under Building Block 2, which may be implemented "through the most efficient units increasing utilization rather than every unit increasing to the same 75% utilization level." RTC 4.4.3, 376 (Response 43), JA___.

2. Historical data support EPA's determination that a phased increase in gas utilization is reasonable.

EPA's determination that Building Block 2 is part of the Best System is further supported by the gradual application of its measures. Contrary to Petitioners' assertion that "EPA provides no data or analysis suggesting how that level of generation might be accomplished," Pet. Record Br. 28, EPA fully examined the feasibility of this phased-in approach.

Specifically, Building Block 2 "reflects a glide path of increases" in gas utilization over an "interim period" from 2022 until full implementation in 2030. 80 Fed. Reg. at 64,797-98. This glide path represents a conservative assessment of generation-shifting ability from steam to gas units over time, based on historical data. See id. at 64,798 & Table 7; Mitigation TSD 3-11–3-15 & nn.25-28, JA___.

Petitioners suggest that EPA should have attributed historical gas-fired generation growth rates primarily to "construction of *new* units" rather than increased utilization of existing ones. Pet. Record Br. 28-29.[103] But the data support EPA's

[103] Petitioners also erroneously assert that EPA failed to account for "the eventual deterioration and retirement of existing units." Id. at 27. EPA specifically considered the age of the existing gas fleet, observing that the bulk of it (over 80% of existing

(Footnote Continued …)

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analysis. In 2012, for example, net gas-fired generation increased approximately 22% over 2011, while the gas fleet's total capacity rose just 3%. Mitigation TSD 3-11–3-13 & Tables 3-3 & 3-4, JA___. Thus, the bulk of the increased generation in 2012 clearly came from *existing*, not new sources. Moreover, EPA conservatively used the rate of increased generation in this single year as a benchmark to determine feasible generation growth over *ten* years from 2012[104] until interim compliance begins in 2022. 80 Fed. Reg. at 64,798. And to determine each successive year's feasible generation growth until 2030, EPA used the average annual growth rate from 1990 to 2012, thus adding to the conservatism of its approach. Id. Accordingly, it was reasonable for EPA to conclude that existing gas units had "demonstrated the ability for a quick shift in generation patterns in response to market or economic drivers," Mitigation TSD 3-11, JA___, and to develop conservative parameters defining such units' further generation growth potential.

3. EPA reasonably accounted for geographic considerations.

EPA also carefully assessed potential "real-world constraints" on the ability of existing gas units to implement Building Block 2, Pet. Record Br. 27, 29-30, and

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capacity) has come online in the last 15 years. Mitigation TSD 3-7 & Table 3-1, JA___. Overall, "the existing fleet is relatively young." Id.; see also Documentation for EPA Base Case v.5.13 Using the Integrated Planning Model 8-14, EPA-HQ-OAR-2013-0602-0212 (EPA assumed 30-year useful life for gas plants), JA___.

[104] EPA made certain adjustments to the 2012 baseline data. E.g., infra Argument V.B.5.

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reasonably determined that these measures are feasible. See generally infra Argument VI.A. Petitioners' argument, that EPA failed to consider whether existing gas units are "located in areas where [they] can serve demand that would otherwise be supplied by coal generation," Pet. Record Br. 29, ignores the fundamental nature of the interconnection, in which "electricity system resources operate in a complex, interconnected grid system that is physically interconnected and operated on an integrated basis across large regions." 80 Fed. Reg. at 64,692. EPA's Building Block 2 modeling demonstrated that each interconnection can support the requisite generation-shifting while continuing to meet "transmission, dispatch, and reliability constraints." Mitigation TSD 3-20, JA___. Moreover, EPA detailed how all types and sizes of units in all locations are able to undertake the Building Block 2 measures. 80 Fed. Reg. at 64,731-36, 64,796-97. Petitioners' conclusory objections do not identify any deficiencies in this record.

Petitioners further contend that geographic concerns are heightened in Texas, "where over 90% of electricity is consumed in ERCOT [Electric Reliability Council of Texas, hereinafter "Council"], which has limited import capacity." Pet. Record Br. 30. The Council, however, is its own region under this Rule (i.e., the Texas Interconnection). 80 Fed. Reg. at 64,739. Any limitations on the Council's ability to "import" power from *outside* the region are irrelevant to the question EPA analyzed, which was whether generation may be shifted among existing sources *within* the region. Id. at 64,738-42.

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4. EPA's modeling supports its conclusions.

Petitioners argue that EPA's model shows that increased utilization of existing gas units would displace significant generation from *new* gas units rather than existing steam units. Pet. Record Br. 30. This is incorrect. The model holds total generation from existing fossil-fuel-fired plants (gas plus steam) constant in each interconnection with the level of such generation projected in the base case. See Mitigation TSD 3-20, JA___. By definition, then, any modeled increase in existing gas-fired generation must displace existing steam generation. The decrease in new gas-fired generation within the modeled scenario is a response to changes in other variables (e.g., increased demand for natural gas) that also lead to offsetting increases in generation from renewable, nuclear and other sources.[105]

5. EPA reasonably accounted for generation from existing units that were under construction in 2012.

Petitioners also challenge Building Block 2's incorporation of gas units under construction prior to January 8, 2014, claiming that such units have operated at 77% capacity, and, thus, cannot increase their utilization as required in Building Block 2. Pet. Record Br. 31-32. This fundamentally mischaracterizes how Building Block 2 works. EPA assumed a 55% capacity factor for purposes of including the under-

[105] See Cover Sheet, "Modeled increase in existing gas-fired generation must displace existing steam generation" (summarizing EPA-HQ-OAR-2013-0602-36476 and EPA-HQ-OAR-2013-0602-36477), JA___.

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construction units' incremental generation and emissions in the 2012 baseline to which Building Block 2's reductions are applied, as if they actually operated in 2012. As commenters noted, and EPA explained in response to comments, "some newly under construction [units] may operate at utilization rates greater than 55% in some cases," but "some of this generation may offset existing 2012 generation and not reflect a purely incremental change to the baseline." RTC 4.5, 11 (Response 10), JA___. Although some under-construction units are presently operating at a 77% capacity factor, they have substituted for retiring fossil-fuel-fired units in many cases and, therefore, have reduced overall emissions when compared to the 2012 baseline. Far from undermining Building Block 2 or EPA's modeling in support of it, this validates the intraregional generation-shifting premise of Building Block 2.

For example, for the North Carolina Lee plant Petitioners cite, Pet. Record Br. 31, EPA's 2012 baseline reflects both *expected incremental* generation from under-construction gas units (assuming the 55% utilization rate is incremental) and *actual* 2012 generation from then-existing coal-fired units that subsequently retired.[106] The Lee gas units operated at high capacity factors in their first full year of operation because part of their generation *replaced* generation from the retired, higher-emitting

[106] Numerous other coal-fired plants scheduled for retirement in 2012-2014 and beyond also were included in EPA's 2012 baseline. See Cover Sheet, "Coal plants scheduled for retirement in 2012-2014 included in EPA's 2012 baseline" (summarizing EPA-HQ-OAR-2013-0602-36849), JA___.

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coal units. Thus, the Lee gas units need not increase utilization to a "92[%] capacity factor" to realize Building Block 2 reductions from the baseline, Pet. Record Br. 31, as reductions have already been achieved. The assumed capacity factor for under-construction sources was intended to capture the extent to which such sources *incrementally* added to total 2012 power generation, and it reasonably served that purpose.

6. EPA reasonably included duct burners in its analysis.

Finally, EPA's record shows that gas units equipped with duct burners (i.e., supplemental combustion equipment)[107] can sustainably operate at higher capacity factors. As explained above, reported data show that "roughly 15 percent of existing [gas] plants operated at *annual* utilization rates of 75[%] or higher on a net summer basis" in 2012. 80 Fed. Reg. at 64,799 (emphasis added). Over 60% of those high-capacity-factor units are *equipped with duct burners.* See 2012 NGCC Plant Capacity Factor, EPA-HQ-OAR-2013-0602-0250, JA___.[108] Consequently, Petitioners' claim

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[107] A typical combined-cycle gas unit is comprised of combustion turbines, a heat recovery steam generator that uses waste heat from the combustion turbines to generate steam, and a steam turbine. Heat-recovery steam generators can be used with or without duct burners, 80 Fed. Reg. at 64,960, which provide supplemental firing to generate additional steam.

[108] This spreadsheet contains gas-plant data submitted to the Energy Information Agency in 2012. The "2012 EIA 860 Form" tab includes data regarding net-summer capacity and equipment configuration (including whether a plant has units equipped with duct burners), while the "2012 EIA 923 Form" tab includes generation data. Based on this information, 41 of the 67 gas plants with a 75% or greater annual-net-

(Footnote Continued …)

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that gas units cannot achieve 75% annual utilization without "continual operation" of their duct burners and "accelerated equipment wear" is demonstrably wrong. Pet. Record Br. 32-33.

C. Building Block 3 Is Achievable.

To determine the renewable generation achievable under Building Block 3, EPA used historical data to project annual targets, and then used modeling to confirm the technical feasibility and cost-effectiveness of those targets. This projection, based on the best available data and consistent with external expert projections, is reasonable. Where analysis "requires a high level of technical expertise," as here, "the informed discretion of the responsible federal agencies" is entitled to substantial deference. Marsh v. Or. Natural Res. Council, 490 U.S. 360, 377 (1989) (quotation omitted).

1. EPA reasonably projected renewable generation based on historical patterns and conservative modeling assumptions.

To quantify Building Block 3, EPA modeled baseline renewable generation in 2021 and then added an annual "growth factor" each year to project how quickly renewable generation could grow under the Rule. To determine the growth factor, EPA used historical data on five renewable-energy technologies to calculate both the *average* and *maximum* amount of generating capacity that was built between 2010 and

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summer capacity factor have units equipped with duct burners. See Cover Sheet, "2012 NGCC Plant Capacity Factor" (summarizing EPA-HQ-OAR-2013-0602-0250), JA___.

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2014 for each technology. EPA then computed the *average* and *maximum* generation—using present-day technology—that could be added to the grid from building that much new renewable capacity each year.

For the Rule's first two years, EPA projected that renewable generation would only grow beyond the 2021 baseline at the *average* historical pace; starting in 2024, EPA projected that generation could grow at the *maximum* historical pace. 80 Fed. Reg. at 64,807-08; Mitigation TSD 4-1–4-6, JA___. Under this projection, total renewable generation in 2030 reaches 706,030,112 megawatt-hours. 80 Fed. Reg. at 64,808.

EPA then tested the "technical feasibility and cost-effectiveness" of the projected generation in the Integrated Planning Model, which confirmed that it could be installed at a reasonable cost, accounting for considerations like resource availability and distance from transmission. Id. at 64,808-09; Mitigation TSD 4-6–4-9, JA___. The Model also distributed the generation between the three interconnections to calculate Building Block 3's contribution to the regional rates. Id.

This was a reasonable, and indeed conservative, approach.

First, by basing projections on actual renewable capacity built between 2010 and 2014, EPA limited the targets to "demonstrated levels of [renewable-energy] deployment that have been successfully integrated into the power system." Id. at 64,806-07. This was a significant constraint because it presumes that additions of renewable generation under the Rule will never exceed 2010-2014 levels, even after

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two decades of technological development and industry expansion. See id. at 64,809 (describing recent renewable growth). Moreover, EPA declined to apply the maximum growth rate in 2022 and 2023 to ensure significant lead time to invest in and plan for the larger generation additions thereafter. Id. at 64,808.

Second, EPA's methodology conservatively assumes that present-day technological "capacity factors," used to calculate the average and maximum generation added between 2022 and 2030, will not increase over time. Mitigation TSD 4-3, JA___. Capacity factors—which in this context represent the actual power a generating unit is expected to produce annually compared to its generating capacity, given, for example, design efficiency, maintenance disruptions, or fluctuations in resource availability—have historically increased for renewable technologies, suggesting EPA's calculation may significantly undercount possible renewable generation. 80 Fed. Reg. at 64,803-04, 64,809.[109]

Third, EPA set conservative modeling parameters.[110] Id. at 64,808; Mitigation TSD 4-20–4-21, JA___. For example, EPA constrained the Model from forecasting new generation in places where significant new transmission would be required, or

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[109] Petitioners allege that technological gains will be outweighed by resource quality declines. Pet. Record Br. 35. History suggests otherwise, as does the breadth of undeveloped resources and the speed of technological advancement. 80 Fed. Reg. at 64,804, 64,809-10.

[110] These included proximity to transmission, siting and land use restrictions, and construction lead times. See Pet. Record Br. 36, 68-69.

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where transmission costs would be prohibitive. See 80 Fed. Reg. at 64,808; Mitigation TSD 4-23–4-24, JA___. Likewise, EPA's Model capped the amount of wind and solar generation that could be built in any one area so that no part of the grid (broken into 64 subregions) would have more than 30% of its electricity coming from wind and solar together, or more than 20% from either alone. 80 Fed. Reg. at 64,808. These generation levels have already been demonstrated and are considered reasonable. Id. at 64,808, 64,810.

EPA's approach was conservative in other ways. EPA calculated targets based on five renewable-energy technologies, while allowing other renewable technologies to be used for compliance, id. at 64,810; modeled the targets without federal tax credit incentives, see RTC 3.3.7, 348 (Response 10), JA___; and set the uniform rates based on the least-stringent regional rate, 80 Fed. Reg. at 64,810-11. The latter factor alone means that states and sources can meet their emission-reduction goals without needing over 160,000,000 megawatt-hours of renewable generation projected under Building Block 3—about 20% of the total. Id.; Mitigation TSD 4-10, JA___.

EPA's approach thus ensures that the Building Block 3 targets are moderate projections that can be achieved at reasonable cost. EPA's targets are consistent with those identified in several other expert studies. Mitigation TSD 4-19–4-20, 4-22 n.45 (citing National Renewable Energy Laboratory ("NREL") analysis compiling renewable feasibility studies), 4-23, JA___, ___, ___.

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2. Petitioners' exaggerated claims are at odds with the best available data and EPA's conservative approach.

Petitioners assert that EPA should have relied on data from the Energy Information Administration ("EIA"), rather than NREL, to develop its 2021 baseline because EIA is "the governmental entity charged with forecasting electricity generation and demand." Pet. Record Br. 33-34. But NREL—which, like EIA, is part of the Department of Energy ("DOE")—is the nation's expert on the development and deployment of renewable energy. As EPA explained, comparing NREL and EIA data demonstrated that "[NREL's] estimates are more in line with current costs and recent market analysis and projections than [EIA's] costs." Mitigation TSD 4-14, JA___. For example, EIA's 2013 projection for wind installation costs in 2030 was almost 30% higher than *actual* costs in 2013. Id. at 4-15, JA___. While EIA improved its 2015 projections, see id. at 4-17, JA___, EPA reasonably concluded that NREL was a better data source "based on the quality of its data" and its "demonstrated success in both reflecting and anticipating [renewable-energy] cost and performance trends." 80 Fed. Reg. at 64,807; see Mitigation TSD 4-12–4-17, JA___. EPA selected NREL's middle rather than most optimistic estimates, however, to support moderate rather than the highest possible targets. 80 Fed. Reg. at 64,807, 64,809; Mitigation TSD 4-12–4-13.[111]

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[111] Petitioners also claim EPA "gamed" its cost analysis by "lowering coal generation" in the baseline. Pet. Record Br. 69. As elsewhere, Petitioners rely on extra-record

(Footnote Continued ...)

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Petitioners next contend that EPA's historical growth projection is flawed because an "inflated" amount of renewable generation was added in 2012, and because it assumes industry will maintain its maximum growth rate over a period of seven years. Pet. Record Br. 34-35. But whether generation additions in a particular year were above the historical norm is immaterial; those additions were actually achieved and demonstrate that the electric grid can integrate significant levels of renewables. See 80 Fed. Reg. at 64,809. And as explained above, given continuing technological advancements, dramatic cost reductions, and renewable industry expansion, maximum capacity additions between 2010 and 2014 are an entirely reasonable benchmark for additions more than a decade later—especially given EPA's other conservative assumptions.

Petitioners also dispute EPA's assumptions regarding capacity factors for existing technology, Pet. Record Br. 35, but as above, EPA's reliance on NREL, rather than EIA, data is reasonable. See Mitigation TSD 4-3, 4-12–4-13, JA___, ___. Moreover, Petitioners err in contrasting EPA's "capacity factor for Texas wind of between 39 and 41%," with "a prior [Council] estimate of 8.7% availability during summer peak demand." See Pet. Record Br. 69. The two are different metrics: the

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evidence, which cannot be considered on judicial review. See 42 U.S.C. § 7607(d)(7)(A). Regardless, the base case is determined by modeling, and EPA does not predetermine the Model's outcome—nor have Petitioners challenged the Model's underlying design or fossil-fuel-related inputs. 80 Fed. Reg. at 64,801 (describing the Model).

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former concerns a wind turbine's expected annual generation; the latter concerns the amount of wind generation capacity a grid operator can *depend* on being available whenever demand hits its peak. EPA's Model recognized that only 8.7% of total wind capacity can be depended on to meet peak demand, RTC 3.3.3, 184 (Response 28), JA___, but was nonetheless able to meet the renewable targets.

Petitioners further claim that EPA's targets will disrupt grid reliability, including grid support services (like "voltage support") needed to ensure the continuous flow of electricity on the electric grid. Pet. Record. Br. 68. But EPA's targets for renewable generation match levels of renewables that "have been achieved without negative impacts to reliability," 80 Fed. Reg. at 64,809, and EPA's modeling included multiple constraints to ensure sufficient resources to maintain reliability. Id. at 64,808. Additionally, with technological advances, renewables are themselves providing grid support services. Id. at 64,810.

Finally, EPA's conservative approach belies Petitioners' exaggerated claims about the targets. See Pet. Record Br. 36. Building Block 3 projects excess renewable generation that is not necessary to comply with the Rule but which can be used directly for compliance or to generate credits for sale—one of many factors supporting EPA's conclusion that robust credit markets will develop. Id. at 64,732. In any case, credit markets are not necessary for compliance; power plant owners also have multiple opportunities to directly purchase or invest in renewables. See id. at 64,804-06; Mitigation TSD 4-24–4-25, JA___.

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Given the staggering advances in renewable-energy development over the last decade, EPA's measured projections regarding further development over the next two decades are reasonable and achievable, and entitled to deference.

D. EPA Reasonably Determined That the Best System Would Not Increase Existing Plants' Emission Rates.

Petitioners assert that EPA's calculation of performance standards was flawed because it failed to consider alleged increases in CO_2 emission rates from reduced utilization of coal plants and increased utilization of gas plants (including "heavy use" of duct burners). Pet. Record Br. 37-38. However, the record demonstrates that EPA did consider whether emission rates from existing plants would change and concluded that the alleged increases will not occur.

For gas plants, historical state-level data demonstrates a negative correlation between emission rate and utilization rate, notwithstanding any supplemental fuel consumed by duct burners during hours of high utilization, which would already be reflected in the historical data for such hours. That is, gas units' emissions are generally *lower* (contrary to Petitioners' claim) as their utilization increases, likely due to efficiency gains from less cycling. RTC 4.4.3, 373 (Response 39), JA___; see also RTC 3.2.2, 103 (Comment 4), JA___.

As to coal plants, by 2030 EPA projects *increased* utilization of existing coal-fired plants in operation, which refutes the premise of Petitioners' assertion that such plants will emit at higher rates due to inefficiencies resulting from *lower*

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utilization. Mitigation TSD 2-55–2-58 (noting industry's pre-Rule announcements of plans to retire 16% of coal capacity by 2020, and that modeling projects those retirement trends to continue through 2030), JA___. Further, Petitioners fail to show that their asserted error would exceed the headroom EPA built into its calculation of the uniform rates to ensure their achievability. E.g., id. 2-50–2-51 (EPA conservatively did not account for the full extent of heat-rate improvements available to coal plants), JA___; 80 Fed. Reg. at 64,792 (same); supra n.95 (same). Thus, Petitioners have not demonstrated that EPA's determination was arbitrary or capricious.

E. EPA Was Not Required to Perform Individual Plant Achievability Analyses.

As discussed above (Argument I.A.4), EPA reasonably concluded that all types of plants can implement the Building Blocks and comply with the uniform rates. There is no basis to Petitioners' claim that EPA must provide a specific demonstration that every individual source can comply with the uniform rates. Pet. Record Br. 48-49. To the contrary, the Rule allows for sufficiently flexible measures to allow every source to comply. Moreover, in setting Section 111 guidelines, EPA is not required to "perform repeated tests on every plant operating within its regulatory jurisdiction." Nat'l Lime Ass'n v. EPA, 627 F.2d 416, 433-34 (D.C. Cir. 1980). Rather the appropriate test is whether EPA gave "due consideration" to "the possible impact on emissions of recognized variations in operations and some rationale … for

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the achievability of the promulgated standard given the tests conducted and the relevant variables identified." Id. at 434. EPA's extensive analysis of the ability of the various sectors of the industry to implement the Best System easily passes that test. Supra Argument I.A.4.[112]

F. Achieving the Uniform Rates Does Not Require Trading, Although the Record Demonstrates That Successful Trading Programs Are Likely to be Established.

Petitioners' claim that EPA did not demonstrate that sources can achieve the uniform rates because EPA relied on trading programs as an emission-reduction measure outside the Best System, Pet. Record Br. 48-53, lacks merit because trading is not an emission-reduction measure, but simply one of several approaches that sources can utilize to implement Building Blocks 2 and 3.[113] Furthermore, the record demonstrates that sources can implement the Building Blocks and achieve the uniform rates without trading, 80 Fed. Reg. at 64,731-32, and clearly supports EPA's determination that sources will be able to rely on trading if they choose. Id. at 64,734-35.

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[112] Moreover, Petitioners' argument is inconsistent with states' ability to consider cost and achievability factors such as remaining useful life.

[113] "Trading" refers to the purchase or sale of compliance instruments (allowances or credits) between parties, such as power plants, renewable-energy facilities, or other market participants. 80 Fed. Reg. at 64,733, and does not include acquiring credits from direct investment.

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The uniform rates are based on the amount of emission reductions EPA determined sources can achieve by implementing the Building Blocks. Sources have a wide range of options for implementing Building Blocks 2 and 3. They can, *inter alia*, increase generation from existing gas plants they control; invest in existing gas plants or new renewable-energy facilities; or enter into agreements to purchase power from existing gas plants or new renewable-energy generators. Id. at 64,731-32; Legal Mem. 137-48, JA___. Sources can utilize these options directly, i.e., through investing in or purchasing power from another generator, or indirectly by participating in a market for tradeable credits (which represent units of generation for compliance in rate-based states) or allowances (which represent authorizations to emit a specified amount of CO_2 for compliance in mass-based states). 80 Fed. Reg. at 64,733-35. Trading, therefore, is not an emission-reduction measure outside of the Best System (such as programs that reduce demand for generation by increasing energy efficiency), but rather one possible method for implementing Building Blocks 2 and 3. EPA never stated that trading is necessary to achieve the uniform rates. Rather, EPA said that trading was integral to its analysis of how the uniform rates could be achieved in light of the near certainty that states will establish trading programs. Id. at 64,733-34.

Nowhere did EPA concede that individual sources are unable to achieve the uniform rates through application of the Building Blocks, and the record demonstrates the opposite. Id. at 64,735 ("all types and sizes of [sources] in all locations are able to undertake the actions described as the [best system]"); id. at

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64,752-54 (performance standards are achievable through application of the Building Blocks). Petitioners' contrary claims, Pet. Record Br. 48-49, are based solely on snippets taken out of context. For example, the quoted statement from the Computation TSD is from a discussion of EPA's methodology for calculating the uniform rates that focused on how sources *would* implement the Best System (on a regional basis), and does not address how sources *must* implement the Best System. JA___. Similarly, the reference to non-Best System measures in the Response-to-Comments document is not to trading, but to such potential measures as energy-efficiency requirements. JA___. Furthermore, the fact that sources *can* rely on non-Best System measures for compliance does not mean that they *must* do so. 80 Fed. Reg. at 64,755-58.

Petitioners' reliance on National Lime, Pet. Record Br. 50, is specious. There EPA relied on enforcement discretion to ameliorate the consequences of a standard that could not be met under most adverse conditions which could reasonably be expected to recur. 627 F.2d at 431 n.46. Here, by contrast, the record demonstrates that the uniform rates are achievable and facilities have multiples ways to achieve them.

EPA's record shows that many, if not all, state plans will provide for trading because it is the most cost-effective method for implementing Building Blocks 2 and 3, and there is no basis to Petitioners' claim that trading programs and markets will not develop. Pet. Record Br. 50-52. Commenters, including some Petitioners (e.g.,

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Alabama, Michigan, North Carolina, Wisconsin), urged EPA to allow for trading as a means of compliance. 80 Fed. Reg. at 64,733 n.379. Thus, Petitioners clearly believe that trading is a cost-effective method for compliance, and their eagerness for the option is itself evidence that states are likely to establish successful trading programs.

Furthermore, Petitioners do not dispute that in every case where the utility industry has been allowed to trade to comply with CAA requirements, vigorous trading markets have rapidly developed. Id. at 64,734-35. Petitioners' attempt to distinguish these programs on the ground that they were federally imposed, Pet. Record Br. 51-52, is misplaced. The three transport rules implementing Section 7410(a)(2)(D)(i)(I), see supra Argument I.A.2.b, established emission standards and provided that states could join a multi-state trading program if they wished, and states did so. For example, in the NO_x SIP call, 63 Fed. Reg. 57,356 (Oct. 27, 1998), EPA promulgated a model trading rule that states could adopt and all states did so.[114]

There is also currently robust trading to meet state renewable-energy standards even though each state adopted its own program without any overarching federal requirement. 80 Fed. Reg. at 64,735. This history demonstrates that the states and the utility industry recognize that trading is an efficient and cost-effective mechanism to achieve compliance with emission requirements, and that they are quite capable of

[114] "The NO_x Budget Trading Program: 2008 Highlights," at 1, https://www.epa.gov/sites/production/files/2015-09/documents/2008_highlights.pdf .

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implementing a trading program for CO_2 emissions. See Small Refiner Lead Phase-Down Task Force v. EPA, 705 F.2d 506, 535-36 (D.C. Cir. 1983) (upholding as reasonable EPA's prediction that a trading market would develop based on competitive nature of industry, experience with other CAA programs, and support for trading in comments). EPA has taken numerous actions to facilitate the development of trading programs, including proposing model trading programs that states can adopt. 80 Fed. Reg. at 64,838-40, 64,892-94, 64,910-11. Given the enthusiasm for trading shown in comments and the states' past participation in CAA trading programs, it is unreasonable to think that states will not design plans that facilitate a robust trading market.

Petitioners' claim that the Rule imposes undue restrictions on trading, Pet. Record Br. 52, is also without merit. Petitioners present no evidence for their assertion that provisions of the Rule that limit the ability of specified facilities to generate tradeable credits, all of which are necessary to ensure the integrity of the Rule so that it achieves the necessary emission reductions, see Argument VII.A below, will impede trading. EPA determined that such a situation is "extremely unlikely" and that EPA would address it if it arose. 80 Fed. Reg. at 64,732 n.377.

G. The Rule Does Not Require States to Regulate Beyond Their Borders.

Petitioners' claim that the Rule is not achievable because states cannot regulate beyond their borders, Pet. Record Br. 54-55, is meritless because the Rule contains no

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such requirement. Rather, the Rule requires only that a state adopt a plan requiring that sources *within* the state comply with the performance standards. EPA has amply demonstrated that sources will be able to achieve the uniform rates by implementing the Building Blocks. See supra Argument I.A.4.

Petitioners identify nothing in Section 111(d) that limits sources' implementation of the Best System to measures that can be taken within a state. That sources may engage in transactions in other states is fully consistent with the fact that interstate exchanges of generation already occur on a regular and substantial basis, due to the integrated interstate market for electricity. 80 Fed. Reg. at 64,691-93; see FERC v. EPSA, 136 S. Ct. at 768. In fact, numerous commenters, including Petitioners, objected to the proposal's application of the Building Blocks on a state-by-state basis, emphasizing the interstate nature of the electricity system and power company transactions. RTC at 4.4.1, 206-208 (Comment 9), JA___. Moreover, it imposes no burden on a state that its sources might take measures outside the state, either directly through investment or contract or indirectly through tradeable credits, and the flexibility to do so allows sources to achieve the uniform rates at the lowest cost. It is not uncommon for sources to rely on out-of-state measures for compliance, whether the purchase of allowances, coal-cleaning services, or alternative sources of fuels.

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VI. EPA Reasonably Considered Statutory Factors, Including Costs and Energy Requirements, and Promulgated Appropriate Subcategories and Implementation Requirements.

A. EPA Reasonably Considered Available Infrastructure and Grid Reliability Issues.

Contrary to Petitioners' argument, Pet. Record Br. 38-47, EPA carefully examined the extent to which available infrastructure can support implementation of the Best System, and reasonably determined that the Rule will not necessitate significant infrastructure additions or modifications. EPA also reasonably assessed reliability concerns.

1. EPA reasonably concluded that the Rule would not significantly increase infrastructure needs.

Although Petitioners suggest a concern regarding gas pipeline infrastructure, their single sentence is not sufficient to raise the issue. Pet. Record Br. 38. Nonetheless, EPA's thorough examination of the natural gas supply and delivery system, including already-planned expansions thereof, supports its conclusion that Building Block 2 is achievable. 80 Fed. Reg. at 64,800-01; Mitigation TSD 3-15–3-19, JA___. Moreover, Building Block 2 incorporates a gradually phased schedule designed to allow time for any modest infrastructure improvements needed to increase gas plant utilization. Id. 3-14, JA___.

With regard to transmission, EPA found that although "some upgrades to the grid (including potential, but modest, expansions of transmission capacity) may be necessary" to support operating gas units at higher capacity factors for longer periods

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of time, "such upgrades are part of the normal planning process." 80 Fed. Reg. at 64,801. Indeed, the electric-transmission system already is undergoing substantial expansion. Id. at n.676. Accordingly, EPA found that Building Block 2 would not necessitate significant additional requirements for transmission planning and construction "beyond those already being addressed at routine intervals by the power sector." Id. at 64,801.

EPA also determined that Building Block 3 should not result in significant additional transmission capacity needs. E.g., id. at 64,809-10; Mitigation TSD 4-22–4-24, JA___. Since the added renewable-generation capacity under Building Block 3 occurs over a fifteen-year period, and with renewable-energy generation equivalent to only 20% of total generation, EPA found that "these additions should be manageable in the normal planning and expenditure process for transmission." Mitigation TSD 4-23–4-24, JA___.

EPA's conclusion is supported by data indicating that the limited amount of transmission construction needed for Building Block 3 is well within the historical range of annual transmission investments. DOE's analysis, for example, projected base case wind capacity growth from 2021 to 2030 of 11.5 gigawatts per year, a growth rate consistent with Building Block 3. 80 Fed. Reg. at 64,810. This added capacity would require 890 circuit miles per year of new transmission, only slightly greater than the 870 miles per year added on average between 1991 and 2011. Id.

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Finally, EPA made several Rule changes to address commenters' concerns regarding infrastructure, e.g., Pet. Record Br. 39-40, such as delaying the start of the interim-compliance period by two years and revising the interim emission limits to assume gradual phase-in of Building Block 2 from 2022 to 2030, thereby providing additional time to build any needed infrastructure. 80 Fed. Reg. at 64,798, 64,879.

2. EPA reasonably assessed reliability and resource adequacy.

Although Petitioners argue that EPA "did not conduct a true reliability assessment" and failed to meaningfully address reliability comments, Pet. Record Br. 40-43, the record demonstrates otherwise. As an initial matter, EPA has never "conceded" that it "lacks the expertise to assess grid reliability." Id. at 40. Nor does this Court's opinion in Delaware support that proposition. Id. at 45; see supra Argument I.B.4.

EPA carefully considered the comments of state and regional entities, power companies, and other stakeholders concerning reliability; consulted with DOE and FERC; and participated in multiple FERC technical conferences. 80 Fed. Reg. at 64,874.[115] EPA also considered published reports and analyses addressing the Proposal's reliability implications. Id. at 64,879-81. Many such analyses concluded that the Proposal could be implemented in a manner "prevent[ing] reliability issues

[115] EPA also developed a coordination strategy with DOE and FERC to monitor Rule implementation, share information, and resolve any difficulties. Id. at 64,879.

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while also reducing carbon pollution and costs." Id. at 64,881; see also id. at 64,880 (e.g., Brattle Group study "concluded that there are real world solutions" to reliability concerns; PJM analysis noted that its capacity market has "sufficient resources to maintain reliability"). Moreover, some of the more pessimistic analyses "assume 'inflexible implementation, are based upon worst-case scenarios, and assume that policy makers, regulators and market participants will stand on the sidelines until it is far too late to act' to ensure reliability"—assumptions that "are not consistent with past actions." Id. at 64,881 (quoting Analysis Group).[116] Indeed, despite similar worries that past environmental regulations would jeopardize the grid, the electric industry has always "done an excellent job of maintaining reliability, including when it has had to comply with environmental rules with much shorter compliance periods and much less flexibility." Id. at 64,875.

Nonetheless, EPA made numerous changes to the Proposal to accommodate stakeholders' reliability concerns, in part by incorporating within the Rule "overall flexibility, a long planning and implementation horizon, and a wide range of options for states and affected [sources]" to achieve the emission requirements. Id. at 64,874; see id. at 64,879. These changes ensure that, "[g]iven the different characteristics of

[116] Many such studies "assume that states, rather than developing state plans that make use of the wide latitude in the final rule to develop plans that are consistent with that state's energy sector and policies," will simply "implement the [B]uilding [B]locks in cookie cutter fashion." RTC 8.9, 148 (Response 7), JA___. This premise is wrong. Id.

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the electric grid within each state and region," there are "many paths to meeting the final rule's requirements that can be taken while" maintaining grid reliability. Id. at 64,875.

For example, EPA modified the Rule's interim-compliance provisions specifically in response to FERC's and others' comments that sufficient time for planning and implementation is essential to ensuring reliability. Id. at 64,875 & n.867. These changes include: allowing states to obtain a two-year extension of their plan submission deadline based on a minimal showing; starting the interim-compliance period in 2022, not 2020; phasing in Building Block 2 requirements between 2022 and 2029; and providing that states need meet interim-compliance milestones only "on average or cumulatively, as appropriate." Id. at 64,875-76, 64,879.

EPA also adopted commenters' suggestion to include a "reliability safety valve" in the Rule. Pet. Record Br. 42. Commenters expressed concerns that a serious, unforeseen event might "require immediate reliability-critical responses by system operators and affected [sources] that would result in unplanned or unauthorized emissions increases." 80 Fed. Reg. at 64,878. Accordingly, in such an emergency, the Rule allows a source to operate under less-stringent emission limits for up to 90 days. Id. at 64,878-79. If after 90 days "there is still a serious, ongoing reliability issue," the source may continue to operate under less-stringent emission limits for a longer period. Id. at 64,879.

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Finally, Petitioners' criticism of the Model's role in assessing reliability is misplaced. Pet. Record Br. 41-42. EPA has used the Model for over two decades "to better understand power sector behavior under future business-as-usual conditions and to evaluate the economic and emission impacts of prospective environmental policies." RIA 3-1–3-2, JA___; accord Technical Support Document: Resource Adequacy and Reliability Analysis 2, EPA-HQ-OAR-2013-0602-36847, JA___. Here, EPA used the Model appropriately to address resource adequacy and reliability concerns "at a general level," while recognizing that local reliability conditions cannot be more specifically assessed "until the [Rule's] planning and implementation process provides the necessary information for reliability authorities to conduct the necessary analysis." RTC 8.9, 184 (Response 14), JA___. Petitioners do not come close to showing that EPA's use of the Model was arbitrary and capricious.

3. EPA adequately addressed the concerns of the Council and rural cooperatives.

The record demonstrates that EPA also reasonably considered reliability concerns associated with the Council and rural cooperatives. Pet. Record Br. 43-47.

a. The Council.

EPA treated the Council as a separate region (i.e., the Texas Interconnection). 80 Fed. Reg. at 64,739. Contrary to Petitioners' suggestion, EPA neither assumed nor "mandated" that Texas Interconnection sources import power from outside the interconnection. Pet. Record. Br. 44. Rather, EPA determined achievable emission

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limitations based on measures that could be reliably implemented *within* this region. See, e.g., RTC 3.1.4, 129 (Response 3) ("[W]ith respect to Texas, the final rule calculates heat-rate improvement on an interconnection basis and thus further obviates commenters' concerns about direct comparisons between plants in [the Council] and those in other interconnections."), EPA-HQ-OAR-2013-0602-36876, JA___; Computation TSD 6 (describing EPA's regional analysis), JA___; Mitigation TSD 3-20, 4-6 (same), JA___, ___.

Rule compliance need not disrupt, and in fact may be incorporated in, the Council's economic dispatch approach, Pet. Record Br. 44. Generally, under any economic dispatch approach, "the system operator will dispatch an electric power plant that experiences an increase in its variable costs—e.g., for environmental-compliance measures—less than it otherwise would have." Legal Mem. 139, JA___. Compliance costs or limits on generation "can be factored in with fuel costs to determine when the unit is committed to be available, how the unit can be most efficiently cycled, and at what level the unit is dispatched." Id.; see also id. at 147 (discussing contractual mechanisms), JA___.[117] And while sources within the Council may "already [be] motivated to make efficiency improvements," Pet. Record Br. 44, both published technical literature and EPA's analysis supported the agency's

[117] Accord, e.g., Analysis Group, EPA's Clean Power Plan: State Plans and Consumer Impacts 12 (July 2014), JA___.

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conclusion that there is further room for improvement. Mitigation TSD 2-50 (Table 2-8), JA___; see generally id. at 2-10–2-51, JA___.[118]

Finally, the Rule neither "ignores" nor interferes with the jurisdictional scheme under the Federal Power Act. Pet. Record Br. 45. This Rule only establishes emission limitations under the CAA; it does not regulate electricity markets. Supra Argument I.B.5.

b. Rural cooperatives.

EPA also considered the reliability concerns of rural cooperatives. Pet. Record Br. 45-47. EPA explained how all types and sizes of covered sources in all locations, including rural cooperatives, feasibly can undertake the measures that constitute the Best System. E.g., 80 Fed. Reg. at 64,796-97, 64,804-06; Legal Mem. 144-47, JA___. The Rule allows states to "implement a broad range of approaches that recognize that the power sector is made up of a diverse range of companies that own and operate fossil fuel-fired [plants]," including rural cooperatives, "all of which are likely to have different ranges of opportunities to reduce [greenhouse-gas] emissions." RTC 2.5, 56 (Response 2), JA___.

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[118] EPA did find that the potential for heat-rate improvement within the Texas Interconnection is substantially lower than it is nationwide. Id. 2-50, JA___. EPA used the interconnection where the achievable emission rate is highest—i.e., least stringent—to calculate the uniform rates for all three interconnections, which "ensure[s] that there is 'headroom' within the [Best System] measures that provides greater assurance of the[ir] achievability" in each region, including Texas. 80 Fed. Reg. at 64,730.

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B. EPA Reasonably Considered the Costs of the Building Blocks and Did Not Use the Benefit-Cost Analysis in the RIA for That Purpose.

Petitioners' challenges to EPA's benefit-cost analysis are irrelevant because EPA did not (nor was required to) use that analysis when considering costs. As required by Section 111(a)(1), EPA analyzed the costs of the Building Blocks[119] when determining the Best System and found that those costs are reasonable. Specifically, EPA found the Building Blocks' costs to be reasonable compared to two benchmarks: the costs that power plants incur to reduce other pollutants, and the CO_2 prices that owners of sources use for planning purposes in their integrated resource plans. 80 Fed. Reg. at 64,750. EPA also found that the costs were reasonable compared to other potential control measures, such as carbon sequestration and co-firing, "in light of the severity of the observed and projected climate change effects on the U.S., U.S. interests, and U.S. citizens, combined with [power plants'] large contribution to U.S. [] emissions." Id. EPA explained that power plants are "by far the largest emitters of [greenhouse gases] among stationary sources," and that EPA "would therefore consider even relatively high costs—which these are not—to be reasonable." Id. at 64,749, 64,751. Petitioners do not challenge these findings.

[119] EPA quantified the Building Blocks' costs individually and in combination. See 80 Fed. Reg. at 64,749, 64,791, 64,801-02, 64,810-11; Mitigation TSD 2-62–2-66, 3-20–3-21, 4-21, JA___, ___, ___.

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Instead, Petitioners exclusively focus on EPA's calculation of benefits in its formal benefit-cost analysis. Pet. Record Br. 69-71. The Act does not require EPA to conduct such an analysis when determining the Best System. Portland Cement Ass'n v. Train, 513 F.2d 506, 508 (D.C. Cir. 1975) (benefit-cost analysis not required under Section 111(a)(1)); cf. Michigan, 135 S. Ct. at 2711 (benefit-cost analysis not required under Section 112). Although EPA performed a benefit-cost analysis, which is included in the Rule's Regulatory Impact Analysis, it did so to comply with an executive order governing significant regulations. See 80 Fed. Reg. at 64,751 & n.431; Executive Order 12,866 § 1 (Sept. 30, 1993).[120] EPA did *not* use that analysis in determining that the costs of the Building Blocks are reasonable. 80 Fed. Reg. at 64,751 (EPA "is not using" a "benefit-cost test (i.e., a determination of whether monetized benefits exceed costs)"). Thus, Petitioners' challenges to the social cost of carbon and other aspects of EPA's benefit-cost analysis in the Regulatory Impact Analysis are irrelevant.

Petitioners' arguments also lack merit. Petitioners impermissibly rely on three extra-record sources, two of which post-date the Rule, to criticize EPA's use of the

[120] EPA's compliance with Executive Order 12,866 is not reviewable. See id. § 10 ("Nothing in this Executive Order shall affect any otherwise available judicial review of agency action. This Executive Order … does not create any right or benefit, substantive or procedural, enforceable at law or equity by a party against the United States …."); Air Transp. Ass'n of Am. v. FAA, 169 F.3d 1, 7 (D.C. Cir. 1999) (identical language in another executive order foreclosed judicial review).

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social cost of carbon. Pet. Record Br. 69-70. As EPA explained in the Rule, however, "the [social cost of carbon] estimates" were developed "over many years, using the best science available, and with input from the public." 80 Fed. Reg. at 64,931. The Office of Management and Budget specifically recommends that agencies use the social cost of carbon in their regulatory impact analyses. See, e.g., Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12,866 (May 2013), JA___; Response to Comments: Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12,866 (July 2015), JA___. Nothing in the Act forecloses EPA's consideration of the social cost of carbon in a benefit-cost analysis, and EPA explained why the estimates account for global rather than only domestic benefits. RTC 8.7.2, 42-45, JA___.

Petitioners' remaining objections are equally unfounded. Their assumption that the Clean Energy Incentive Program will result in 300 million additional tons of emissions, Pet. Record Br. 71, incorrectly conflates a theoretical regulatory maximum with the modeling projections used to assess emissions impacts, and ignores compensating reductions prior to the start of the Rule's performance period. See RIA 4-8–4-9, JA___; see generally 80 Fed. Reg. at 64,830-32.[121] EPA projected modest

[121] EPA requested comment on early-action crediting (which is accomplished by the Clean Energy Incentive Program) and no commenter raised an objection regarding its

(Footnote Continued …)

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electricity price changes from the Rule, ranging from 3.2% in 2020 to no change in 2030, and addressed the small possibility that industries might respond to those price increases by shifting production abroad. RIA 4-5, 5-4 (Table 5-1), JA___, ___; see Pet. Record Br. 71. Finally, there is no evidence that the Rule could cause "30,000 premature deaths," Pet. Record Br. 71; on the contrary, EPA estimated that the pollution reductions associated with the Rule will *avoid* up to 3,530 premature deaths per year by 2030. RIA 4-31 (Table 4-24), JA___.

C. EPA Established Appropriate Subcategories.

The Rule establishes emission guidelines for two subcategories of existing sources: steam units and combustion turbines, 80 Fed. Reg. at 64,760, consistent with EPA's new source standards, 80 Fed. Reg. at 64,543, 64,601. And contrary to Petitioners' argument, EPA reasonably determined that no other subcategories were "necessary." Pet. Record Br. 67.

Neither the statute nor EPA's regulations "mandate" subcategorization. Id. EPA retains discretion to determine whether it is "appropriate" to subcategorize under Section 111(d). 40 C.F.R. § 60.22(b)(5) ("The Administrator will specify different emission guidelines … when … [such] factors *make subcategorization appropriate*") (emphasis added); see Consumer Fed'n of Am. v. HHS, 83 F.3d 1497,

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relevance to EPA's benefit-cost analysis. See 79 Fed. Reg. at 34,918-19; 79 Fed. Reg. at 64,545-46. Therefore, Petitioners cannot do so here. 42 U.S.C. § 7607(d)(7)(B).

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1504 (D.C. Cir. 1996) ("shall, as appropriate," does not eliminate discretion). And subcategorizing for lignite in a different context does not compel EPA to make the same determination here. See White Stallion, 748 F.3d at 1249-50 (establishing a subcategory in one rule does not necessitate a similar subcategory in another), rev'd on other grounds, Michigan, 135 S. Ct. 2699.

EPA appropriately subcategorized for steam units and combustion turbines because Building Blocks 1 and 2 apply only to steam units and "all affected [sources] can achieve the relevant performance standard set by applying the [Best System] to each of the[] two subcategories." RTC 1.10.3, 159 (Response 6), JA___; 80 Fed. Reg. at 64,760. No other factors merited additional subcategories. 80 Fed. Reg. at 64,760 (rejecting further subcategorization, including on the basis of coal type). The possibility that some sources may cause unique downstream impacts by retiring—which is an economic choice not mandated by the Rule—is a red herring. States can "impose different emission reduction obligations on different sources," including for mine-mouth lignite units, so long as the overall state goals are met, id. at 64,723, and can avoid stranded assets by implementing, inter alia, a trading program, id. at 64,872.

D. The Rule Does Not Impermissibly Regulate New Sources.

Petitioners' claim that the Rule requires States to "prevent the increased dispatch of new units," and thereby "unlawfully subject such units … to a state plan," Pet. Record Br. 65-66, is without merit. The Rule imposes no such requirement. It requires only that states *choosing* to adopt a mass-based trading program as an

alternative way to implement the Rule must design their plans to achieve emission performance equivalent to the uniform rates.[122] To do so, the state *could*, among other options, incentivize lower- or non-emitting generation or adopt state-law-only limits on new source emissions. 40 C.F.R. § 60.5790(b)(5). This "leakage" requirement is consistent with EPA's authority to offer alternative compliance options under Section 111(d) provided they result in emission performance meeting the requirements of the Rule and Section 111(d).

The Rule's fundamental requirement is that states develop plans to limit CO_2 from existing plants by securing a degree of emission limitation, expressed in the form of uniform rates, that EPA determined is achievable through application of the Best System. Under the uniform rates, existing sources are incentivized to shift generation to lower or non-emitting generators, which creates emission rate credits that existing sources can use to lower their effective emission rate. Responding to comments requesting flexibility to implement the Rule through mass-based trading limits, EPA calculated a mass-based goal for each state as an equivalent compliance alternative to the uniform rates. 80 Fed. Reg. at 64,822-23.

However, EPA recognized that sources in a mass-based trading program have different incentives, with different implications for overall emissions, than sources

[122] This requirement applies only to mass-based trading plans, not any other type of mass-based plan or any rate-based plan. 40 C.F.R. § 60.5790(b)(5).

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with rate-based limits, and that the mass-based goal would not be equivalent if these incentives were not addressed. Id. at 64,823. Specifically, sources with rate-based limits have limited incentive to shift generation to new fossil-fuel-fired sources because those sources do not create emission rate credits. In contrast, sources in an existing-source mass-based trading program have incentives to shift generation to *any* generator outside the program, including new fossil-fuel-fired sources, because doing so lowers their mass emissions, which frees up allowances they can then sell to other existing sources. Because shifting generation to new fossil-fuel-fired sources does not reduce existing plants' effective emission rates but allows emissions up to the total number of allowances, without provisions to protect against leakage, a state's existing sources would in the aggregate have a higher effective emission rate than the uniform rate. Under these circumstances, the mass-based trading plans would not provide equivalence with the uniform rates and would violate the requirements of Section 111(d). Id. at 64,820-21. Moreover, without provisions to protect against leakage, the greater incentive to shift emissions to new fossil-fuel-fired sources under mass-based trading plans could result in higher overall emissions (emissions from new sources resulting from the shifted generation plus emissions authorized by the allowances from existing sources) than under the uniform rates—which would again undermine the purpose of the Rule and Section 111(d).

Accordingly, the Rule requires that a state choosing a mass-based trading program must include measures to address such emissions "leakage," thereby

safeguarding an emissions performance equivalent to the uniform rates. Id. Furthermore, any such optional regulation of new sources will be under state, rather than federal, law. Id. at 64,888. Thus, such regulation would not conflict with Section 111's distinction between new and existing sources.

E. The Rule Does Not Prohibit Enhanced Oil Recovery.

While carbon sequestration is not part of the Best System, it is an option that sources can use, subject to reporting requirements under 40 C.F.R. Part 98, Subpart RR. 80 Fed. Reg. at 64,884. These requirements do not "functionally prohibit[] facilities from using CO_2 in enhanced oil recovery," i.e., by injecting CO_2 into an oil reservoir to increase production. Pet. Record Br. 64. Rather, compliance with Subpart RR is of reasonable cost, does not change an oil recovery well's permitting status, and does not cause injected CO_2 to be classified as waste. 80 Fed. Reg. at 64,590, 64,591 n.490. Contrary to Petitioners' claims, "[t]here is also no *a priori* restriction on commingling CO_2 from different sources." NSPS RTC 6.3, 6-41 (Response 6.3-71), EPA-HQ-OAR-2013-0495-11865, JA___.

Petitioners had adequate notice. EPA solicited comment on carbon sequestration and directed commenters to the new source rule for additional discussion. 79 Fed. Reg. at 34,876. The new source rule expressly proposed that injection of captured CO_2 for enhanced oil recovery would trigger Subpart RR reporting. 79 Fed. Reg. at 1483. Petitioners knew this. See, e.g., UARG Comments, Vol. 5, No. 23, 10, EPA-HQ-OAR-2013-0602-22767 (quoting Petitioner Denbury's

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concern with Subpart RR's effect on enhanced oil recovery operations), JA___. And any perceived error is harmless. Portland Cement Ass'n v. EPA, 665 F.3d at 192 (finding harmless error where notice was provided in parallel rulemaking).

VII. EPA Reasonably Calculated State-Specific Goals and Determined That All States Will be Able to Develop Compliant Plans.

A. EPA Reasonably Determined That Pre-2013 Generating Facilities Cannot Provide Emission-Rate Credits.

Petitioners' challenges to the December 31, 2012 cutoff for generating emission-rate credits, Pet. Record Br. 56-63, 82-84, are meritless. EPA calculated the uniform rates by applying the Best System to the amount of fossil-fuel-fired generation in 2012.[123] To provide flexibility, EPA calculated rate- and mass-based goals for each state by applying those rates to the amount of each state's steam and gas generation in 2012. 80 Fed. Reg. at 64,821. State plans may allow sources to comply with a rate-based standard by holding credits that reflect generation from certain low- or zero-emitting sources, such as renewable or nuclear generation. 40 C.F.R. §§ 60.5790; 60.5800.[124] Because only facilities that commence operation or increase generation capacity after December 31, 2012, can be assumed to reduce

[123] EPA chose 2012 because it was a representative year for the power sector and had the best data for baseline emissions (with certain adjustments). 80 Fed. Reg. at 64,814-15. No Petitioner has challenged EPA's choice of the baseline year.

[124] The limitations on which sources can generate credits are necessary only for a rate-based plan. In a mass-based plan, crediting of low- or zero-emitting generation is unnecessary; sources simply must hold allowances equal to their total emissions during a compliance period. 40 C.F.R. §§ 60.5790(b); 60.5825(a).

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fossil-fuel-fired emissions from the baseline level, only such facilities are eligible to generate credits for rate-based compliance. Id. at § 60.5800(a)(1); 80 Fed. Reg. at 64,737, 64,814, 64,896-97.

Moreover, if pre-2013 measures reduced fossil-fuel emissions, such reductions have already been accounted for in the baseline, and cannot logically be credited as reductions from baseline emissions.[125] In fact, the pre-2013 emission reductions can be beneficial to utilities and the states because they may need to make fewer additional reductions to meet the uniform rates or state goals. For example, North Carolina's Clean Smokestacks Act required sources in the state to reduce sulfur dioxide and nitrogen oxides emissions to reduce ozone and particulate matter pollution. Pet. Record Br. 82-84; see http://daq.state.nc.us/news/leg/cleanstacks.shtml. That sources chose to comply with those requirements by replacing their fossil-fueled-fired generation with cleaner generation put the state in a better position to comply with the Rule's requirements. 80 Fed. Reg. at 64,897. However, those pre-2013 reductions do not reduce emissions from the 2012 baseline, and there is no basis for granting them credits.

[125] Facilities that commenced operation during 2012 also reduce the baseline in accordance with the amount of fossil generation they replaced during 2012, and crediting is unwarranted. 80 Fed. Reg. at 64,815. Such facilities also contribute to reduced emissions.

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Petitioners ignore this fundamental logical flaw in their argument and none of Petitioners' arguments demonstrates that EPA's determination was arbitrary or capricious. First, Petitioners generically argue that EPA "ignored" various existing sources of electric generation as compliance options. Pet. Record Br. 56-58. However, EPA explained why it is inappropriate to issue credits for generation already accounted for in the baseline. EPA accounted for fluctuations in hydropower generation due to changing weather by adjusting the baseline for states with high percentages of hydropower. 80 Fed. Reg. at 64,815; Computation TSD, Appendix 7, JA___. EPA also discussed the role of generation by nuclear plants and waste-to-energy facilities. 80 Fed. Reg. at 64,899-900, 64,901-02. Petitioners do not address these facts and do not specify in what way (other than allowing credits for pre-2013 generation) they believe EPA should have considered these facilities.

Petitioners' second argument, that the Rule "discriminates" against or "punishes" states or utilities that had high levels of non-fossil-fuel generation before 2013, Pet. Record Br. 58-63, 82-84, is also meritless. All states and facilities are treated the same and have the same cutoff date. Petitioners provide no explanation of why units already in operation in 2012, and thus already reflected in the generation and emissions baseline, should be able to generate credits representing emission reductions from the 2012 level. Furthermore, the pre-2013 renewable and nuclear facilities cited by Petitioners, Pet. Record Br. 59, 62-63, were constructed either to meet increasing demand or to replace demand previously met by fossil-fuel-fired

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plants. In either case, if that demand had instead been met by continuing or increased fossil-fuel generation, those states would now have significantly higher baselines and their sources would now need to achieve correspondingly greater emission reductions. 80 Fed. Reg. at 64,737.

Thus, rather than being discriminated against or punished, states in which larger amounts of non-fossil generation were in place prior to 2013 have to make a smaller effort now to meet the Rule's requirements. Petitioners provide no record support, nor any other factual support, for their assertion that pre-2013 renewable sources will cease operating if they cannot generate emission credits. Pet. Record Br. 60. Nor do Petitioners address the fact that utilities have an incentive to keep such renewable generation in operation, whether credited or not, because it contributes to sources' ability to meet their emission standards. Petitioners provide no evidence that the value of credits would be large enough to justify the capital cost of replacing existing renewable generation that is currently operating and economically viable. To the contrary, EPA found that renewable generation, once installed, remains competitive, 80 Fed. Reg. at 64,805; that programs that incentivize existing renewable generation will likely continue to be robust, id. at 64,803; and that all low-carbon generation contributes toward meeting the Rule's emission-performance levels, and thus has an incentive to remain in operation under the Rule, id. at 64,897.

Petitioners' claims regarding waste-to-energy facilities, Pet. Record Br. 60-62, as well as North Carolina's claims, id. at 82-84, are based almost exclusively on

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non-record evidence, and thus are not properly before the Court. 42 U.S.C. § 7607(d)(7). Regardless, waste-to-energy facilities in operation during the baseline year do not reduce emissions from the baseline, and thus there is no basis for granting them credits. 80 Fed. Reg. at 64,899-900. EPA's rationale for crediting only the biogenic portion of a post-2012 facility's throughput is also self-evident. While the biogenic portion may meet the Rule's qualified biomass requirements and thus help control increases of atmospheric-CO_2 levels, id. at 64,757, 64,899, burning the anthropogenic portion (e.g., plastics), emits fossil-based CO_2. Id. at 64,900. Because combusting anthropogenic wastes increases, rather than controls, atmospheric-CO_2 levels, there is no basis for granting it credits.

B. EPA Reasonably Calculated Wisconsin's Baseline Emissions.

Petitioners allege, Pet. Record Br. 72-73, that EPA "improperly" declined to adjust Wisconsin's 2012 baseline to reflect the 2013 retirement of the Kewaunee nuclear plant. In fact, EPA consistently and reasonably excluded adjustments for *all* retirements occurring after the 2012 baseline year—including both zero-emitting nuclear plants, like Kewaunee, and high-emitting facilities like coal-fired plants. As EPA explained, it chose 2012 because it "was the most recent data year for which complete data were available when the EPA undertook analysis for the [Proposal] and it reflected *actual performance* at the state level." 80 Fed. Reg. at 64,814 (emphasis added). While EPA did make particular adjustments to reflect unique circumstances *in that baseline year*, as it did for Minnesota, EPA concluded that the historical,

"objective" nature of the baseline year, id., would be undermined by additional adjustments based on uncertain projections of grid response to fleet turnover. Computation TSD 7, JA___.

Accordingly, EPA uniformly rejected adjustments based on unit retirements after the baseline year. See 80 Fed. Reg. at 64,813 n.741. "Even where fleet turnover is certain," like in Wisconsin's case, "the *impact* of that retirement is not." Computation TSD 7 (emphasis added), JA___; see RTC 4.5, 25-26 (Response 24, addressing Kewaunee plant closure), JA___. Attempting to determine whether, in an interconnected system, generation was replaced by non-emitting or fossil-fuel-fired sources, by in- or out-of-state generation, or not replaced at all, would "begin to shift the baseline from a historical-data informed baseline to a projection-informed baseline."[126] Computation TSD 7, JA___. EPA reasonably declined to engage in such speculation, whether for nuclear retirements or coal retirements. In any event, given the extensive flexibility in the Rule, Wisconsin's state-specific goals are reasonable and achievable.

[126] This speculative exercise is demonstrated by Wisconsin's own comment, which offered four distinct proposals for the assumed mix of replacement generation. Wisconsin Dep't of Natural Res. Comment 49-52, EPA-HQ-OAR-2013-0602-23541, JA___.

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C. The Rule Will Not Cause Particular Harm to Utah.

Petitioners assert that EPA is "unfairly penalizing Utah" by not adjusting its baseline to account for a 2012 outage at the Intermountain Power Project. Pet. Record Br. 77-79. EPA did make adjustments to the baseline for outlier events causing exceptional distortions in the baseline year; for outages, an adjustment was made where: (1) the outage constituted a more than 75% reduction in the unit's "heat input" (the total energy potential of the feedstock fuel); and (2) the unit represented more than 10% of the state's total "heat input" (i.e., all fossil generation). See Computation TSD Appendix 7, JA___; 80 Fed. Reg. at 64,814-15.

However, Intermountain's outage failed to meet the first criterion, as it resulted in only a 35% reduction as compared to a 2014 benchmark year. See Unit Outage Criteria Sheet, Rows 1924-25, EPA-HQ-OAR-2013-0602-36848, JA___. Petitioners do not challenge the reasonableness of EPA's adjustment criteria for unit outages, or the factual basis for EPA's determination that the criteria were not met. Pet. Record. Br. 78-79. Petitioners also fail to support with record evidence their claim that "Utah plants were not deployed to make up the shortfall." See Intermountain Power Agency Comments 6, EPA-HQ-OAR-2013-0602-24053, JA___, cited in Pet. Record Br. 78.

Petitioners separately assert that Utah cannot increase gas generation because it agreed in a state implementation plan for another pollutant that it would "run its gas units at lower (moderate) capacities." Pet. Record Br. 79. This argument is barred

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because it was not raised during public comment. See 42 U.S.C. § 7607(d)(7)(B). Rather, Utah commented that its four gas-fired plants "are permitted—*and not constrained by existing State Implementation Plans*—to operate at the levels envisioned by EPA." State of Utah Comments 15 (emphasis added), EPA-HQ-OAR-2013-0602-23100, JA___. Petitioners now rely on information outside the record, which cannot be considered on judicial review. See Pet. Record Br. 79-80; 42 U.S.C. § 7607(d)(7)(A).

In any event, Petitioners' assertion that the Rule will jeopardize public health and welfare in areas near gas-fired plants is unsubstantiated. States have flexibility in establishing gas-fired plants' emission rates—and sources have flexibility in implementing them—to avoid such concerns. See 80 Fed. Reg. at 64,783, 64,801. Utah has not established that its sources are unable to forgo increasing generation at gas-fired plants and achieve reductions through the other Building Blocks, alternative emission-reduction measures, or emission-credit trading. Id. at 64,730, 64,732, 64,736.

D. EPA Properly Considered Wyoming's Circumstances.

Petitioners Wyoming and North Dakota contend that EPA ignored "difficulties for Wyoming in developing renewables in the protected sage grouse corridor" and that EPA should have consulted with the Fish and Wildlife Service under the Endangered Species Act ("ESA"), 16 U.S.C. § 1536(a)(2), to "avoid these difficulties." Pet. Record Br. 75-76. This argument fails for two independent reasons.

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First, consultation is required only if an agency concludes that its action "may affect" a species listed as threatened or endangered; if the agency determines that its action will have no effect on a listed species or its critical habitat, ESA consultation is not triggered. 50 C.F.R. § 402.14(a); Ctr. For Biological Diversity v. U.S. Dep't of the Interior, 563 F.3d 466, 474-75 (D.C. Cir. 2009). Because the sage grouse is not listed, 80 Fed. Reg. 59,858 (Oct. 2, 2015), any difficulties Wyoming might face in developing sage grouse habitat could not trigger ESA consultation.

Second, EPA reasonably determined that ESA consultation was not triggered because issuing the Rule has no direct or indirect effects on listed species. 80 Fed. Reg. at 64,925-27. The Rule provides the states (or EPA, as necessary) with considerable discretion in developing implementation plans, and does not authorize or require any on-the-ground action affecting listed species. Id. at 64,926-27, 64,710. ESA consultation is not triggered in these circumstances. See Ctr. For Biological Diversity, 563 F.3d at 483.[127]

Wyoming's remaining contentions are also unavailing. As described in Argument V.A, Building Block 1 accounts for variations among individual units, and

[127] Nor does the Rule resemble the "past agency action[]" cited by Petitioners. Pet. Record Br. 76-77. There, agencies intending to authorize new wind projects predetermined siting and operating criteria to obviate project-specific ESA review. 80 Fed. Reg. 24,914 (May 1, 2015). In contrast, EPA's Rule does not (and could not) predetermine how wind projects should be sited or operated, and the extent to which a plan may rely on wind projects is speculative. See 80 Fed. Reg. at 64,926.

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has not "ignored" the particular features of Wyoming's fleet. See Pet. Record Br. 75. Moreover, the Rule incorporates significant compliance flexibility and does not mandate the application of the Building Blocks. See 80 Fed. Reg. at 64,816. Nor has the Rule "disproportionately" affected Wyoming. See Pet. Record Br. 75. EPA's regional approach in fact *reduces* disparities among states. 80 Fed. Reg. at 64,736-37, 64,742; see supra Argument IV.A.

E. Utah's and Arizona's Concerns Regarding Tribal Lands Are Purely Speculative.

Utah's and Arizona's claims regarding sources on tribal lands, Pet. Record Br. 73-75, are not properly before the Court because they are speculative, and thus not ripe. Nor is there any support for any more general claim that EPA should have permitted trading between rate- and mass-based states. Both states assert that they may have a problem if EPA finalizes its proposed federal plan for specific power plants in tribal jurisdictions and if that plan is mass-based while the state's plan is rate-based (or vice versa). However, EPA's plan is not yet final and neither state plan exists yet. Furthermore, the states do not explain why they could not meet their goals in light of the Rule's flexibilities, or why, if they needed to coordinate with EPA or the tribes, they would not be able to do so. 80 Fed. Reg. at 64,897-98.

Moreover, Petitioners' attempt to compare EPA's calculation of mass-based goals to the establishment of a hybrid mass- and rate-based trading program is specious. The former is a one-time mathematical exercise. Id. at 64,822. The latter is

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an unexplained suggestion that EPA should allow the interchangeable use of different types of compliance instruments without any record basis as to how it could function, much less how it would maintain the emission-performance integrity of interstate trading. Id. at 64,839.

CONCLUSION

For the foregoing reasons, the petitions for review should be denied.

Respectfully submitted,

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March 28, 2016

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CERTIFICATE OF COMPLIANCE WITH FEDERAL RULE OF APPELLATE PROCEDURE 32(A)

I hereby certify that this brief complies with the requirements of Fed. R. App. P. 32(a)(5) and (6) because it has been prepared in 14-point Garamond, a proportionally spaced font.

I further certify that this brief complies with the type-volume limitation of Fed. R. App. P. 32(a)(7)(B) because it contains **41,949 words**, excluding the parts of the brief exempted under Rule 32(a)(7)(B)(iii), according to the count of Microsoft Word.

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CERTIFICATE OF SERVICE

I hereby certify that on March 28, 2016, I electronically filed the foregoing brief with the Clerk of the Court for the United States Court of Appeals for the District of Columbia Circuit by using the appellate CM/ECF system.

The participants in the case are registered CM/ECF users and service will be accomplished by the appellate CM/ECF system.

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To: Lee Fuller[lfuller@ipaa.org]
From: Goffman, Joseph
Sent: Thur 3/17/2016 4:38:45 PM
Subject: Re: Thanks

Thanks, Lee. Appreciate the thoughtful discussion of the issues.

- Joseph Goffman
Sent from my iPhone

On Mar 16, 2016, at 6:12 PM, Lee Fuller <lfuller@ipaa.org> wrote:

<image001.gif>
Joe,

Thanks for putting yesterday's call together on the ICR discussion.

I wanted to take some of your time to describe the dynamics of the Section 111(d) decision from my sense of the industry's perspective. Perhaps, it will be useful.

First, the array of regulatory initiatives directed at the oil and natural gas production industry in this last year of the Obama Administration creates an adverse and suspicion laden atmosphere. While not all of these are air or methane related, a substantial number are – a revised Ozone NAAQS, Subpart OOOOa, CTGs on existing VOC sources in Ozone Nonattainment Areas, source determination, the BLM venting and flaring regulation, changing the Greenhouse Gas reporting inventory process, and – now – the Section 111(d) action.

Second, all of these are principally advocated by EDF, NRDC, the Sierra Club and others – many of which have as their avowed agenda preventing the US development of both oil and natural gas. Since 2012 the industry views the Obama Administration moving from recognizing the benefits of natural gas production for the national economy and for meeting climate incentives to aggressively targeting its existence.

Third, all of this is coming when the industry if facing its most significant and perplexing financial crisis in decades – much of it driven by external factors and some of it driven by the success the industry had in developing US resources at a time when the economy was crippled in many other areas. Over the next several months, there are expectations of a significant number of bankruptcies but at minimum company resources are highly restricted. Marginal wells (80 percent of oil wells and 67 percent of natural gas wells) are currently operating at a loss and many will fail if there is no recovery in prices soon.

Fourth, for existing sources, the Administration is pursuing three different initiatives for regulation – CTGs driving state regulations, the BLM venting and flaring rules and Section 111(d). The first two are different such that an operator on BLM lands in an Ozone Nonattainment Area will be faced with conflicting requirements. And, then, there will be

another existing source federal regulation. Some states are acting separately as well.

Fifth, the regulatory development of Subpart OOOO, Subpart OOOOa and the CTGs has troubled industry regarding the technological judgements and the cost analysis. For example, in all of these analyses, EPA has used a natural gas value of $4.00/mcf. However, during this time the national wellhead price for natural gas hovered at or below $2.00/mcf and for many areas including large parts of the Marcellus, it has been nearer $1.00/mcf. Natural gas prices do not appear to be recovering any time in the foreseeable future. Similarly, when the Agency proposed its CTGs, it essentially used the same requirements in the NSPS. But, since most of the burden of these regulations would fall on marginal wells, industry believes that the analysis should have been based on a Reasonably Available Control Measures test rather than a Best System of Emissions Reductions assessment. The ICR offers an opportunity to address these questions, but crafting it to do so will be the challenge.

Sixth, EPA's Air Enforcement office has initiated an aggressive effort in North Dakota related – as I understand it – to Subpart OOOO storage vessel compliance. My knowledge here is limited because companies do not discuss details of their situations with trade associations when they become involved in negotiating on enforcement actions. However, the basic framework appears to be that the Agency is asserting that operators have failed to design and operate their storage vessels properly. Not surprisingly, operators believe that EPA is using faulty analyses of their emissions but cannot get the Agency to disclose its information. Regardless, EPA has targeted a few companies – one is privately held, another is economically weak – with fines that would probably bankrupt them (particularly the private company). The logical intent here is for a negotiation leading to not only compliance with the Subpart OOOO requirements but additional controls in otherwise unregulated emissions sources. From the standpoint of the ICR effort, the use of Section 114 to initiate these enforcement actions raises significant apprehensions about the use of information acquired under the ICR process. And, the tone of the actions in North Dakota has further skewed industry's view about EPA.

Seventh, industry continues to see much of this existing source effort as overkill. The Administration has publicly sought a 40-45 percent reduction in methane emissions from the petroleum and natural gas systems sections in 2012-2025 timeframe. Industry believes it has succeeded in that objective with the NSPS requirements, for the production sector in the Subpart OOOO regulations. Consequently, for the subsequent regulatory actions, the cost effectiveness tests should be even more carefully applied. In industry's view the production sector is just over one percent of the GHGI. I recognize that EPA is questioning its GHGI calculations and the timing of that action has also raised questions. I cannot at this time directly dispute the recalculation but I would note a couple of facts. One, EPA states that Subpart W generates reports from about 30 percent of the industry. This is not surprising because the remainder of the industry is marginal wells. Two, it appears that EPA's increased emissions estimates are based on scaling up the Subpart W information based on facilities. But, I don't believe that marginal wells emit at the level of the Subpart W facilities and question the scale up process. In earlier analyses EPA had determined that Subpart W reports would cover about 85 percent of the emissions from this sector but the

scale up in the revised GHGI seems much larger than a 15 percent amount. Clearly, more analysis needs to be done by people with more understanding than I have. But, this issue points again to the existing source issue. First, the overwhelming majority of the facilities will be marginal wells that average about 2.7 barrels/day for oil and 22 mcfd for natural gas and these will not produce emissions at the rate of large facilities – and will not be capable of absorbing significant regulatory costs. Second, by the time the existing source regulations are implemented, the large sources will either have been regulated under NSPS, particularly Subpart OOOO, or will have implemented similar requirements under voluntary controls prior to Subpart OOOO. The remaining universe of larger sources will be a small component of the total emissions pool.

I appreciate your efforts in working with me and hope this will provide some context as we go forward.

Best,

Lee

To: Cyran, Carissa[Cyran.Carissa@epa.gov]
Cc: Stewart, Lori[Stewart.Lori@epa.gov]; Koerber, Mike[Koerber.Mike@epa.gov]
From: Goffman, Joseph
Sent: Wed 3/2/2016 1:36:05 AM
Subject: RE: FYI quote from you is used in the Middle Georgia Area's advance path forward (plan)

Good grief. Glad I am not planning to attend this meeting. I do remember the statement – and the reference was to their collaborative, initiative-taking process, not the substance of their plan, and I took the meeting as part of the CPP pre-proposal outreach process. But, other than that….

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Hi Joe,

Just an FYI The Middle Georgia area's Advance "path forward" (plan) for how they intend to address ozone and PM - Middle Georgia Advance Path Forward - contains a quote from you on page 6. Mike Koerber noted that the group enjoyed their prior conversation with Joe and refer to this quote often in their materials/discussions. Mike also noted that our Advance folks here have some reservations about the Middle Georgia group's efforts and caution about not making such a strong endorsement.

Thanks.

Carissa

To: joegoffman Personal Privacy
From: Goffman, Joseph
Sent: Fri 2/26/2016 9:33:53 PM
Subject: FW: CPP litigation -- Here is Petitioners' second brief, on procedural and record issues
PETITIONERS RECORD-ISSUE BRIEF.PDF
PETITIONERS' OPENING BRIEF ADDENDUM.PDF

From: Hoffman, Howard
Sent: Saturday, February 20, 2016 8:49 AM
To: OGC CPP Litigation Clients <OGC_CPP_Litigation_Clients@epa.gov>
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ORAL ARGUMENT SCHEDULED FOR JUNE 2, 2016

No. 15-1363 (and consolidated cases)

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

STATE OF WEST VIRGINIA, *et al.*,
Petitioners,
v.
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *et al.*,
Respondents.

On Petition for Review of Final Agency Action of the United States Environmental Protection Agency 80 Fed. Reg. 64,662 (Oct. 23, 2015)

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CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

Pursuant to Circuit Rule 28(a)(1), Petitioners state as follows:

A. Parties, Intervenors, and Amici Curiae

These cases involve the following parties:

Petitioners:

No. 15-1363: State of West Virginia; State of Texas ; State of Alabama; State of Arizona Corporation Commission; State of Arkansas; State of Colorado; State of Florida; State of Georgia; State of Indiana; State of Kansas; Commonwealth of Kentucky; State of Louisiana; State of Louisiana Department of Environmental Quality; Attorney General Bill Schuette, People of Michigan; State of Missouri; State of Montana; State of Nebraska; State of New Jersey; State of North Carolina Department of Environmental Quality; State of Ohio; State of South Carolina; State of South Dakota; State of Utah; State of Wisconsin; and State of Wyoming.

No. 15-1364: State of Oklahoma *ex rel*. E. Scott Pruitt, in his official capacity as Attorney General of Oklahoma and Oklahoma Department of Environmental Quality.

No. 15-1365: International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers & Helpers.

No. 15-1366: Murray Energy Corporation.

No. 15-1367: National Mining Association.

No. 15-1368: American Coalition for Clean Coal Electricity.

No. 15-1370: Utility Air Regulatory Group and Americ an Public Power Association.

No. 15-1371: Alabama Power Company; Georgia Power C ompany; Gulf Power Company; and Mississippi Power Company.

No. 15-1372: CO_2 Task Force of the Florida Electric Power Coordinating Group, Inc.

No. 15-1373: Montana-Dakota Utilities Co., a Divis ion of MDU Resources Group, Inc.

No. 15-1374: Tri-State Generation and Transmission Association, Inc.

No. 15-1375: United Mine Workers of America.

No. 15-1376: National Rural Electric Cooperative As sociation; Arizona Electric Power Cooperative, Inc.; Associated Electric Cooperative, Inc.; Big Rivers Electric Corporation; Brazos Electric Power Cooperative, Inc.; Buckeye Power, Inc.; Central Montana Electric Power Cooperative; Central Power Electric Cooperative, Inc.; Corn Belt Power Cooperative; Dairyland Power Cooperative; Deseret Generation & Transmission Co-operative; East Kentucky Power Cooperative, Inc.; East River Electric Power Cooperative, Inc.; East Texas Electric Cooperative, Inc.; Georgia Transmission Corporation; Golden Spread Electrical Cooperative, Inc.; Hoosier Energy Rural Electric Cooperative, Inc.; Kansas Electric Power Cooperative, Inc.; Minnkota Power Cooperative, Inc.; North Carolina Electric Membership Corporation; Northeast Texas Electric Cooperative, Inc.; Northwest Iowa Power

Cooperative; Oglethorpe Power Corporation; PowerSouth Energy Cooperative; Prairie Power, Inc.; Rushmore Electric Power Cooperative, Inc.; Sam Rayburn G&T Electric Cooperative, Inc.; San Miguel Electric Cooperative, Inc.; Seminole Electric Cooperative, Inc.; South Mississippi Electric Power Association; South Texas Electric Cooperative, Inc.; Southern Illinois Power Cooperative; Sunflower Electric Power Corporation; Tex-La Electric Cooperative of Texas, Inc.; Upper Missouri G. & T. Electric Cooperative, Inc.; Wabash Valley Power Association, Inc.; Western Farmers Electric Cooperative; and Wolverine Power Supply Cooperative, Inc.

No. 15-1377: Westar Energy, Inc.

No. 15-1378: NorthWestern Corporation d/b/a NorthWestern Energy.

No. 15-1379: National Association of Home Builders ("NAHB").

No. 15-1380: State of North Dakota.

No. 15-1382: Chamber of Commerce of the United States of America; National Association of Manufacturers; American Fuel & Petrochemical Manufacturers; National Federation of Independent Business; American Chemistry Council; American Coke and Coal Chemicals Institute; American Foundry Society; American Forest & Paper Association; American Iron & Steel Institute; American Wood Council; Brick Industry Association; Electricity Consumers Resource Council; Lignite Energy Council; National Lime Association; National Oilseed Processors Association; and Portland Cement Association.

No. 15-1383: Association of American Railroads.

No. 15-1386: Luminant Generation Company LLC; Oak Grove Management Company LLC; Big Brown Power Company LLC; Sandow Power Company LLC; Big Brown Lignite Company LLC; Luminant Mining Company LLC; and Luminant Big Brown Mining Company LLC.

No. 15-1393: Basin Electric Power Cooperative.

No. 15-1398: Energy & Environment Legal Institute.

No. 15-1409: Mississippi Department of Environmental Quality; State of Mississippi; and Mississippi Public Service Commission.

No. 15-1410: International Brotherhood of Electrical Workers, AFL-CIO.

No. 15-1413: Entergy Corporation.

No. 15-1418: LG&E and KU Energy LLC.

No. 15-1422: West Virginia Coal Association.

No. 15-1432: Newmont Nevada Energy Investment, LLC, and Newmont USA Limited.

No. 15-1442: The Kansas City Board of Public Utilities – Unified Government of Wyandotte County/Kansas City, Kansas.

No. 15-1451: The North American Coal Corporation; The Coteau Properties Company; Coyote Creek Mining Company, LLC; The Falkirk Mining Company; Mississippi Lignite Mining Company; North American Coal Royalty

Company; NODAK Energy Services, LLC; Otter Creek Mining Company, LLC; and The Sabine Mining Company.

No. 15-1459: Indiana Utility Group.

No. 15-1464: Louisiana Public Service Commission.

No. 15-1470: GenOn Mid-Atlantic, LLC; Indian River Power LLC; Louisiana Generating LLC; Midwest Generation, LLC; NRG Chalk Point LLC; NRG Power Midwest LP; NRG Rema LLC; NRG Texas Power LLC; NRG Wholesale Generation LP; and Vienna Power LLC.

No. 15-1472: Prairie State Generating Company, LLC .

No. 15-1474: Minnesota Power (an operating division of ALLETE, Inc.).

No. 15-1475: Denbury Onshore, LLC.

No. 15-1477: Energy-Intensive Manufacturers Working Group on Greenhouse Gas Regulation.

No. 15-1483: Local Government Coalition for Renewable Energy.

No. 15-1488: Competitive Enterprise Institute; Buckeye Institute for Public Policy Solutions; Independence Institute; Rio Grande Foundation; Sutherland Institute; Klaus J. Christoph; Samuel R. Damewood; Catherine C. Dellin; Joseph W. Luquire; Lisa R. Markham; Patrick T. Peterson; and Kristi Rosenquist.

Respondents:

Respondents are the United States Environmental Protection Agency (in Nos. 15-1364, 15-1365, 15-1367, 15-1368, 15-1370, 15-1373, 15-1374, 15-1375, 15-1376,

15-1380, 15-1383, 15-1398, 15-1410, 15-1418, 15-1442, 15-1472, 15-1474, 15-1475, 15-1483) and the United States Environmental Protection Agency and Gina McCarthy, Administrator (in Nos. 15-1363, 15-1366, 15-1371, 15-1372, 15-1377, 15-1378, 15-1379, 15-1382, 15-1386, 15-1393, 15-1409, 15-1413, 15-1422, 15-1432, 15-1451, 15-1459, 15-1464, 15-1470, 15-1477, 15-1488).

Intervenors and Amici Curiae:

Dixon Bros., Inc.; Gulf Coast Lignite Coalition; Joy Global Inc.; Nelson Brothers, Inc.; Norfolk Southern Corp.; Peabody Energy Corp.; and Western Explosive Systems Company are Petitioner-Intervenors.

Advanced Energy Economy; American Lung Association; American Wind Energy Association; Broward County, Florida; Calpine Corporation; Center for Biological Diversity; City of Austin d/b/a Austin Energy; City of Boulder; City of Chicago; City of Los Angeles, by and through its Department of Water and Power; City of New York; City of Philadelphia; City of Seattle, by and through its City Light Department; City of South Miami; Clean Air Council; Clean Wisconsin; Coal River Mountain Watch; Commonwealth of Massachusetts; Commonwealth of Virginia; Conservation Law Foundation; District of Columbia; Environmental Defense Fund; Kanawha Forest Coalition; Keepers of the Mountains Foundation; Mon Valley Clean Air Coalition; National Grid Generation, LLC; Natural Resources Defense Council; New York Power Authority; NextEra Energy, Inc.; Ohio Environmental Council; Ohio Valley Environmental Coalition; Pacific Gas and Electric Company; Sacramento

Municipal Utility District; Sierra Club; Solar Energy Industries Association; Southern California Edison Company; State of California by and through Governor Edmund G. Brown, Jr., and the California Air Resources Board, and Attorney General Kamala D. Harris; State of Connecticut; State of Delaware; State of Hawaii; State of Illinois; State of Iowa; State of Maine; State of Maryland; State of Minnesota by and through the Minnesota Pollution Control Agency; State of New Hampshire; State of New Mexico; State of New York; State of Oregon; State of Rhode Island; State of Vermont; State of Washington; and West Virginia Highlands Conservancy are Respondent-Intervenors.

Philip Zoebisch; Pedernales Electric Cooperative, Inc.; Municipal Electric Authority of Georgia; Pacific Legal Foundation; Texas Public Policy Foundation; Morning Star Packing Company; Merit Oil Company; Loggers Association of Northern California; and Norman R. "Skip" Brown are *amici curiae* in support of Petitioners.

Former EPA Administrators William D. Ruckelshaus and William K. Reilly; Institute for Policy Integrity at New York University School of Law; National League of Cities; U.S. Conference of Mayors; Baltimore, MD; Boulder County, CO; Coral Gables, FL; Grand Rapids, MI; Houston, TX; Jersey City, NJ; Los Angeles, CA; Minneapolis, MN; Pinecrest, FL; Portland, OR; Providence, RI; Salt Lake City, UT; San Francisco, CA; West Palm Beach, FL; American Thoracic Society; American Medical Association; American College of Preventive Medicine; American College of

Occupational and Environmental Medicine; and the Service Employees International Union are *amici curiae* in support of Respondents. American Sustainable Business Council and South Carolina Small Business Chamber of Commerce are movant *amici curiae* in support of Respondent.

B. Rulings Under Review

These consolidated cases involve final agency action of the United States Environmental Protection Agency titled, "Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units," and published on October 23, 2015, at 80 Fed. Reg. 64,662.

C. Related Cases

These consolidated cases have not previously been before this Court or any other court. Counsel is aware of five related cases that, as of the time of filing, have appeared before this Court:

(1) *In re Murray Energy Corporation*, No. 14-1112,

(2) *Murray Energy Corporation v. EPA*, No. 14-1151 (consolidated with No. 14-1112),

(3) *State of West Virginia v. EPA*, No. 14-1146,

(4) *In re: State of West Virginia*, No. 15-1277, and

(5) *In re Peabody Energy Corporation*, No. 15-1284 (consolidated with No. 15-1277).

Per the Court's order of January 21, 2016, the following cases are consolidated and being held in abeyance pending potential administrative resolution of biogenic

carbon dioxide emissions issues in the Final Rule: *National Alliance of Forest Owners v. EPA*, No. 15-1478; *Biogenic CO2 Coalition v. EPA*, No. 15-1479; and *American Forest & Paper Association, Inc. and American Wood Council v. EPA*, No. 15-1485.

CORPORATE DISCLOSURE STATEMENTS

Non-governmental Petitioners submit the following statements pursuant to Rule 26.1 of the Federal Rules of Appellate Procedure and Circuit Rule 26.1:

Alabama Power Company is a wholly-owned subsidiary of Southern Company, which is a publicly held corporation. Other than Southern Company, no publicly-held company owns 10% or more of Alabama Power Company's stock. Southern Company is traded publicly on the New York Stock Exchange under the symbol "SO."

American Coalition for Clean Coal Electricity ("ACCCE") is a partnership of companies that are involved in the production of electricity from coal. ACCCE recognizes the inextricable linkage between energy, the economy and our environment. Toward that end, ACCCE supports policies that promote the wise use of coal, one of America's largest domestically produced energy resources, to ensure a reliable and affordable supply of electricity to meet our nation's demand for energy. The ACCCE is a "trade association" within the meaning of Circuit Rule 26.1(b). It has no parent corporation, and no publicly held company owns a 10% or greater interest in the ACCCE.

American Public Power Association ("APPA") is the national association of publicly-owned electric utilities. APPA has no outstanding shares or debt securities in the hands of the public. APPA has no parent company. No publicly held company has a 10% or greater ownership in APPA.

Arizona Electric Power Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of Arizona Electric Power Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Associated Electric Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of Associated Electric Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Association of American Railroads ("AAR") is a nonprofit trade association whose members include all of the Class I freight railroads (the largest freight railroads), as well as some smaller freight railroads and Amtrak. AAR represents its member railroads in proceedings before Congress, the courts, and administrative agencies in matters of common interest, such as the issues that are the subject matter of this litigation. AAR is a "trade association" within the meaning of Circuit Rule 26.1(b). It

has no parent corporation, and no publicly held company owns a 10% or greater interest in AAR.

Basin Electric Power Cooperative ("Basin Electric") is a not-for-profit regional wholesale electric generation and transmission cooperative owned by over 100 member cooperatives. Basin Electric provides wholesale power to member rural electric systems in nine states, with electric generation facilities in North Dakota, South Dakota, Wyoming, Montana, and Iowa serving approximately 2.9 million customers. Basin Electric has no parent companies. There are no publicly held corporations that have a 10% or greater ownership interest in Basin Electric.

Big Brown Lignite Company, LLC is a wholly owned subsidiary of Luminant Holding Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Texas Competitive Electric Holdings Company LLC ("TCEH"). TCEH is a Delaware limited liability company and is a wholly owned subsidiary of Energy Future Competitive Holdings Company ("EFCH"), which is a Texas corporation and a wholly owned subsidiary of Energy Future Holdings Corp. ("EFH Corp."). Substantially all of the common stock of EFH Corp., a Texas corporation, is owned by Texas Energy Future Holdings Limited Partnership, which is a privately held limited partnership. No publicly held entities have a 10% or greater equity ownership interest in EFH Corp.

Big Brown Power Company, LLC is a wholly owned subsidiary of Luminant Holding Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Texas Competitive Electric Holdings Company LLC ("TCEH"). TCEH is a Delaware limited liability company and is a wholly owned subsidiary of Energy Future Competitive Holdings Company ("EFCH"), which is a Texas corporation and a wholly owned subsidiary of Energy Future Holdings Corp. ("EFH Corp."). Substantially all of the common stock of EFH Corp., a Texas corporation, is owned by Texas Energy Future Holdings Limited Partnership, which is a privately held limited partnership. No publicly held entities have a 10% or greater equity ownership interest in EFH Corp.

Big Rivers Electric Corporation has no parent corporation. No publicly held corporation owns any portion of Big Rivers Electric Corporation, and it is not a subsidiary or an affiliate of any publicly owned corporation.

Brazos Electric Power Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of Brazos Electric Power Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Buckeye Institute for Public Policy Solutions ("Buckeye Institute") is a nonprofit organization incorporated in Ohio under Section 501(c)(3) of the Internal Revenue Code. The Buckeye Institute seeks to improve Ohio policies by performing research and promoting market-oriented policy solutions. No parent company or publicly-held company has a 10% or greater ownership interest in the Buckeye Institute.

Buckeye Power, Inc. has no parent corporation. No publicly held corporation owns any portion of Buckeye Power, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Central Montana Electric Power Cooperative has no parent corporation. No publicly held corporation owns any portion of Central Montana Electric Power Cooperative, and it is not a subsidiary or an affiliate of any publicly owned corporation.

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CO_2 Task Force of the Florida Electric Power Coordinating Group, Inc. ("FCG") is a non-profit, non-governmental corporate entity organized under the laws of Florida. The FCG does not have a parent corporation. No publicly held corporation owns 10% or more of the FCG's stock.

Competitive Enterprise Institute ("CEI") is a nonprofit organization incorporated in Washington D.C. under Section 501(c)(3) of the Internal Revenue Code. CEI focuses on advancing market approaches to regulatory issues. No parent company or publicly-held company has a 10% or greater ownership interest in CEI.

Corn Belt Power Cooperative has no parent corporation. No publicly held corporation owns any portion of Corn Belt Power Cooperative, and it is not a subsidiary or an affiliate of any publicly owned corporation.

Coteau Properties Company ("Coteau Properties") is a wholly-owned subsidiary of The North American Coal Corporation ("NACoal"). No publicly held entity has a 10% or greater ownership interest in Coteau Properties. The general nature and purpose of Coteau Properties, insofar as relevant to this litigation, is the mining and marketing of lignite coal as fuel for power generation in North Dakota.

Coyote Creek Mining Company, LLC ("Coyote Creek Mining") is a wholly-owned subsidiary of NACoal. No publicly held entity has a 10% or greater ownership interest

in Coyote Creek Mining. The general nature and purpose of Coyote Creek Mining, insofar as relevant to this litigation, is the mining and marketing of lignite coal as fuel for power generation in North Dakota.

Dairyland Power Cooperative has no parent corporation. No publicly held corporation owns any portion of Dairyland Power Cooperative, and it is not a subsidiary or an affiliate of any publicly owned corporation.

Denbury Onshore, LLC is a wholly owned subsidiary of Denbury Resources Inc., a publicly held corporation whose shares are listed on the New York Stock Exchange. Other than Denbury Resources Inc., no publicly-held company owns 10% or more of any of Petitioner's stock and no publicly-held company holds 10% or more of Denbury Resources, Inc., stock. The stock of Denbury Resources, Inc. is traded publicly on the New York Stock Exchange under the symbol "DNR." Denbury is an oil and gas production company. As a part of its oil recovery operations (generally termed "tertiary" or "enhanced" recovery) that are performed in several states, Denbury, with its affiliated companies, produces, purchases, transports, and injects carbon dioxide for the purpose of the recovery of hydrocarbon resources.

Deseret Generation & Transmission Co-operative has no parent corporation. No publicly held corporation owns any portion of Deseret Generation & Transmission Co-operative, and it is not a subsidiary or an affiliate of any publicly owned corporation.

East Kentucky Power Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of East Kentucky Power Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

East River Electric Power Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of East River Electric Power Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

East Texas Electric Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of East Texas Electric Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Energy-Intensive Manufacturers Working Group on Greenhouse Gas Regulation ("EIM") is a coalition of individual companies. EIM has no outstanding shares or debt securities in the hands of the public. EIM has no parent corporation, and no publicly held company has 10% or greater ownership in EIM.

Entergy Corporation ("Entergy") is a publicly traded company incorporated in the State of Delaware, with its principal place of business in the city of New Orleans, Louisiana. Entergy does not have any parent companies that have a 10% or greater ownership interest in Entergy. Further, there is no publicly-held company that has a 10% or greater ownership interest in Entergy. Entergy is an integrated energy company engaged primarily in electric power production and electric retail distribution operations. Entergy delivers electricity to approximately 2.8 million customers in Arkansas, Louisiana, Mississippi, and Texas.

Falkirk Mining Company ("Falkirk Mining") is a wholly-owned subsidiary of NACoal. No publicly held entity has a 10% or greater ownership interest in Falkirk Mining. The general nature and purpose of Falkirk Mining, insofar as relevant to this litigation, is the mining and marketing of lignite coal as fuel for power generation in North Dakota.

GenOn Mid-Atlantic, LLC exists to provide safe, reliable, and affordable electric power to consumers. It is a limited liability corporation wholly owned by NRG North America LLC, a limited liability corporation wholly owned by GenOn Americas Generation, LLC. GenOn Americas Generation, LLC is a limited liability corporation wholly owned by NRG Americas, Inc. NRG Americas, Inc. is a corporation wholly owned by GenOn Energy Holdings, Inc., a corporation wholly owned by GenOn Energy, Inc. GenOn Energy, Inc. is a corporation wholly owned by NRG Energy, Inc. a Delaware publicly-traded corporation. NRG Energy, Inc. has no parent corporation. As of the last reporting period, T. Rowe Price Associates, Inc. held a 10% or greater ownership in NRG Energy, Inc. As of the last reporting period, T. Rowe Price Associates, Inc. was a subsidiary of T. Rowe Price Group, Inc., a publicly-traded company.

Georgia Power Company is a wholly-owned subsidiary of Southern Company, which is a publicly held corporation. Other than Southern Company, no publicly-held company owns 10% or more of Georgia Power Company's stock. Southern Company is traded publicly on the New York Stock Exchange under the symbol "SO."

Georgia Transmission Corporation has no parent corporation. No publicly held corporation owns any portion of Georgia Transmission Corporation, and it is not a subsidiary or an affiliate of any publicly owned corporation.

Golden Spread Electrical Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of Golden Spread Electrical Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Gulf Power Company is a wholly-owned subsidiary of Southern Company, which is a publicly held corporation. Other than Southern Company, no publicly-held company owns 10% or more of Gulf Power Company's stock. Southern Company is traded publicly on the New York Stock Exchange under the symbol "SO."

Hoosier Energy Rural Electric Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of Hoosier Energy Rural Electric Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Independence Institute is a nonprofit organization incorporated in Colorado under Section 501(c)(3) of the Internal Revenue Code. The Independence Institute is a public policy think tank whose purpose is to educate citizens, legislators, and opinion makers in Colorado about policies that enhance personal and economic freedom. No parent company or publicly-held company has a 10% or greater ownership interest in the Independence Institute.

Indian River Power LLC exists to provide safe, reliable, and affordable electric power to consumers. It is a limited liability corporation wholly owned by NRG Energy, Inc., a Delaware publicly-traded corporation. NRG Energy, Inc. has no parent corporation. As of the last reporting period, T. Rowe Price Associates, Inc. held a 10% or greater ownership in NRG Energy, Inc. As of the last reporting period, T. Rowe Price Associates, Inc. was a subsidiary of T. Rowe Price Group, Inc. a publicly-traded company.

Indiana Utility Group ("IUG") is a continuing association of individual electric generating companies operated for the purpose of promoting the general interests of the membership of electric generators. IUG has no outstanding shares or debt securities in the hand of the public and has no parent company. No publicly held company has a 10% or greater ownership interest in IUG.

International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers, and Helpers ("IBB") is a non-profit national labor organization with headquarters in Kansas City, Kansas. IBB's members are active and retired members engaged in various skilled trades of welding and fabrication of boilers, ships, pipelines, and other industrial facilities and equipment in the United States and Canada, and workers in other industries in the United States organized by the IBB. IBB provides collective bargaining representation and other membership services on behalf of its members. IBB is affiliated with the American Federation of Labor-Congress of Industrial Organizations. IBB and its affiliated lodges own approximately 60% of the outstanding stock of Brotherhood Bancshares, Inc., the holding company of the Bank

of Labor. Bank of Labor's mission is to serve the banking and other financial needs of the North American labor movement. No entity owns 10% or more of IBB.

International Brotherhood of Electrical Workers, AFL-CIO ("IBEW") is a non-profit national labor organization with headquarters located at 900 7th Street, N.W., Washington, D.C. 20001. IBEW's members are active and retired skilled electricians and related professionals engaged in a broad array of U.S. industries, including the electrical utility, coal mining, and railroad transportation sectors that stand to be impacted adversely by implementation of EPA's final agency action. IBEW provides collective bargaining representation and other membership services and benefits on behalf of its members. IBEW is affiliated with the American Federation of Labor-Congress of Industrial Organizations. IBEW has no parent companies, subsidiaries, or affiliates that have issued shares or debt securities to the public.

Kansas Electric Power Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of Kansas Electric Power Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

LG&E and KU Energy LLC is the holding company for Louisville Gas and Electric Company ("LG&E") and Kentucky Utilities Company ("KU"), regulated utilities that serve a total of 1.2 million customers. LG&E serves 321,000 natural gas and 400,000 electric customers in Louisville, Kentucky and 16 surrounding counties, whereas KU serves 543,000 customers in 77 Kentucky counties and five counties in Virginia. LG&E and KU Energy LLC is a wholly-owned subsidiary of PPL Corporation. Other than PPL Corporation, no publicly-held company owns 10% or more of any of LG&E and KU Energy LLC's membership interests. No publicly held company has a 10% or greater ownership interest in PPL Corporation.

Local Government Coalition for Renewable Energy ("Coalition") is a not-for-profit association of local government entities, including cities, counties and special purpose authorities. Working in coordination with the Municipal Waste Management Association, the environmental affiliate of the U.S. Conference of Mayors, the Coalition participates in state and federal regulatory proceedings, as well as judicial review proceedings, that affect operation of waste-to-energy facilities for management of municipal solid waste. None of the Coalition members have issued stock, partnership shares or any similar indicia of ownership interests, and none of the Coalition members have a parent corporation. As noted below, the Coalition joins this brief with respect to Arguments III.A and III.B.

Louisiana Generating LLC exists to provide safe, reliable, and affordable electric power to consumers. It is a limited liability corporation wholly owned by NRG South

Central Generating LLC, a limited liability corporation which in turn is wholly owned by NRG Energy, Inc., a Delaware publicly-traded corporation. NRG Energy, Inc. has no parent corporation. As of the last reporting period, T. Rowe Price Associates, Inc. held a 10% or greater ownership in NRG Energy, Inc. As of the last reporting period, T. Rowe Price Associates, Inc. was a subsidiary of T. Rowe Price Group, Inc. a publicly-traded company.

Luminant Big Brown Mining Company, LLC is a wholly owned subsidiary of Luminant Holding Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Texas Competitive Electric Holdings Company LLC ("TCEH"). TCEH is a Delaware limited liability company and is a wholly owned subsidiary of Energy Future Competitive Holdings Company ("EFCH"), which is a Texas corporation and a wholly owned subsidiary of Energy Future Holdings Corp. ("EFH Corp."). Substantially all of the common stock of EFH Corp., a Texas corporation, is owned by Texas Energy Future Holdings Limited Partnership, which is a privately held limited partnership. No publicly held entities have a 10% or greater equity ownership interest in EFH Corp.

Luminant Generation Company, LLC is a wholly owned subsidiary of Luminant Holding Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Texas Competitive Electric Holdings Company LLC ("TCEH"). TCEH is a Delaware limited liability company and is a wholly owned subsidiary of Energy Future Competitive Holdings Company ("EFCH"), which is a Texas corporation and a wholly owned subsidiary of Energy Future Holdings Corp. ("EFH Corp."). Substantially all of the common stock of EFH Corp., a Texas corporation, is owned by Texas Energy Future Holdings Limited Partnership, which is a privately held limited partnership. No publicly held entities have a 10% or greater equity ownership interest in EFH Corp.

Luminant Mining Company, LLC is a wholly owned subsidiary of Luminant Holding Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Texas Competitive Electric Holdings Company LLC ("TCEH"). TCEH is a Delaware limited liability company and is a wholly owned subsidiary of Energy Future Competitive Holdings Company ("EFCH"), which is a Texas corporation and a wholly owned subsidiary of Energy Future Holdings Corp. ("EFH Corp."). Substantially all of the common stock of EFH Corp., a Texas corporation, is owned by Texas Energy Future Holdings Limited Partnership, which is a privately held limited partnership. No publicly held entities have a 10% or greater equity ownership interest in EFH Corp.

Midwest Generation LLC exists to provide safe, reliable, and affordable electric power to consumers. It is a limited liability corporation wholly owned by Midwest Generation Holdings II, LLC. Midwest Generation Holdings II, LLC is a limited liability corporation wholly owned by Midwest Generation Holdings I, LLC. Midwest Generation Holdings I, LLC is a limited liability corporation 95% of which is owned by Mission Midwest Coal, LLC and 5% of which is owned by Midwest Generation Holdings Limited, which in turn is wholly owned by Mission Midwest Coal, LLC. Mission Midwest Coal, LLC is a limited liability corporation wholly owned by NRG Midwest Holdings LLC, which in turn is a limited liability corporation wholly owned by Midwest Generation EME, LLC. Midwest Generation EME, LLC is a limited liability corporation wholly owned by NRG Energy Holdings Inc. which is a corporation wholly owned by NRG Acquisition Holdings Inc. NRG Acquisition Holdings is a corporation wholly owned by NRG Energy, Inc., a Delaware publicly-traded corporation. NRG Energy, Inc. has no parent corporation. As of the last reporting period, T. Rowe Price Associates, Inc. held a 10% or greater ownership in NRG Energy, Inc. As of the last reporting period, T. Rowe Price Associates, Inc. was a subsidiary of T. Rowe Price Group, Inc. a publicly-traded company.

Minnesota Power is an operating division of ALLETE, Inc. No publicly-held company has a 10% or greater ownership interest in ALLETE, Inc.

Minnkota Power Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of Minnkota Power Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Mississippi Lignite Mining Company ("Mississippi Lignite Mining") is a wholly-owned subsidiary of NACoal. No publicly held entity has a 10% or greater ownership interest in Mississippi Lignite Mining. The general nature and purpose of Mississippi Lignite Mining, insofar as relevant to this litigation, is the mining and marketing of lignite coal as fuel for power generation in Mississippi.

Mississippi Power Company is a wholly-owned subsidiary of Southern Company, which is a publicly held corporation. Other than Southern Company, no publicly-held company owns 10% or more of Mississippi Power Company's stock. Southern Company is traded publicly on the New York Stock Exchange under the symbol "SO."

Montana-Dakota Utilities Co. is engaged in the distribution of natural gas and the generation, transmission, and distribution of electricity in the states of North Dakota, South Dakota, Montana, and Wyoming. Montana-Dakota Utilities Co. is a division of

MDU Resources Group, Inc. No publicly held company has a 10% or greater ownership interest in MDU Resources Group, Inc.

Murray Energy Corporation has no parent corporation and no publicly held corporation owns 10% or more of its stock. Murray Energy Corporation is the largest privately-held coal company and largest underground coal mine operator in the United States.

National Association of Home Builders ("NAHB") is a not-for-profit trade association organized under the laws of Nevada. NAHB does not have any parent companies that have a 10% or greater ownership interest in NAHB. Further, there is no publicly-held company that has a 10% or greater ownership interest in NAHB. NAHB has issued no shares of stock to the public. NAHB is comprised of approximately 800 state and local home builders associations with whom it is affiliated, but all of those associations are, to the best of NAHB's knowledge, nonprofit corporations that have not issued stock to the public. NAHB's purpose is to promote the general commercial, professional, and legislative interests of its approximately 140,000 builder and associate members throughout the United States. NAHB's membership includes entities that construct and supply single-family homes, as well as apartment, condominium, multi-family, commercial, and industrial builders, land developers, and remodelers.

National Rural Electric Cooperative Association has no parent corporation. No publicly held corporation owns any portion of National Rural Electric Cooperative Association, and it is not a subsidiary or an affiliate of any publicly owned corporation.

Newmont Nevada Energy Investment, LLC is a wholly-owned subsidiary of Newmont USA Limited and is the owner and operator of the TS Power Plant, a 242 MW coal-fired power plant located in Eureka County, Nevada, which provides power to Newmont USA Limited's mining operations. No other publicly held corporation owns 10% or more of the stock of Newmont Nevada Energy Investment, LLC.

Newmont USA Limited owns and operates 11 surface gold and copper mines, eight underground mines, and 13 processing facilities in Nevada that are served by the TS Power Plant. Newmont USA Limited is a wholly owned subsidiary of Newmont Mining Corporation and no other publicly held corporation owns 10% or more of its stock.

NODAK Energy Services, LLC ("NODAK") is a wholly-owned subsidiary of NACoal. No publicly held entity has a 10% or greater ownership interest in NODAK.

The general nature and purpose of NODAK, insofar as relevant to this litigation, is the operation of a lignite benefication facility within Great River Energy's Coal Creek Station, a lignite-fired power generating station in North Dakota.

The North American Coal Corporation ("NACoal") is a wholly-owned subsidiary of NACCO Industries, Inc. NACoal is not publicly held, but NACCO Industries, Inc., its parent, is a publicly traded corporation that owns more than 10% of the stock of NACoal. No other publicly-held corporation owns more than 10% of the stock of NACoal. The general nature and purpose of NACoal, insofar as relevant to this litigation, is the mining and marketing of lignite coal as fuel for power generation and the provision of mining services to natural resources companies.

North American Coal Royalty Company ("North American Coal Royalty") is a wholly-owned subsidiary of NACoal. No publicly held entity has a 10% or greater ownership interest in North American Coal Royalty. The general nature and purpose of North American Coal Royalty, insofar as relevant to this litigation, is the acquisition and disposition of mineral and surface interests in support of NACoal's mining of lignite coal as fuel for power generation and the provision of mining services to natural resources companies.

North Carolina Electric Membership Corporation has no parent corporation. No publicly held corporation owns any portion of North Carolina Electric Membership Corporation, and it is not a subsidiary or an affiliate of any publicly owned corporation.

Northeast Texas Electric Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of Northeast Texas Electric Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Northwest Iowa Power Cooperative has no parent corporation. No publicly held corporation owns any portion of Northwest Iowa Power Cooperative, and it is not a subsidiary or an affiliate of any publicly owned corporation.

NorthWestern Corporation is a publicly traded company (NYSE: NWE) incorporated in the State of Delaware with corporate offices in Butte, Montana and Sioux Falls, South Dakota. NorthWestern Corporation has no parent corporation. As of February 17, 2016, based on a review of statements filed with the Securities and Exchange Commission pursuant to Sections 13(d), 13(f), and 13(g) of the Securities and Exchange Act of 1934, as amended, BlackRock Fund Advisors is the only shareholder owning more than 10% or more of NorthWestern Corporation's stock.

In addition to publicly traded stock, NorthWestern Corporation has issued debt and bonds to the public.

NRG Chalk Point LLC exists to provide safe, reliable, and affordable electric power to consumers. It is wholly owned by GenOn Mid-Atlantic, LLC. GenOn Mid-Atlantic, LLC is a limited liability corporation wholly owned by NRG North America LLC, a limited liability corporation wholly owned by GenOn Americas Generation, LLC. GenOn Americas Generation, LLC is a limited liability corporation wholly owned by NRG Americas, Inc. NRG Americas, Inc. is a corporation wholly owned by GenOn Energy Holdings, Inc., a corporation wholly owned by GenOn Energy, Inc. GenOn Energy, Inc. is a corporation wholly owned by NRG Energy, Inc., a Delaware publicly-traded corporation. NRG Energy, Inc. has no parent corporation. As of the last reporting period, T. Rowe Price Associates, Inc. held a 10% or greater ownership in NRG Energy, Inc. As of the last reporting period, T. Rowe Price Associates, Inc. was a subsidiary of T. Rowe Price Group, Inc. a publicly-traded company.

NRG Power Midwest LP exists to provide safe, reliable, and affordable electric power to consumers. It is a limited partnership 99% of which is owned by NRG Power Generation Assets LLC and 1% of which is owned by NRG Power Midwest GP LLC, a limited liability corporation wholly owned by NRG Power Generation Assets LLC. NRG Power Generation Assets LLC is a limited liability corporation wholly owned by NRG Power Generation LLC, which is a limited liability corporation wholly owned by NRG Americas, Inc. NRG Americas, Inc. is a corporation wholly owned by GenOn Energy Holdings, Inc., a corporation wholly owned by GenOn Energy, Inc. GenOn Energy, Inc. is a corporation wholly owned by NRG Energy, Inc., a Delaware publicly-traded corporation. NRG Energy, Inc. has no parent corporation. As of the last reporting period, T. Rowe Price Associates, Inc. held a 10% or greater ownership in NRG Energy, Inc. As of the last reporting period, T. Rowe Price Associates, Inc. was a subsidiary of T. Rowe Price Group, Inc. a publicly-traded company.

NRG Rema LLC exists to provide safe, reliable, and affordable electric power to consumers. It is a limited liability corporation wholly owned by NRG Northeast Generation, Inc., a corporation wholly owned by NRG Northeast Holdings Inc. NRG Northeast Holdings Inc. is a corporation wholly owned by NRG Power Generation LLC, a limited liability corporation wholly owned by NRG Americas, Inc. NRG Americas, Inc. is a corporation wholly owned by GenOn Energy Holdings, Inc., a corporation wholly owned by GenOn Energy, Inc. GenOn Energy, Inc. is a corporation wholly owned by NRG Energy, Inc., a Delaware publicly-traded corporation. NRG Energy, Inc. has no parent corporation. As of the last reporting

period, T. Rowe Price Associates, Inc. held a 10% or greater ownership in NRG Energy, Inc. As of the last reporting period, T. Rowe Price Associates, Inc. was a subsidiary of T. Rowe Price Group, Inc. a publicly-traded company.

NRG Texas Power LLC exists to provide safe, reliable, and affordable electric power to consumers. It is a limited liability corporation wholly owned by NRG Texas LLC, which in turn is a limited liability corporation wholly owned by NRG Energy, Inc., a Delaware publicly-traded corporation. NRG Energy, Inc. has no parent corporation. As of the last reporting period, T. Rowe Price Associates, Inc. held a 10% or greater ownership in NRG Energy, Inc. As of the last reporting period, T. Rowe Price Associates, Inc. was a subsidiary of T. Rowe Price Group, Inc. a publicly-traded company.

NRG Wholesale Generation LP exists to provide safe, reliable, and affordable electric power to consumers. It is a limited partnership 99% owned by NRG Power Generation Assets LLC and 1% owned by NRG Wholesale Generation GP LLC, both of which are wholly owned by NRG Power Generation LLC. NRG Power Generation LLC is a limited liability corporation wholly owned by NRG Americas, Inc. NRG Americas, Inc. is a corporation wholly owned by GenOn Energy Holdings, Inc., a corporation wholly owned by GenOn Energy, Inc. GenOn Energy, Inc. is a corporation wholly owned by NRG Energy, Inc., a Delaware publicly-traded corporation. NRG Energy, Inc. has no parent corporation. As of the last reporting period, T. Rowe Price Associates, Inc. held a 10% or greater ownership in NRG Energy, Inc. As of the last reporting period, T. Rowe Price Associates, Inc. was a subsidiary of T. Rowe Price Group, Inc. a publicly-traded company.

Oak Grove Management Company, LLC is a wholly owned subsidiary of Luminant Holding Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Texas Competitive Electric Holdings Company LLC ("TCEH"). TCEH is a Delaware limited liability company and is a wholly owned subsidiary of Energy Future Competitive Holdings Company ("EFCH"), which is a Texas corporation and a wholly owned subsidiary of Energy Future Holdings Corp. ("EFH Corp."). Substantially all of the common stock of EFH Corp., a Texas corporation, is owned by Texas Energy Future Holdings Limited Partnership, which is a privately held limited partnership. No publicly held entities have a 10% or greater equity ownership interest in EFH Corp.

Oglethorpe Power Corporation has no parent corporation. No publicly held corporation owns any portion of Oglethorpe Power Corporation, and it is not a subsidiary or an affiliate of any publicly owned corporation.

Otter Creek Mining Company, LLC ("Otter Creek") is a wholly-owned subsidiary of NACoal. No publicly held entity has a 10% or greater ownership interest in Otter Creek. The general nature and purpose of Otter Creek, insofar as relevant to this litigation, is the development of a mine to deliver lignite coal as fuel for power generation in North Dakota.

PowerSouth Energy Cooperative has no parent corporation. No publicly held corporation owns any portion of PowerSouth Energy Cooperative, and it is not a subsidiary or an affiliate of any publicly owned corporation.

Prairie Power, Inc. has no parent corporation. No publicly held corporation owns any portion of Prairie Power, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Prairie State Generating Company, LLC ("PSGC") is a private non-governmental corporation that is principally engaged in the business of generating electricity for cooperatives and public power companies. PSGC does not have a parent corporation and no publicly-held corporation owns ten% or more of its stock.

Rio Grande Foundation is a nonprofit organization incorporated in New Mexico under Section 501(c)(3) of the Internal Revenue Code. The Rio Grande Foundation is a research institute dedicated to increasing liberty and prosperity for New Mexico's citizens. No parent company or publicly-held company has a 10% or greater ownership interest in the Rio Grande Foundation.

Rushmore Electric Power Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of Rushmore Electric Power Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

The Sabine Mining Company ("Sabine Mining") is a wholly-owned subsidiary of NACoal. No publicly held entity has a 10% or greater ownership interest in Sabine Mining. The general nature and purpose of Sabine Mining, insofar as relevant to this litigation, is the mining of lignite coal as fuel for power generation in Texas.

Sam Rayburn G&T Electric Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of Sam Rayburn G&T Electric Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

San Miguel Electric Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of San Miguel Electric Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Sandow Power Company, LLC is a wholly owned subsidiary of Luminant Holding Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Texas Competitive Electric Holdings Company LLC ("TCEH"). TCEH is a Delaware limited liability company and is a wholly owned subsidiary of Energy Future Competitive Holdings Company ("EFCH"), which is a Texas corporation and a wholly owned subsidiary of Energy Future Holdings Corp. ("EFH Corp."). Substantially all of the common stock of EFH Corp., a Texas corporation, is owned by Texas Energy Future Holdings Limited Partnership, which is a privately held limited partnership. No publicly held entities have a 10% or greater equity ownership interest in EFH Corp.

Seminole Electric Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of Seminole Electric Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

South Mississippi Electric Power Association has no parent corporation. No publicly held corporation owns any portion of South Mississippi Electric Power Association, and it is not a subsidiary or an affiliate of any publicly owned corporation.

South Texas Electric Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of South Texas Electric Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Southern Illinois Power Cooperative has no parent corporation. No publicly held corporation owns any portion of Southern Illinois Power Cooperative, and it is not a subsidiary or an affiliate of any publicly owned corporation.

Sunflower Electric Power Corporation has no parent corporation. No publicly held corporation owns any portion of Sunflower Electric Power Corporation, and it is not a subsidiary or an affiliate of any publicly owned corporation.

Sutherland Institute is a nonprofit organization incorporated in Utah under Section 501(c)(3) of the Internal Revenue Code. The Sutherland Institute is a public policy think tank committed to influencing Utah law and policy based on the core principles of limited government, personal responsibility, and charity. No parent company or

publicly-held company has a 10% or greater ownership interest in the Sutherland Institute.

Tex-La Electric Cooperative of Texas, Inc. has no parent corporation. No publicly held corporation owns any portion of Tex-La Electric Cooperative of Texas, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Tri-State Generation and Transmission Association, Inc. ("Tri-State") is a wholesale electric power supply cooperative which operates on a not-for-profit basis and is owned by 1.5 million member-owners and 44 distribution cooperatives. Tri-State issues no stock and has no parent corporation. Accordingly, no publicly held corporation owns 10% or more of its stock.

United Mine Workers of America ("UMWA") is a non-profit national labor organization with headquarters in Triangle, Virginia. UMWA's members are active and retired miners engaged in the extraction of coal and other minerals in the United States and Canada, and workers in other industries in the United States organized by the UMWA. UMWA provides collective bargaining representation and other membership services on behalf of its members. UMWA is affiliated with the America Federation of Labor-Congress of Industrial Organizations. UMWA has no parent companies, subsidiaries, or affiliates that have issued shares or debt securities to the public.

Upper Missouri G. & T. Electric Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of Upper Missouri G. & T. Electric Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Utility Air Regulatory Group ("UARG") is a not-for-profit association of individual generating companies and national trade associations that participates on behalf of its members collectively in administrative proceedings under the Clean Air Act, and in litigation arising from those proceedings, that affect electric generators. UARG has no outstanding shares or debt securities in the hands of the public and has no parent company. No publicly held company has a 10% or greater ownership interest in UARG.

Vienna Power LLC exists to provide safe, reliable, and affordable electric power to consumers. It is a limited liability corporation wholly owned by NRG Energy, Inc., a Delaware publicly-traded corporation. NRG Energy, Inc. has no parent corporation. As of the last reporting period, T. Rowe Price Associates, Inc. held a 10% or greater ownership in NRG Energy, Inc. As of the last reporting period, T. Rowe Price

Associates, Inc. was a subsidiary of T. Rowe Price Group, Inc. a publicly-traded company.

Wabash Valley Power Association, Inc. has no parent corporation. No publicly held corporation owns any portion of Wabash Valley Power Association, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

West Virginia Coal Association ("WVCA") is a trade association representing more than 90% of West Virginia's underground and surface coal mine production. No publicly-held company has 10% or greater ownership of the WVCA.

Western Farmers Electric Cooperative has no parent corporation. No publicly held corporation owns any portion of Western Farmers Electric Cooperative, and it is not a subsidiary or an affiliate of any publicly owned corporation.

Westar Energy, Inc. ("Westar") is a publicly traded company (symbol: WR) incorporated in the State of Kansas, with its principal place of business in the city of Topeka, Kansas. Westar is the parent corporation of Kansas Gas and Electric Company ("KGE"), a Kansas corporation with its principal place of business in Topeka, Kansas. Westar owns all of the stock of KGE. In addition to Westar's publicly traded stock, both Westar and KGE have issued debt and bonds to the public. Westar does not have any parent companies that have a 10% or greater ownership interest in Westar. Further, there is no publicly-held company that has a 10% or greater ownership interest in Westar.

Wolverine Power Supply Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of Wolverine Power Supply Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

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GLOSSARY OF TERMS

Act (or CAA)	Clean Air Act
BSER	Best System of Emission Reduction
CO_2	Carbon Dioxide
EIA	U.S. Energy Information Administration
EPA	U.S. Environmental Protection Agency
ERCs	Establishing Tradable Emission Reduction Credits
ERCOT	Electric Reliability Council of Texas
JA	Joint Appendix
MWh	Megawatt-Hour
NERC	North American Electric Reliability Corporation
NO_x	nitrogen oxides
Pounds of CO2 per Megawatt Hour	lbs CO_2 / MWh
Proposed Rule or Proposal	U.S. Environmental Protection Agency, Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 34,830 (June 18, 2014)
RTOs	Regional Transmission Organizations
Rule	U.S. Environmental Protection Agency, Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, Final Rule, 80 Fed. Reg. 64,662 (Oct. 23, 2015)

JURISDICTIONAL STATEMENT

Petitioners incorporate by reference the jurisdictional statements included in Petitioners' Opening Brief on Core Legal Issues.

STANDING STATEMENT

Petitioners incorporate by reference the standing statements included in Petitioners' Opening Brief on Core Legal Issues.

STATEMENT OF ISSUES

1. Whether EPA violated section 307 of the Clean Air Act ("CAA" or "Act")[3] by promulgating a rule it never proposed.

2. Whether the Rule violates section 111 because EPA's "best system of emission reduction" is not "adequately demonstrated" and because the Rule's emission guidelines are not "achievable" by regulated sources.

3. Whether the Rule arbitrarily and capriciously excludes certain sources of non-emitting generation from the compliance options available for state plans.

4. Whether EPA failed to consider important aspects of, and has made critical errors in, its emission guidelines, including:

a. Failing to establish necessary subcategories;

b. Failing to consider renewable energy limits;

c. Regulating sources that can only be regulated under section 111(b); and

d. Conducting a deeply flawed cost-benefit analysis.

5. Whether the Rule is arbitrary and capricious because it fails to accommodate individual States' circumstances, thus causing particular harm to certain States.

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[3] Unless otherwise stated, all statutory references are to the Clean Air Act. The Table of Authorities includes parallel citations to the U.S. Code.

STATUTES AND REGULATIONS

The Rule is codified in 40 C.F.R. Part 60, Subpart UUUU. All applicable statutes and regulations are contained in the addendum attached hereto or the addendum to the Opening Brief of Petitioners on Core Legal Issues.

INTRODUCTION

Even if EPA had authority under section 111(d) to fundamentally transform the electric sector through "generation shifting" and to regulate the activity of owners and operators of sources rather than the sources themselves,[4] the Rule remains fatally flawed.

The Rule is so untethered to what EPA proposed that no one could have divined the Rule EPA finalized—an emission reduction program based on separate, uniform performance rates for coal- and gas-fired units applied nationwide. This violates a bedrock administrative law principle—that the final rule, or at least something akin to it, has actually been proposed, so that the public has a meaningful opportunity to comment.

In part due to this failure, the administrative record does not support EPA's conclusions and aggressive emission reduction goals. Nearly everything in the Rule—from the foundation of EPA's "best system of emission reduction" to the

[4] Petitioners have explained why EPA does *not* have such authority in Petitioners' Opening Brief on Core Legal Issues ("Core Issues Brief").

achievability of the emission guidelines,[5] from the workability of the individual "Building Blocks" to EPA's projections of the renewable and natural gas-fired generating capacity, from the individual emission limits to EPA's broadest emission reduction claims—is based on unfounded assumptions and pure speculation, all made by an agency that by its own admission lacks expertise to restructure the energy sector.

This is not how rulemaking works. The Rule must be vacated.

STATEMENT OF THE CASE

I. The Proposed Rule

EPA's proposed rule would have established emission guidelines in the form of State-specific annual average carbon dioxide ("CO_2") emission rate goals for each of the 49 States with existing fossil fuel-fired units. 79 Fed. Reg. 34,830, 34,957, Table 1 (June 18, 2014), JA__, __ ("Proposed Rule" or "the proposal").[6] Each State-specific goal was designed to reflect the aggregate CO_2 emissions performance of all affected units in that State, adjusted to account for redispatch from coal to gas, EPA's

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[5] EPA's emission "guidelines" are in fact binding standards of performance; to avoid confusion, however, this brief refers to them as "guidelines." *See* Core Issues Brief at 74-78.

[6] The Core Issues Brief presents in its Statement of the Case the statutory and regulatory history of section 111; a description of the President's Climate Action Plan and the Rule; and a summary of the Rule's requirements. That Statement of the case also provides a detailed explanation of how EPA devised national "CO_2 emission performance rates" for fossil fuel-fired power plants based on three "Building Blocks." To avoid repetition, this brief incorporates by reference that Statement.

projected generation from qualifying renewable energy sources, and generation "avoided" through consumer-based energy efficiency measures. *Id.* at 34,893-94, JA__-__. EPA based the Proposed Rule's emission guidelines on a "best system of emission reduction" ("BSER") comprising four EPA-identified "Building Blocks." *Id.* at 34,836-37, JA__-__.

Building Block 1 was based on heat rate improvements (*i.e.*, improved combustion efficiency) of 6% at coal units across each State's fleet. *Id.* at 34,859-61, JA__-__.

Building Block 2 was based on displacing some or all of a State's coal-fired generation with increased generation from existing natural gas combined cycle units, until those gas units operate at 70% of their annual nameplate capacity on average or until coal generation is eliminated from the State. *Id.* at 34,862-64, JA__-__. EPA observed that 10% of existing gas units in the nation operated at annual capacity factors (*i.e.*, the ratio of a unit's actual output to its maximum potential output over a year) of 70% or higher in 2012 and assumed the remaining fleet could reach and sustain the same utilization level on average. *Id.* at 34,863, JA__.

Building Block 3 reflected new renewable generation and generation from under-construction and nuclear capacity at risk for retirement. *Id.* at 34,866, JA__.

Finally, Building Block 4 was based on reducing consumers' electricity demand through State-run energy efficiency programs. *Id.* at 34,871, JA__.

EPA calculated each State's unique goal by adjusting 2012 generation and emissions data from the State's regulated units to reflect the theoretical application of each Building Block on a statewide level. *Id.* at 34,895-96, JA__-__. The resulting emission guidelines were binding only on States and were not targeted at—or directly applicable to—individual units. Instead, EPA expected States to develop their own plans to impose legal requirements on a broad class of "affected entities." *Id.* at 34,901, JA__. For example, state plans might oblige entities other than existing fossil-fuel units to develop new renewable generation or implement consumer efficiency programs. *Id.* The Proposed Rule also allowed States to adopt "market-based trading programs" and develop multi-State plans, but trading was not an integral part of the BSER. *See id.* at 34,837, JA__.

II. The Rule

Although the Rule repeats many of the proposal's fundamental legal defects,[7] its core regulatory requirements bear little resemblance to the proposal. In particular, EPA dramatically altered the most fundamental aspect of the emission guidelines, based its definition of BSER and the target implementation levels on an entirely new rate-based methodology, and included emissions trading as an integral part of the Rule. Each of these changes is discussed below.

[7] *See* Core Issues Brief at 29-86.

A. Nationally Uniform Performance Rates

In stark contrast to the proposal, the final Rule establishes two nationally uniform emission rates–(i) one for coal-, oil, and gas-fired steam generating units;[8] and (ii) one for natural gas combined cycle units. 40 C.F.R. part 60, subpart UUUU, Table 1. These rates, and state plans implementing them, only apply to coal and gas units, and not to the broad range of "affected entities" as proposed.

Although the Rule also specifies rate-based and mass-based goals for each State, these are simply alternative expressions of the uniform performance rates. The Rule makes clear the emission rates are the "chief regulatory requirement of th[e] rulemaking," 80 Fed. Reg. at 64,820, 64,823, JA__, __; the State goals, derived from the performance rates, are alternative ways to demonstrate compliance. *Id.* at 64,820, JA__. EPA based the national performance rates on modified versions of three of the four proposed "Building Blocks," applied regionally rather than on the State level. *Id.* at 64,718, JA__.

EPA's adoption of nationally uniform rates that apply only to affected units shifts the burden of assuring that alternative generation would be available away from the States (as in the Proposed Rule) to the owners and operators of affected units. Instead of expecting States to ensure compliance with statewide goals through a broad

[8] The vast majority of steam units are coal units. References in this brief to coal units include the small number of gas- and oil-fired steam units the Rule covers. "Gas units" refers to natural gas combined cycle units.

range of state measures, the Rule effectively imposes on owners and operators of affected units the obligation to do whatever is necessary to comply with the rates, including investing in and shifting generation to alternative sources of generation, subsidizing alternative generation, or shutting down affected units. *Id.* at 64,718, 64,724, JA__, __.

B. BSER Determination and Building Block Targets

As the basis for the national performance rates, EPA determined the BSER would be based on the modified three Building Blocks. *Id.* at 64,744, JA__. Rather than applying the BSER on a State-by-State basis, as proposed, EPA applied the Building Blocks in the aggregate across three broad regions, such that the final Rule's performance rates are not based on measures that can be implemented within many States or reflect achievable targets for individual units. *Id.* at 64,813, 64,816-19, JA__, __-__.

This shift from State-specific goals based on State-by-State analysis to uniform performance rates based on a regional analysis led EPA to find that each Building Block could "achieve" new, and in most cases more aggressive, generation targets. For example, in estimating heat rate improvement targets for coal units under Building Block 1, the Agency disavowed any reliance on "implementation of specific measures." Greenhouse Gas Mitigation Measures Technical Support Document for the Final Rule ("GHG Mitigation Measures TSD") at 2-25, EPA-HQ-OAR-2013-0602-36859, JA__. Instead, EPA *assumed* that units could "maintain [over time] the

better heat rates they have previously achieved" only over a brief period by reducing variation from those heat rates using "good maintenance and operating practices." *Id.* Based on past heat rate data, EPA estimated potential heat rate improvements of 2.1 to 4.3% for the three regions. 80 Fed. Reg. at 64,789, 64,817, JA__, __.

For Building Block 2, EPA altered the target utilization rate for gas units from 70% of net nameplate capacity, to 75% of net summer capacity. *Id.* at 64,795, JA__. The final Rule also expects that under-construction gas units, once completed, can contribute 20% of capacity to displace coal-fired generation. *See id.* at 64,817, JA__.

EPA modified Building Block 3 by removing nuclear and existing renewable generation from the BSER and dramatically increasing the incremental renewable generation targets it considers achievable. *Id.* at 64,803, 64,809, JA__, __. Instead of basing state renewable generation targets on the average of neighboring state policies, EPA determined the nationwide maximum year-to-year change in renewable generation from 2010-2014 and added that amount each year after 2023—in addition to aggressive projections of "base case" renewable growth—to develop regional renewable generation targets, more than doubling the amount of new renewable energy predicted under the Proposed Rule. *Id.* at 64,807-08, JA__-__.

Moreover, EPA explained that it assessed whether the BSER was adequately demonstrated, and whether the Building Block targets and the emission guidelines were achievable, on an industry-wide basis rather than for individual affected units. *See id.* at 64,816-19, 64,779, JA__-__, __; CO_2 Emission Performance Rate and Goal

Computation Technical Support Document for CPP Final Rule ("Goal Computation TSD") at 6, EPA-HQ-OAR-2013-0602-3850, JA__. Further, EPA clarified its BSER is not simply based on reducing the operations of fossil units. Instead, fossil generation is being reduced due to a shift to alternative generation, including substantially increased renewable generating capacity that EPA claims will assure that overall demand is met. *See* 80 Fed. Reg. at 64,724 n.352, 64,782, JA__, __. As such, EPA's conclusion that its BSER is adequately demonstrated (and that its emission guidelines are achievable) relies on finding that the resulting generation mix can fully meet demand that was previously served by fossil fuel-fired generation.

C. The Integral Role of Trading Programs

Unlike the proposal, the Rule makes emissions trading programs "an integral part of [EPA's] BSER analysis," establishing tradable emission reduction credits ("ERCs") as the only mechanism available for affected units to achieve the Rule's uniform emission performance rates. *Id.* at 64,734, JA ___.[9] In other words, EPA's assumption that States will "establish standards of performance incorporating emissions trading" is key to its conclusion that the owners and operators of all affected units have tools available to implement the BSER. *Id.* at 64,735, JA__. Likewise, EPA's decision to apply BSER on a regional rather than state level assumes

[9] This is underscored by EPA's proposed federal plan, which requires interstate trading to achieve its standards. 80 Fed. Reg. at 64,966-65,011, (Oct. 23, 2015).

the availability not only of trading, but *interstate* trading, because an affected unit's standard will be based at least partly on emission-reducing opportunities outside its State. *Id.* at 64,666, 64,673, 64,827, JA__, __, __.

The *only* way an affected unit can comply with the Rule's uniform emission performance rates is to generate, purchase, or hold a sufficient number of ERCs through a trading program to calculate a lower (wholly fictional) average emission rate for the source at or below 1,305 pounds of CO_2 per megawatt hour ("lbs CO_2/MWh") (for coal units) or 771 lbs CO_2/MWh (for gas units). 40 C.F.R. § 60.5790(c)(1); *see also* 80 Fed. Reg. at 64,752, JA__ (listing actions affected units can take to achieve limits, all of which include using ERCs). These ERCs are not automatically issued or distributed to affected units. They must be created through the production of qualifying generation, such as new renewable generation, and then transferred. Increased generation from gas units may also create ERCs that can be used for compliance by coal units. 80 Fed. Reg. at 64,905 , JA__. Because increased generation from existing gas units must itself be covered by ERCs from other qualifying sources, the Rule relies doubly on ERCs generated from increased renewable generation. *Id.* at 64,905, JA__. Moreover, ERCs can only exist if they are provided for in a State's plan, and they can only be traded between States if expressly allowed in the plans of both the generating and purchasing States.

Therefore, the Rule's requirements cannot be met if EPA's projected levels of renewables or a sufficiently robust trading program fail to materialize. Any shortfall in

renewable generation will yield a shortfall in ERCs, making it impossible for affected units to obtain the only available compliance tools to generate electricity.

SUMMARY OF ARGUMENT

The final Rule is fatally flawed on myriad procedural and substantive grounds. It was promulgated in a manner flatly at odds with the protections expressly set out in the Act, and its substance is spawned of pure speculation, unsupported by the record. The Rule must be vacated because it is arbitrary, capricious, and contrary to law.

I. Meaningful public participation is an essential element of rulemaking. EPA's Rule could not have been divined from its proposal. By departing so radically from that proposal, EPA promulgated a Rule on which the public had no opportunity to comment.

II. EPA bears the burden to show that its selected "best system of emission reduction" has been adequately demonstrated to be reliable, efficient, and not exorbitantly costly. EPA must also show the emission guidelines derived from that system are "achievable" by individual sources, operating in the real world. Conjecture, speculation, and crystal ball inquiries do not suffice.

Here, because EPA uses a restructuring of the energy supply sector to drive CO_2 emission reductions, EPA must show that its system actually can achieve that result, without impairing the reliability of the nation's electric supply. EPA has not made that showing for its three "Building Blocks," separately or together.

EPA must also show that individual sources can achieve the emission guidelines, consistent with meeting electric demand. EPA concedes that no individual source could install controls that would enable it to meet the guidelines. Instead, the guidelines can only be met if a substantial number of sources shut down and the remaining sources purchase ERCs from EPA-favored generation facilities. That cannot happen without threatening electric supply reliability in many States.

III. The Rule treats the electric sector as a single "grid" comprising all generating sources in the nation. But in selecting which sources can generate emission reduction credits or be counted for compliance purposes, EPA arbitrarily discriminates against many existing, low- or zero-emission generating units that are part of that grid.

IV. Though EPA purports to have taken State-specific circumstances into account in setting the 47 individual state emission goals, in fact it only considered how much coal generation and how much gas generation each State possessed. EPA gave no meaningful consideration to State-specific factors that will make compliance with its emission guidelines impossible, including imminent plant retirements, transmission and pipeline infrastructure, the difficulty of trading between States and Indian tribes, State-specific electric market structure and reliability challenges, historic emission rates that show that EPA's emission guidelines are unrealistic, and earlier voluntary emission reduction efforts that make the Rule's additional required reductions impossible to achieve.

ARGUMENT

I. EPA Violated Section 307 By Promulgating A Never-Proposed Rule.

In the Rule, EPA departed fundamentally from the proposal, turning the rulemaking process into a mockery. "The process of notice and comment rule-making is not to be an empty charade," but instead "a process of reasoned decision-making" in which "interested parties" are afforded "the opportunity . . . to participate in a meaningful way." *Conn. Light & Power Co. v. NRC*, 673 F.2d 525, 528 (D.C. Cir. 1982). Meaningful participation is impossible when EPA proposes one thing and finalizes something else entirely.

A. The Rule Is Fundamentally Different From The Proposal.

As explained above, the final Rule establishes a CO_2 emission reduction program based on uniform, nationally applicable performance rates for two types of units – 1,305 lbs CO_2/MWh for coal, and 771 lbs CO_2/MWh for gas. 80 Fed. Reg. at 64,752, JA__. Every other element of the Rule flows from these two performance rates. Yet neither rate, nor even the concept of such a rate, was noticed in the Proposed Rule. In fact, EPA clearly stated that it had rejected the option of setting uniform rates, emphasizing it was proposing "the use of output-weighted-average emission rates for all affected [units] in a state *rather than nationally uniform emission rates*

for all affected [units] of particular types." 79 Fed. Reg. at 34,894, JA__ (emphasis added).[10] The Rule thus does exactly what EPA said in its proposal it would not do.

EPA had proposed to develop a unique goal for each State based on a complex mathematical formula. *Id.* at 34,896 n.265, JA__. That goal was to be a single, blended rate that applied to both the coal- and gas-fired units in a State. *Id.* at 34,895, JA __. A broad range of "affected entities," including producers of alternative generation, were responsible for implementation of these state goals. Everything was tied to EPA's establishment of these State-specific, blended, output-weighted-average emission rates. EPA thus did not include, or solicit any comment on, *any* emission reduction program based on uniform unit-specific performance rates applicable to general categories of units. Nor did EPA signal that it was considering adopting a rule that would shift all responsibility for implementation from "affected entities" to "owners/operators" of affected units.[11]

Finally, EPA adopted applicability language in the Rule that expanded coverage to units not subject to the proposal. Under the proposal, only facilities "constructed

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[10] The only other reference to "uniform" rates in the proposal is later on the same page, where EPA explains why it is proposing the use of output-weighted-average emission rates *rather than* nationally uniform rates. 79 Fed. Reg. at 34,894, JA__.

[11] This case thus stands in stark contrast to the typical case where EPA proposes to set a standard at a particular level, but also takes comment on other possible levels. *See, e.g.*, 79 Fed. Reg. 1,430, 1,470, 1,487 (Jan. 8, 2014) (soliciting comment on a range of possible new unit standards for the same pollutant and source category regulated here).

for the purpose of" supplying to the grid 1/3 or more of potential output and 219,000 MWh net-electric output were covered. 79 Fed. Reg. at 34,954, JA__. This mirrored decades-old applicability language governing steam generating units under the NSPS, Subpart Da. *See* 40 C.F.R. §§ 60.40Da(a)(1), 60.41Da; *see also* 44 Fed. Reg. 33,580, 33,613 (June 11, 1979). The final Rule expands coverage to include most generators connected to a utility power distribution system and capable of selling more than 25 MW of electricity. 40 C.F.R. § 60.5845.

Simply put, EPA promulgated a final rule it never proposed.

B. EPA's Circumvention of the Rulemaking Process Requires Vacatur.

By finalizing a Rule bearing no resemblance to the proposal, EPA violated its obligations under section 307(d)(3) and circumvented the rulemaking process. By law, EPA must provide in each proposal the factual data on which that proposed rule is based, the methodology used in obtaining and analyzing the data, and major legal interpretations and policy considerations underlying the proposal. CAA § 307(d)(3)(A)-(C). The very purpose of this requirement is to give the public a meaningful opportunity to comment. Here, EPA pulled the ultimate "surprise switcheroo," *Envtl. Integrity Project v. EPA*, 425 F.3d 992, 996 (D.C. Cir. 2005), rendering any comment opportunity illusory.

This is not a "logical outgrowth" case, in which EPA promulgated a rule "that differs in some particulars from its proposed rule." *Small Refiner Lead Phase-Down Task*

Force v. EPA, 705 F.2d 506, 546 (D.C. Cir. 1983). "Whatever a 'logical outgrowth' of [an agency's] proposal may include, it certainly does not include the Agency's decision to repudiate its proposed [position] and adopt its inverse." *Envtl. Integrity Project*, 425 F.3d at 998. For such changes to be lawful, the "necessary predicate" is that the agency "has alerted interested parties to the possibility of the agency's adopting a rule different than the one proposed," so the final rule is a "logical outgrowth" of the proposal. *Kooritzky v. Reich*, 17 F.3d 1509, 1513 (D.C. Cir. 1994).

This doctrine does not extend to a final rule that finds no roots in, and actually adopts the very frame work expressly rejected in, the agency's proposal. "Something is not a logical outgrowth of nothing," and the doctrine is inapplicable where commenters would have had to "divine [the agency's] unspoken thoughts." *Envtl. Integrity Project*, 425 F.3d at 996 (citations omitted). Agencies "may not turn the provision of notice into a bureaucratic game of hide and seek." *MCI Telecomms. Corp. v. FCC*, 57 F.3d 1136, 1142 (D.C. Cir. 1995).

No one could have divined from EPA's proposal that a final rule based on uniform, nationally-applicable performance rates was even a possibility, that units not even addressed in the proposal would be regulated, or that EPA would apply an entirely different methodology with new data in establishing those rates. Such silence in a proposal does more than frustrate meaningful comment; it assures no comment.

EPA should have proposed and taken comment on its new approach, just as EPA did when it took a fundamentally different approach in the CO_2 standards for

new generating units that were promulgated on the same day.[12] That EPA did not take the same easy (and lawful) step here bespeaks the Administration's rush to get the Rule out the door. Unless this Court repudiates EPA's conduct, it invites abuse of the rulemaking process. The Rule must be vacated. If EPA wishes to promulgate this Rule, it must start over, with a proper proposal.

II. EPA'S BSER Is Not "Adequately Demonstrated" And Its Emission Guidelines Are Not "Achievable" Under Section 111.

A. EPA Must Show Both "Adequate Demonstration" Of The BSER And "Achievability" Of The Emission Guidelines.

This Court "ha[s] established a rigorous standard of review under section 111." *Nat'l Lime Ass'n v. EPA*, 627 F.2d 416, 429 (D.C. Cir. 1980). EPA must establish that the BSER is "'adequately demonstrated,'" and that the performance standards derived from the BSER are "'achievable.'" *Id.* (quoting CAA § 111(a)). EPA fails to establish either. Both requirements derive from section 111(a)(1), which defines a "standard of performance" as

> a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction) the Administrator determines has been adequately demonstrated.

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[12] EPA first proposed those standards for new generating units on April 13, 2012. 77 Fed. Reg. 22,392. After "receiv[ing] more than 2.5 million comments," along with "new information," EPA formally withdrew that proposal on January 8, 2014, 79 Fed. Reg. 1,352, and initiated a new rulemaking process, 79 Fed. Reg. 1,430.

CAA § 111(a)(1). The two, though interrelated, are legally distinct, and the Rule must satisfy both.

The first demands that EPA "adequately demonstrate[]" that the technology selected as BSER "is one which has been shown to be reasonably reliable, reasonably efficient, and [not] exorbitantly costly in an economic or environmental way." *Essex Chem. Corp. v. Ruckelhaus*, 486 F.2d 427, 433 (D.C. Cir. 1973). Although EPA does not have to show the technology is currently in *regular use*, it must "'adequately demonstrate[]' that there will be 'available technology.'" *Portland Cement Ass'n v. Ruckelhaus*, 486 F.2d 375, 391 (D.C. Cir. 1973) (citation omitted).

The second requires EPA to establish the performance rate to be achieved through application of the BSER is "within the realm of the adequately demonstrated system's efficiency." *Essex Chem. Corp.*, 486 F.2d at 433-34. EPA may not set a rate "at a level that is purely theoretical or experimental," nor may it base its assessment of feasibility on "its subjective understanding of the problem or a 'crystal ball inquiry.'" *Id.* at 433-34 (quoting *Portland Cement*, 486 F.2d at 391); *accord Lignite Energy Council v. EPA*, 198 F.3d 930, 934 (D.C. Cir. 1999) ("EPA may not base its determination … on mere speculation or conjecture"). Rather, EPA must "affirmatively show that its standard reflects consideration of the range of relevant variables that may affect emissions in different plants" and must explain how the standard is "capable of being met under most adverse circumstances which can reasonably be expected to recur." *Nat'l Lime Ass'n*, 627 F.2d at 431 n.46, 433.

B. EPA Failed To Satisfy Its Burdens.

Until this Rule, EPA has always used tests and studies of existing control equipment to determine whether individual sources could apply a particular technology (e.g., a wet scrubber) or operational practice (e.g., fuel switching) to reduce emissions to a specified level. *See, e.g.*, *id.*, at 627 F.2d at 424-25 (baghouses, scrubbers, and other technologies); *Essex Chem. Corp.*, 486 F.2d at 435-46 (SO_2 absorption systems, acid-mist eliminators, and other technologies). The Court would review to ascertain whether EPA had shown both that (1) the technology or practice (the "system of emission reduction") was "adequately demonstrated" and (2) the resulting emission limit was "achievable" on a source-by-source basis. *E.g., Sierra Club v. Costle*, 657 F.2d 298 (D.C. Cir. 1981); *Nat'l Lime Ass'n*, 627 F.2d at 431-48; *Essex Chem. Corp.*, 486 F.2d at 436-41.

Here, EPA's "system of emission reduction" is neither a technology nor an operational process that controls emissions from individual facilities. Instead, it is a "system of alternative electric generation" intended to reduce emissions from the whole industry, primarily by shifting generation from existing coal units to gas units and new renewable resources.

By de-coupling BSER from actions taken at individual sources, and instead reorganizing the industry, EPA does not escape its burden to show the system has been adequately demonstrated and the emission guidelines are achievable. To the contrary, it must now evaluate not just whether individual sources will be able to

reach a certain emission target upon installing a tested technology, but whether the lights will stay on across the country under the Rule. This is critical, because if EPA has guessed wrong, brown-outs, black outs, and severe economic disruption will result.

This Court therefore must "take a 'hard look'" at EPA's facts and reasoning, *Small Refiner Lead Phase-Down Task Force*, 705 F.2d at 520 (citation omitted), and it should not afford any deference to EPA's explanations, as the agency admittedly lacks expertise in the power supply industry. *Unbelievable, Inc. v. N.L.R.B.*, 118 F.3d 795, 805 (D.C. Cir. 1997) (citation omitted) (the "court does not defer to agency decision in matter outside of agency's expertise").[13]

EPA bears an enormous burden. It must show its system of alternative generation will be "reasonably reliable," "reasonably efficient," and not "exorbitantly costly." *Essex Chem.*, 486 F.2d at 433. EPA must show its plan *will work*. This involves complex considerations about how electricity will be generated and distributed, including whether each Building Block can be employed at EPA's assumed levels, where new generating resources will be located, whether sufficient transmission

[13] EPA, Response to Public Comments on Proposed Amendments to National Emission Standards for Hazardous Air Pollutants for Existing Stationary Reciprocating Internal Combustion Engines and New Source Performance Standards for Stationary Internal Combustion Engines at 50, EPA-HQ-OAR-2008-0708-1491 ("The issues related [to] management of energy markets and competition between various forms of electric generation are far afield from EPA's responsibilities for setting standards under the CAA.").

infrastructure will exist to handle the generation shifting the Rule requires, and whether the resulting mix of generating assets can provide reliable power at all times to all customers in all parts of the nation. EPA is required to identify a BSER "that has been demonstrated" to avoid precisely this kind of guesswork.

Because EPA's BSER is not tethered to actions taken at individual sources, even if EPA had adequately demonstrated its system of alternative generation on a sector wide-basis (which it did not), it still would not follow that EPA's emission guidelines are achievable. EPA must independently show that individual existing sources and States can employ the Building Blocks to achieve the emission guidelines on a consistent basis, accounting for "the range of relevant variables that may affect emissions in different plants." *Nat'l Lime Ass'n*, 627 F.2d at 431 n.46, 433. In so doing, EPA may not resort to "mere speculation or conjecture." *Lignite Energy Council*, 198 F.3d at 934. But EPA cannot avoid such speculation, as reorganizing an entire industry to reduce emissions has never before been attempted, much less demonstrated.

EPA has not carried its burden here. It has not shown the three Building Blocks are adequately demonstrated or achievable. It has failed to reasonably assess the substantial new transmission the Rule effectively requires. It has not shown individual sources can achieve its performance rates through application of the BSER. And it illegally requires sources and States to rely on an inadequately demonstrated

emissions trading program to achieve compliance with its emission guidelines and State plan requirements.

1. EPA Has Not Shown That Any Of Its Three Building Blocks Is Adequately Demonstrated Or Achievable.

As explained below, EPA sought to demonstrate its Building Blocks on a regional basis. By so doing, it failed to comply with the statutory requirement to demonstrate that its BSER is adequately demonstrated and its emission guidelines are achievable by sources. *See National Lime Ass'n*, 627 F.2d at 434. But even assuming a regional approach is lawful, EPA also failed to demonstrate that the Building Blocks targets are achievable regionally.

a. Building Block 1.

EPA's first Building Block relies on heat rate improvements to reduce CO_2 emissions at existing coal-fired units. 80 Fed. Reg. at 64,745, JA__. But EPA's heat rate improvement target is based on abstract, arbitrary calculations untied to any specific heat rate improvement measures. *See id.*; GHG Mitigation Measures TSD at 2-25, JA__. Consequently, EPA has failed to establish that any specific measures are adequately demonstrated, or that its Building Block 1 target is achievable.

EPA calculated the average heat rate improvement that would occur if each coal-fired unit could reduce its hourly heat rate by a percentage value (or "consistency factor") based on the lowest historical "benchmark" values reported under similar operating conditions. GHG Mitigation Measures TSD at 2-45 to 2-47, JA__-__. Using

this approach, EPA estimated heat rate improvement targets for each region. *Id.* at 2-50, JA__.[14] Essentially, EPA observed that units' heat rates appeared to be lower at some times or in some years than others, and then assumed that coal units could proactively and continually replicate past optimum heat rate observations simply by using "good maintenance and operating practices." *Id.* at 2-25, 2-45, JA__, __.

Nothing in the record supports this assumption. In fact, the opposite is true: although some units might be able to take steps to marginally improve or maintain their heat rates, heat rate variation is driven by factors beyond their control. UARG Comments at 221, EPA-HQ-OAR-2013-0602-22768, JA__; Southern Company Comments at 81, 91-96, EPA-HQ-OAR-2013-0602-22907, JA__. Yet EPA did not distinguish between variations that are driven by controllable factors and those that are uncontrollable for an existing source, such as unit design, size, cooling conditions, and location. 80 Fed. Reg. at 64,788, JA__; *see also* UARG Comments at 221, JA__.[15]

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[14] EPA claimed two other approaches supported these targets: (i) a calculation of the average improvement if each unit returned to its best two-year average heat rate; and (ii) a similar approach using separate estimates of the best two-year average heat rate under different operating conditions. 80 Fed. Reg. at 64,788-89, JA__-__.

[15] The same logic holds true for numerous other sources for myriad reasons. The Rule did not consider, nor did EPA allow comment on, issues of critical importance to many sources, and space constraints do not permit them to be raised with specificity here. This Court must understand that not raising those issues does not diminish their importance; deficiencies in the Rule were interwoven into the warp and woof of every sentence, requirement, and the very logic underlying the Rule.

For instance, although EPA claims that it controlled for the influence of capacity factor and ambient temperature, two primary drivers of heat rate, units have no way to control their capacity factors, which are driven by demand and each unit's position in the dispatch or local meteorological conditions. 80 Fed. Reg. at 64,788, JA__. Units operate more efficiently at higher loads and on cooler days. *Id.*; *see also* GHG Mitigation TSD at 3-5, JA__ (capacity factor accounts for up to a 50% variation in heat rate); UARG Comments at 209-10, JA__-__; LG&E and KU Energy LLC Comments at 13-14, EPA-HQ-OAR-2013-0602-31932, JA__-__; EPA Memorandum, Best System of Emission Reduction (BSER) for Reconstructed Steam Generating Units and Integrated Gasification Combined Cycle (IGCC) Facilities ("Reconstructed EGU TSD") at 4, EPA-HQ-OAR-2013-0603-0046, JA__ (operating at 50% load can increase heat rate by 10% or more). EPA did not truly "control for the influence of [the] variables" as it claims. 80 Fed. Reg. at 64,788, JA__. Its approach is premised on average operating conditions over the historical period EPA analyzed; it cannot account for changed operating conditions the coal-fired fleet can be expected to face in the future.

Consequently, if the coal fleet faces lower capacity factors (which is the express goal of Building Block 2's shift to gas generation) or higher ambient temperatures (which is likely if Building Block 2 forces more coal units to serve as summertime peak load units), the resulting increase in heat rate could overwhelm any of the fleet's marginal heat rate improvements. By failing to account for uncontrollable factors that

can counteract heat rate improvement efforts, EPA ignored its duties to ensure that its BSER "is reasonably reliable" and to set performance rates that are "achievable under the range of relevant conditions." *Nat'l Lime Ass'n*, 627 F.2d at 431 n.46, 433.

More fundamentally, EPA failed to show that sufficient heat rate-improving measures are available for units to implement to achieve EPA's targets. EPA admits its targets are based on statistical analyses and not on "heat rate improvements that would be achieved by implementation of specific measures." GHG Mitigation Measures TSD at 2-25, JA__. EPA provides a list of "best operating practices" and "equipment upgrades" that are *conceptually* capable of reducing heat rates, *id.* at 2-11, JA__, but fails to analyze whether those measures can yield sufficient improvements, whether they are available to a sufficient number of units, or whether they are already being implemented at units and thus cannot be further deployed. In other words, EPA has no idea whether Building Block 1 will work on the ground.

In reality, the heat rate improvement measures EPA lists—particularly the lower-cost "best operating practices"—are already widely adopted. 80 Fed. Reg. at 64,792, JA__. Many units, having already made such improvements, cannot achieve a reduction in heat rates from 2012 levels, especially because many of the units made modifications to comply with EPA rules that require additional energy to operate and therefore reduce the efficiency of the unit. *See* UARG Comments at 211-28, JA__-__; Gulf Coast Lignite Coalition Comments at 25-27, EPA-HQ-OAR-2013-0602-23394, JA__-__; Southern Company Comments at 80-91, EPA-HQ-OAR-2013-0602-22907,

JA__-__; LG&E and KU Energy LLC Comments at 10-14, JA__-__; Luminant Comments at 53-59, EPA-HQ-OAR-2013-0602-33559, JA__-__. Particularly in energy-deregulated markets such as the Electric Reliability Council of Texas ("ERCOT"), coal generators have installed state-of-the-art technologies to improve thermal efficiencies simply to compete effectively, and there are few additional gains available. *See* Public Utility Comm'n of Texas Comments ("PUCT Comments") at 42, EPA-HQ-OAR-2013-0602-23305, JA__. Also, the actual payoffs of EPA-identified measures are limited, given that they are not compatible with all units, and their benefits are non-additive and degrade over time. UARG Comments at 212-16, JA__-__; Luminant Comments at 55, 57 n.237, JA__, __.

EPA failed to assess whether any specific measures are available for units to achieve its Building Block 1 targets, and did not show that the targeted heat rates have ever been maintained across the coal fleet. There is no basis for assuming that the best historical efficiency ever achieved can be achieved every year in the future.

Because many of EPA's erroneous assumptions were never noticed, *supra* Section I, there was no opportunity to comment on them. By not allowing comment, for example, on incorrect 2012 data, EPA is severely penalizing new units intentionally designed to be highly efficient and provide base load electricity for a 30-year life span. Such a procedurally deficient Rule, with a BSER that fails to meet statutory standards, is arbitrary, capricious, and contrary to law. Prairie State

Generating Company Comments at 3, 6, EPA-HQ-OAR-2013-0602 (Dec. 1, 2014), JA __, __.

b. Building Block 2.

EPA's second Building Block also is not adequately demonstrated and its targets are not achievable, because EPA (i) failed to support its target for increased utilization of existing gas units, (ii) erroneously counted hypothetical "unused" capacity from under-construction gas units, and (iii) improperly relied on capacity from gas units' duct burners for redispatch.

(i) EPA Failed To Support Its Target For Increased Utilization Of Existing Gas Units.

Building Block 2 assumes existing fossil steam generation will shift "to existing [gas units] within each region up to a maximum [gas] utilization of 75% on a net summer basis." 80 Fed. Reg. at 64,795, JA__. EPA bases this 75% capacity factor on speculative assumptions about the level of generation the existing gas fleet can achieve, without assessing the fleet's real-world constraints, accounting for the eventual deterioration and retirement of existing units, or reconciling its assumptions with its modeling results. *See* GHG Mitigation Measures TSD at 3-5 to 3-13, JA__-__. Thus, EPA has not shown that the existing gas fleet can obtain an overall 75% capacity factor, or that its Building Block 2 target is achievable.

EPA relied on three data types to justify its 75% capacity factor; none of these supports its conclusion.

First, EPA cited a statistical analysis based on 2012 generation. *Id.* at 3-6 to 3-11, JA__-__. This reveals the overall average capacity factor of the gas fleet in 2012 was only 46%; more than 20% of the fleet operated at a capacity factor of less than 20%, and only 15% operated at or above the 75% level. *Id.* at 3-6, 3-9, JA__, __. These data—which occurred in a year with historically low natural gas prices that already incentivized the use of gas generation, *see id.* at 3-11, JA__—hardly support a conclusion that a fleet-wide capacity factor of 75% has been demonstrated or is achievable.

In fact, the existing fleet would have to increase its generation by about two-thirds from 2012 levels to meet the 75% capacity factor, and EPA provides no data or analysis suggesting how that level of generation might be accomplished. EPA argues nonetheless that because capacity factors of 75% or more were achieved in each of the electricity interconnections *on at least one day*, this "demonstrate[s] the ability of the natural gas transmission system to support this level of generation." GHG Mitigation Measures TSD at 3-11, JA__. But EPA never explains how these high usage numbers establish that such circumstances could be achieved across the fleet *day-after-day, year-after-year*, and never considers the various site- or region-specific factors such as economics, regional grid restrictions, and regulatory constraints that would inform that question.

Second, EPA presented data suggesting natural gas generation is expected to grow over time. *Id.* at 3-11 to 3-13, JA__-__. This is irrelevant. Such growth will come

to a significant extent from the construction of *new* units. But since new units cannot be used to "average down" the CO_2 emission rates for affected fossil-steam units, 80 Fed. Reg. at 64,801, JA__, EPA's data provides no indication that the capacity factor for the *existing* fleet can increase by the approximately two-thirds EPA assumes.

Third, EPA pointed to the availability of the existing gas fleet, stating that "EPA assumes that [gas] has an availability of 87%" and that certain units may have availability factors as high as 92%. GHG Mitigation Measures TSD at 3-5, JA__. But "availability" (the percentage of hours during a given year a unit is available to not offline due to outages) offers no information about whether those units are capable of operating at sufficiently higher capacity factors over an extended period to meet a fleet-wide capacity factor target of 75%, or are located sufficiently close to coal units to supply the load that the displaced generation would have served. For example, many units with "available" capacity cannot increase utilization due to permit limits on operations, the need to provide dedicated backup capacity for renewable resources, or their location in areas designated as nonattainment for one or more ambient air quality standards. *See* UARG Comments at 230-31, JA__.

EPA never assessed these critical questions. Even if the fleet could physically achieve such a high capacity factor, Building Block 2 can work only if the fleet is located in areas where it can serve demand that would otherwise be supplied by coal generation. For example, it is of little use if a gas unit in Florida can physically operate at a 75% capacity factor if the coal generation it needs to displace is located in North

Dakota, even though both locations are within the eastern interconnection. That is not how electricity transmission works.

These limitations are heightened in Texas, where over 90% of electricity is consumed in ERCOT, which has limited import capacity. *See infra* II.B.2.b.i. In calculating the amount of generation shifting under Building Block 2, EPA did not consider this but instead assumed, wrongly, that generation shifting can occur freely across entire interconnections. Goal Computation TSD at 14-15, JA__-__.

Finally, EPA's Building Block 2 assumption is undermined by its own modeling. EPA used its Integrated Planning Model to show that existing gas units could be operated at a 75% capacity factor. *Id.* at 3-20, JA__. What the model actually showed was that, to achieve that capacity factor, existing gas units would have to displace generation not only from existing coal units, as contemplated under Building Block 2, but also from *new* gas units in significant amounts. *Compare* CPP Base Case Modeling, Base Case RPT Files, RegionalSummaryModelRegionSets, sheet at rows 2335 and 2355, JA__, *with* CPP BB2 75% Modeling, BB2-75% RPT Files, RegionalSummaryModelRegionSets, rows 2335 and 2355, JA__. EPA's model thus demonstrates that the existing gas cannot achieve a 75% capacity factor *through generation shifting from coal units*.

EPA failed to meet its burden with respect to Building Block 2.

(ii) EPA Erroneously Counted "Unused" Capacity From Under-Construction Units.

EPA also erred by counting hypothetical "unused" generating capacity from under-construction gas units as available for redispatch under Building Block 2. EPA assumed gas units that were under-construction or commenced operation in 2012 would operate at a 55% annual capacity factor in the future without the Rule, leaving 20% of their generating capacity available to displace generation from coal units. 80 Fed. Reg. at 64,817, JA__.

This assumption is speculative and unreasonable. EPA ignored key factors that drive a new unit's utilization, particularly whether it was designed to provide baseload or as a load-following unit. UARG Comments at 197, JA__. Subsequent operating data from many of these "under-construction" units show EPA dramatically underestimated their actual utilization. For example, North Carolina's Lee gas unit operated at an 81% annual net capacity factor in its first full year of operation, already well above EPA's 75% Building Block 2 target, let alone its 55% baseline assumption for under-construction units, leaving no room for increased utilization. *Id.* Indeed, for the set of units EPA designated as "under-construction" because they commenced operation during 2012, the generation-weighted average capacity factor was 77% in their first full year of operation. *See id.*, Attachment C at 11 Tbl. 6, JA__. EPA's guidelines call on those units to devote another 20% of their capacity to displacing coal-fired generation, for a total capacity factor of 92%.

This error inflated the level of redispatch under Building Block 2, making the performance standards infeasibly stringent. EPA should have excluded hypothetical generation from under-construction units when calculating the guidelines because it had no rational way to estimate their future unused capacity. EPA claims that even if it overestimated available redispatch capacity, some of the under-construction units' baseline generation will have a "replacement effect instead of an incremental one," yielding the same overall shift from coal- to gas-fired generation. 80 Fed. Reg. at 64,817 n.748. This is more baseless conjecture: EPA offers no evidence this "replacement effect" exits, that it will outweigh EPA's mistakes regarding utilization of under-construction units, or that it will replace generation from coal-fired units rather than more expensive renewable generation.

(iii) EPA Erred By Relying On Capacity From Gas-Fired Units' Duct Burners For Redispatch.

Building Block 2 is further undermined by EPA's erroneous reliance on capacity from gas units' duct burners for redispatch under Building Block 2. Response to Comments ("RTC") Ch. 3 § 3.2 at 172, EPA-HQ-OAR-2013-0602-36876, JA__. Many gas units are equipped with duct burners that can *temporarily* boost power output during peak load periods. UARG Comments at 206, JA__. Continual operation of these duct burners is infeasible: their use introduces thermal stress that the unit is not designed to withstand for prolonged periods, causing accelerated equipment wear. *Id.* Duct burners also operate less efficiently than the rest of the unit, substantially

increasing the unit's heat rate (and thus its CO_2 emission rate). *Id.* EPA's sole response—that "[d]uct burners are a component of [gas] capacity" and are therefore included for redispatch—is conclusory and fails to address the serious problems commenters raised. RTC Ch. 3 § 3.2 at 172, JA__. Consequently, EPA's unsupported 75% capacity factor is in reality significantly higher.

For these reasons, EPA's conclusion that Building Block 2 can achieve the targeted level of generation shifting is precisely the type of "crystal ball" inquiry prohibited by the case law. *Portland Cement*, 486 F.2d at 391.

c. Building Block 3.

Building Block 3 assumes that generation at affected units will be replaced "by using an expanded amount of zero-emitting renewable electricity (RE)." 80 Fed Reg. at 64,803, JA__. EPA determined the amount of available new renewables generation by forecasting the growth in renewables generation anticipated through 2021 in the absence of the Rule, and adding target renewables growth rates for 2022-2030 that EPA predicts can occur as a result of the Rule. *See id.* at 64,807-09, JA__; GHG Mitigation Measures TSD at 4-1 to 4-2, 4-6, JA__-__, __. Both forecasts are based on unsupported, unrealistic assumptions about future growth. EPA thus has not shown that the total renewables required by the Rule are adequately demonstrated, nor shown that its Building Block 3 target is achievable.

EPA calculated growth levels of renewable energy anticipated to occur without the Rule that are significantly greater than those projected by the U.S. Energy

Information Administration ("EIA")—the governmental entity charged with forecasting electricity generation and demand. EPA projected that by 2020 renewable energy generation, other than hydropower, will grow to 406,000 GWh; yet EIA projects that it will grow only to 335,000 GWh. *Compare* Analysis of the Clean Power Plan, Base Case SSR at Summary Tab[16] *with* EIA Annual Energy Outlook 2015 at A-31, EPA-HQ-OAR-2013-0602-36563, JA __. Moreover, EPA's projection in the Rule was significantly greater than its projection in the proposal that renewable energy generation in 2020 would be only 299,000 GWh. *See* Analysis of the Proposed Clean Power Plan, Base Case SSR at Summary tab.[17]

EPA failed to adequately explain why it increased its projections so significantly in the Final Rule, or why the estimation of the entity responsible for such forecasts should be discounted, particularly given that EPA is no expert on these issues. EPA used 2012's growth in renewables as the base growth level, but that year was artificially inflated due to a tax credit that expired on December 31, 2012—causing many projects to be shifted from 2013 to 2012. 21st Century Energy, "What's In a Target," 13-15 (Jan. 2016), http://www.energyxxi.org/sites/default/files/What%27s%20In%20a%20Target%20FINAL.pdf. EPA has failed to

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[16] *Available at* http://www.epa.gov/sites/production/files/2015-08/base_case.zip, Base Case SSR Excel file, Summary Tab.

[17] *Available at* http://www.epa.gov/sites/production/files/2015-07/epa_base_for_the_proposed_clean_power_plan.zip, (Base Case-SSR Excel file, Summary Tab.

adequately demonstrate the near-term renewables levels used in its BSER determination.

With regard to renewable generation levels after 2021, EPA assumed that each of the various types of renewables (solar, onshore wind, geothermal, and hydropower) can achieve annual growth rates from 2024-2030 equivalent to the maximum annual growth rate each achieved from 2010-2014. GHG Mitigation Measures TSD at 4-5, JA__. In other words, EPA assumed that each technology will achieve its *highest* historical one-year growth rate for seven consecutive years. EPA failed to explain the basis for this extraordinary assumption. Rather, it appears once again to be the type of "crystal ball inquiry" that cannot support a BSER determination.

A closer look at the numbers reveals how disconnected from reality EPA's assumption truly is. EPA assumed wind power on average can achieve a capacity factor of 41.8%, when historical average capacity factors across the United States from 2008-2014 range between 28.1% and 34%. *Compare GHG* Mitigation Measures TSD at 4-3, JA__, *with* EIA, *Electric Power Monthly* at Table 6.7.B. (Feb. 2014), EPA-HQ-OAR-2013-0602-0162, JA __. While technologies may be expected to improve over time, any such improvements will likely be offset by the need to place an increasing amount of wind generating capacity in less optimal locations. In any event, EPA failed to adequately explain how average wind capacity factors can be increased by the approximately 30% it assumes.

Why does this matter? It matters because, if EPA's crystal ball guesses turn out to be wrong (as the record predicts they will), the results will be disastrous. Under the Rule, because no gas unit can comply with the applicable performance rates, any generation produced by a gas unit must be "offset" by ERCs from Building Block 3. 40 C.F.R. § 60.57954(b). As a result, if no ERCs were available from Building Block 3, there would also be no ERCs for Building Block 2, with the result that *no* gas or coal unit could generate *any* electricity. Every shortfall in the number of Building Block 3 ERCs needed for gas units to increase their capacity factor to 75% will result in a shortfall in ERCs that coal units need to generate electricity. Consequently, if EPA's Building Block 3 assumptions are not supported, not only will there be a shortfall in the generation produced by Building Block 2 and 3, but, even more troubling, generation that could be produced by coal and is needed to meet the shortfall from Building Blocks 2 and 3 will not be able to be produced. This "death spiral" that EPA's "system" creates underscores the critical error EPA made in finding that Building Block 3 is "adequately demonstrated" and "achievable."

In the end, EPA based its Building Block 3 analysis not on historically demonstrated levels of renewable generation, but on unsupported, highly speculative assumptions that far exceed both current projections and average historical growth rates. EPA also failed to assess any of the real world considerations associated with such massive growth, including where the new generating resources will be built, who will build them, and how will they be integrated into the existing electrical grids.

Southern Company Comments at 153-55, JA__. Building Block 3 is thus impermissibly based on speculation and conjecture.

d. EPA Failed To Account For Application Of BSER On Generating Units' Emission Rates.

EPA's Building Blocks also fail to account for how application of the BSER will negatively impact generating units' emission rates. To calculate the guidelines, in each interconnection EPA used the overall average 2012 CO_2 emission rates for coal units (adjusted downward by the Building Block 1 target) and gas units. Goal Computation TSD at 10, 16-17, JA__. But EPA ignored comments demonstrating that implementing BSER will *raise* the CO_2 emission rates of those units above 2012 levels. For coal units, the BSER is based on reducing those units' utilization, which EPA admits *increases* CO_2 emission rates. For some units, low load operation can increase heat rate by 10% or more, eclipsing any Building Block 1 heat rate improvements. GHG Mitigation Measures TSD at 2-34, JA__; Reconstructed EGU TSD at 4, JA__; UARG Comments at 209-10, JA__.

For gas units, implementing BSER will involve increasing utilization of less efficient units that were designed for optimum performance when following load (i.e., not acting as baseload). UARG Comments at 210, JA__. These units emit CO_2 at higher rates when used more heavily, increasing the overall emission rate of the subcategory. *See* 79 Fed. Reg. at 34,980, JA__ (admitting some gas units "are designed to be highly efficient when operated as load-following units" but are less efficient at

baseload). Heavy use of gas units' duct burner capacity, *see supra* at II.B.1.b.iii will also raise those units' CO_2 emission rates. EPA's failure to account for these effects on fleet average emission rates further undermines its BSER calculation.

2. EPA Has Failed To Account For Grid Reliability Or Infrastructure Needs.

EPA's BSER is also fatally flawed because EPA failed to meaningfully assess the massive infrastructure build-out and upgrades that must occur or the Rule's impact on the reliability of the electric grid. EPA has not shown its plan will work, if for no other reason than it has failed to consider fully and adequately the important questions of transmission infrastructure and reliability.

a. EPA Failed To Meaningfully Assess The Need To Build New Infrastructure.

EPA failed to meaningfully assess the new infrastructure that will be required to implement Building Block 2 and 3's generation shifting. Replacing fossil generation with new generation requires transmission infrastructure. EPA thus must establish that the replacement generation contemplated by its BSER can be delivered in a manner that ensures reliable power to meet user demands in all parts of the country. EPA has not made that showing. EPA also failed to demonstrate that the existing gas pipeline infrastructure would be sufficient to meet the substantially increased demand for gas under the Rule. Southern Company Comments at 121-24, 220, JA__.

Instead of assessing how new infrastructure will be created and paid for, EPA incorrectly assumes little additional infrastructure will be needed. *See, e.g.*, 80 Fed. Reg.

at 64,801, 64,810, JA __. EPA failed to demonstrate that this assumption is anything but a speculative, "crystal ball" hope. Indeed, EPA's assumption is belied by the chorus of warnings from the experts.

For example, the North American Electric Reliability Corporation ("NERC"), the regulatory authority charged with ensuring the reliability of the North American bulk power network, concluded that the Rule's "transformative shift" in electricity generation would "lead[] to the need for transmission and gas infrastructure reinforcements." NERC, Potential Reliability Impacts of EPA's Proposed Clean Power Plan at vii, EPA-HQ-OAR-2013-0602-37007, JA__. NERC noted that thousands of miles of new high voltage transmission would be required to satisfy reliability and contingency analysis requirements. *Id.* at vii, 32, 34, JA__. Similarly, Regional Transmission Organizations ("RTOs") charged with operating the system to balance generation and demand warned that substantial new infrastructure was needed to ensure reliability. *See, e.g.*, Midcontinent Independent System Operator, Inc. Comments at 3, EPA-HQ-OAR-2013-0602-22547, JA__; Southwest Power Pool Comments at 3, EPA-HQ-OAR-2013-0602-20757, JA__.

States and utilities also commented on the proposal's lack of transmission capacity to support generation shifting in various parts of the nation. *See, e.g.*, Southern Company Comments at 219-21, JA__-__; Montana Public Service Comm'n Comments at 9, 11-12, EPA-HQ-OAR-2013-0602-23936, JA__, __-__; Mississippi Public Service Commission Comments at 21-23, EPA-HQ-OAR-2013-0602-22931,

JA__; North Dakota Department of Health Comments at 23, EPA-HQ-OAR-2013-0602-24110, JA__; West Virginia Department of Environmental Protection Comments at 35, 62, EPA-HQ-OAR-2013-0602-23540, JA__; Public Utility Commission of Texas ("PUCT") Comments at 42, EPA-HQ-OAR-2013-0602-23305, JA __. For example, commenters noted that in Wyoming there is no significant gas generation to absorb the load EPA mandates be taken from the State's coal plants, which means most of the required generation shifting must go to newly-constructed wind farms; and this new generation will require substantial new transmission infrastructure to ensure reliability. Basin Electric Comments at 25-29, JA__-__.

EPA offered little justification for its contrary conclusion, except to assert the States will somehow work miracles with the "flexibility" allegedly afforded them. *See* 80 Fed. Reg. at 64,801, 64,810, JA__, __. This is not a demonstration; it is an abdication.

b. EPA Failed To Ensure Reliable Electric Supply.

Additionally, to be "adequately demonstrated," any system of emission reduction for fossil units must ensure a reliable electric supply to avoid brownouts and blackouts. EPA has failed to show that its system of alternative electric generation will be reliable—in other words, that the lights won't go out.

EPA conceded both that it lacks the expertise to assess grid reliability and that it did not conduct a true reliability assessment of the generation shifting its "system"

of emission reduction requires. *See* 80 Fed. Reg. at 64,874-81, JA__-__.[18] EPA recognized that "planning authorities and system operators constantly consider, plan for and monitor the reliability of the electricity system with both a long-term and short-term perspective." *Id.* at 64,874, JA__. Further, it acknowledged such reliability assessments are "multidimensional, comprehensive, and sophisticated." *Id.* But nowhere in the record did EPA provide such an assessment showing that application of its ambitious BSER will result in the transmission necessary for a reliable electricity system. Instead, EPA deferred for another day consideration of this critical issue, and assumed States, system planners, and operators could "develop a pathway" to a reliable electricity system. *See id.* at 64,876-77, JA__-__. Thus, this nation's electricity depends on the creation of a new "pathway" engineered by States and system planners that the Rule's architect cannot articulate.

Further, EPA's conclusion that system reliability will not be affected is based not on a legal or technical conclusion, but on an *assumption* baked into its Integrated Planning Model—the model "must maintain adequate reserves in each region" and is

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[18] EPA did produce a document purporting to assess the reliability impacts of the final Rule based on its modeling. Technical Support Document: Resource Adequacy and Reliability Analysis ("Reliability TSD") at 1-2, EPA-HQ-OAR-2013-0602-36847, JA __-__. Rather than assessing reliability in a meaningful way, it merely "assumes that adequate transmission capacity exists to deliver any resources located in or transferred to [a] region." *Id.* at 3, JA __. Tellingly, EPA does not even cite its analysis in discussing reliability in the preamble to the Rule. *See* 80 Fed. Reg. at 64,874-81, JA __-__. And EPA concedes that future analysis is required to assess reliability issues. *Id.* at 63,876-77, JA __-__.

built around that assumption. Reliability TSD at 3, JA __; *see* PUCT Comments at 30, JA __.

NERC, the RTOs, and others warned EPA of significant reliability concerns with EPA's proposal to quickly and radically restructure the nation's energy supply. *See, e.g.*, Midcontinent Independent System Operator, Inc. Comments at 3, EPA-HQ-OAR-2013-0602-22547, JA __ (expressing similar concerns); Southwest Power Pool, SPP's Reliability Impact Assessment of the EPA's Proposed Clean Power Plan at 3, 5-6 (Oct. 8, 2014), JA__, ___-___(describing its reliability assessment of the proposed rule); NERC, Potential Reliability Impacts of EPA's Proposed Clean Power Plan, Initial Reliability Review at 19, EPA-HQ-OAR-2013-0602-37006, JA__ ("NERC Reliability Review").

EPA largely brushed off these concerns. It failed to conduct its own meaningful assessment or confront the issues posed by Southwest Power Pool's assessment. It failed to address the need for a reliability safety valve; and its "reliability safety mechanism" does not address the problem, as it provides only temporary relief for catastrophic events like floods and offers States *no* flexibility to adjust either the emission requirements or the schedule to address reliability problems. 80 Fed. Reg. at 64,876, 64,878, JA __, __. Its vague statements about working "with FERC and DOE … to help ensure continued reliable electric generation and transmission" offer no reasoned discussion of the issue and no assurance that its plan will work. And its assurances that the Rule provides "flexibility" and a "gradual" compliance schedule

ducks rather than confronts the issue, *id.* at 64,875-76, JA __, reflecting EPA's wish-upon-a-star approach.

Moreover, the "flexibility" EPA touts is not available in all areas, particularly in ERCOT and in areas served by rural electric cooperatives. In these areas, unique characteristics put such flexibility firmly out of reach, and showcase the reliability problems posed by the Rule that EPA has failed to confront and adequately demonstrate.

(i) The Electric Reliability Council Of Texas

In setting BSER based on national performance rates, EPA irrationally refused to address the unique nature of the electric market in Texas. Texas is the only State that has utilities operating in each of the nation's three electrical interconnections: ERCOT, the western interconnection, and the eastern interconnection. Approximately 90% of Texas electricity consumption (covering 75% of Texas's land mass) occurs within ERCOT. http://www.ercot.com/about/profile/. It is a unique "power island," separated from the nation's eastern and western interconnections by asynchronous ties that inhibit cross-interconnect electric transmission.[19] This means nearly all "generation shifting" would have to occur within Texas. *See* PUCT Comments at 31, JA__; Texas Comm'n on Environmental Quality's ("TCEQ")

[19] ERCOT can import a limited amount of megawatts from outside its grid. *See* ERCOT 2014 State of the Grid Report at 7, http://www.ercot.com/content/news/presentations/2015/2014%20State_of_the_Grid_Web_21015.pdf.

Comments at 2, EPA-HQ-OAR-2013-0602-22305, JA__; Luminant Comments at 49, JA__. Texas thus cannot reduce its coal generation and purchase and import gas-fired or renewable generation from a generator in another State at the levels EPA mandates. PUCT Comments at 31; TCEQ Comments at 2. Compliance with the Rule would pose significant challenges to maintaining reliability within ERCOT.

The Rule would supplant ERCOT's economic dispatch model operating in a uniquely competitive market. PUCT Comments at 10, JA__. Because ERCOT investor-owned utilities have been separated into generation, transmission and distribution, and retail services companies—with only the transmission and distribution function subject to traditional regulation—units bear the risk of owning and operating their assets without guaranteed recovery of their costs or profit through regulated utility rates. *See* Tex. Util. Code Ann. § 39.001; PUCT Comments at 1, 4, JA__, __. In the absence of long-term power contracts, the ERCOT market is operated through unit-specific bidding and dispatch, with ERCOT using the generation with the lowest bids to serve load, subject to transmission constraints. PUCT Comments at 48, JA__. Bids are generally made reflecting the short-run marginal costs of the units and dispatch decisions are made by ERCOT on the basis of those bids. *Id.* at 43, JA__. Therefore, units in this competitive energy-only market are already motivated to make efficiency improvements to their plants. *Id.*

EPA has ignored concerns from PUCT and Luminant regarding these impacts in the ERCOT Market. *See* Luminant Comments at 66-68, JA__-__; PUCT

Comments at 8-10, 37-38, 42-44, 48-51, JA at __-__, __-__, ___-__, __-__. EPA acknowledged that "all of the lower-48 states, *with the exception of Texas*, are part of a multi-state, regional grid." Legal Memorandum for Proposed Carbon Pollution Emission Guidelines for Existing Electric Utility Units at 91, EPA-HQ-OAR-2013-0602-0419, JA__ (emphasis added). The Federal Power Act also recognizes the limited nature of federal jurisdiction over the unique ERCOT market. 16 U.S.C. § 824(b); *see also* PUCT Comments at 8 n.12, JA__. EPA ignored these critical distinctions in the Rule.

EPA's only answer is the Rule's so-called "flexibility." 80 Fed. Reg. at 64,665, 64,880, JA__, __. But EPA's "central" assumption of a multi-state electricity system that provides this "flexibility" and underlies its BSER is simply not applicable to Texas. 79 Fed. Reg. at 34,878, JA__. EPA is not an expert in electric grid reliability, *Del. Dept. of Natural Res. & Envtl. Control v. EPA*, 785 F.3d 1, 18 (D.C. Cir. 2015), and its inexperience is evident here. EPA's refusal to account for ERCOT's unique status and to heed ERCOT's reliability concerns is arbitrary and capricious. *Id.*

(ii) Cooperatives

The Rule also will make it impossible for many electric cooperatives to provide reliable, low cost electricity to rural America (including the poorest parts of the nation) in compliance with their obligations under 7 U.S.C. § 901, *et seq.* Rural electric cooperatives typically serve large, primarily residential, low-density service territories in the poorest and most rural parts of the country. National Rural Electric

Cooperative Association ("NRECA") Comments at 2-3, 129-30, EPA-HQ-OAR-2013-0602-33118, JA__-__, __-__.

The Rule severely restricts generation sources available to cooperatives, *see* NERC Reliability Review at 19, JA__, many of which own a single coal unit and rely on its high-capacity-factor operation for their generation. Generation & Transmission Cooperative Fossil Group Comments ("G&T Fossil Comments") at 21, EPA-HQ-OAR-2013-0602-23164, JA__. These cooperatives have invested billions of dollars to install state-of-the-art emissions controls on their coal units to comply with other regulations. *See* NRECA Comments at 14, JA__; *see also* EPA, Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards 3-13 (Dec. 2011), http://www.epa.gov/ttn/ecas/regdata/RIAs/matsriafinal.pdf. Severely constraining or retiring the operation of coal units will in turn severely challenge cooperatives' ability to serve their members and create substantial financial issues. NRECA Comments at 52, JA__.

For example, the Arizona cooperatives serve 150,000 individual meters, spread across a large rural service area. Arizona Electric Power Co. Comments at 2, EPA-HQ-OAR-2013-0602-22972, JA__. Arizona Electric Power Company will be forced to curtail coal and gas-fired generation or even retire some or all of its steam units by 2022 to comply. *Id.* at 49, JA__. Such closure jeopardizes electric reliability in Southern Arizona. *Id.* at 29, JA__.

Cooperatives do not have shareholders or equity. G&T Fossil Comments at 22, JA __. All increased costs associated with the Rule must be borne by member-customers through increased rates, which will have a devastating impact on the communities served. *Id.*; Western Farmers Electric Cooperative Comments at 14, Dkt. No. EPA-HQ-OAR-2013-0602-23644, JA__. Moreover, because many rural residents do not have access to natural gas and must depend exclusively on electricity or expensive propane and heating oil for warmth during cold months, electric cooperative member-customers lack practical, affordable alternatives when their electric rates rise. NRECA Comments at 2, JA __. In electric cooperative service territories, increases in rates force difficult decisions about whether to heat or cool houses even in extreme weather. *Id.* at 2-3, 129-30, JA __-__, __-__.

By failing to take the unique challenges of rural areas into account in its BSER, EPA has failed to demonstrate its system is reasonably reliable—that rural customers will still have an affordable and reliable electric supply.

3. EPA's BSER Is Not "Demonstrated" Or "Achievable" By Individual Sources.[20]

EPA compounds its first error—its failure to show that the individual Building Blocks are adequately demonstrated on a grid-wide scale or that the individual targets from those Building Blocks are achievable—by then combining them and further speculating about how they will operate together and how individual sources can achieve the performance rates.

EPA acknowledged that the BSER must "be available to an *individual source* … [and] allow it to meet the standard." 80 Fed. Reg. at 64,722, JA__ (emphasis added). Moreover, EPA "recognize[d] the uniqueness and complexity of individual power plants" and was "aware that there are site-specific factors that may prevent some [units] from achieving performance equal to region-level assumptions for a given technology." Goal Computation TSD at 6, JA__. Yet EPA admittedly did not "mak[e] those unit-level evaluations," instead applying assumptions of what the source category *as a whole* might achieve through application of the Building Blocks *on a regional basis*. *Id.*; 80 Fed. Reg. at 64,779, JA__.

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[20] As discussed in the Core Issues Brief, EPA's system of emission reduction is unlawful because it is not based on pollution controls or process changes that can be accomplished at the source itself, but instead necessitates the construction of new renewable energy facilities and generation shifting. Even if these activities could be considered to be legally valid components of BSER under section 111(d), EPA would still have to show that individual sources will be able to employ such strategies to meet the ambitious emission guidelines on a per-source basis.

This is fatal to the Rule. And while it may be difficult for EPA to demonstrate that individual units can apply an industry-wide system as opposed to controls or practices implementable at an individual facility, that is EPA's statutory burden with this Rule. It cannot be shirked simply because the scope of EPA's BSER is unprecedented. Further, as in *National Lime Ass'n*, EPA erred by establishing emission guidelines without analyzing whether much of the industry can meet them, given the great "variations in operations" of utilities around the country. 627 F.2d at 434.

4. The Rule is Not Saved by the Presumed Availability of a Trading Program.

EPA concedes that individual sources will not be able to achieve the Rule's performance rates through the Building Blocks, but nonetheless insists that compliance can be achieved through "a wide range of emission reduction measures, *including measures that are not part of the BSER*." RTC Ch.1 §§ 1.0-1.5 at 179, JA__ (emphasis added). In particular, EPA states that emissions trading is "integral" to its assessment of the BSER and the achievability of its emission guidelines. 80 Fed. Reg. at 64,733-35, JA__-__. EPA cannot rely on actions that are not part of the BSER to establish the achievability of its guidelines. It has neither established a trading program nor analyzed the reliability or achievability of any such programs that might be established by the States. Moreover, the restrictions EPA has placed on State trading programs makes it far less likely that sufficiently robust programs will develop.

EPA's admission that sources will need to engage in trading to satisfy the emission guidelines is itself a concession that the guidelines are not "achievable through the application of [BSER]" as required by section 111(a)(1). This is again fatal. EPA cannot establish emission guidelines based on its BSER, acknowledge that those guidelines are unachievable in many cases through application of the BSER, and then tell regulated parties they have the "flexibility" to apply other, non-BSER actions to achieve the guidelines. While regulated parties often have flexibility to choose alternative methods of satisfying a standard that has been shown to be achievable through application of the BSER, that is far different than allowing EPA to rely on non-BSER measures to show that the standard itself is achievable. This Court has rejected this very argument before, holding that "the flexibility appropriate to enforcement will not render 'achievable' a standard which cannot be achieved on a regular basis." *National Lime Ass'n*, 627 F.2d at 431 n.46.

Nor does EPA conduct any meaningful analysis to determine whether, even if it could rely on trading, sufficiently robust trading systems will arise. For trading to be relied upon to justify EPA's BSER, several things must happen. First, because the Rule does not establish (or even require the creation of) any trading mechanism, States must individually adopt trading programs. Second, because in many instances actions within particular States will be insufficient for the sources within the State to comply, State plans must be coordinated to allow for interstate trading. Third,

participants within these coordinated trading programs must generate and trade enough credits to allow compliance for all sources.

EPA offers no analysis showing this will happen; it only "anticipates" that "organized markets will develop." 80 Fed. Reg. at 64,731-32, JA__-__. Anticipation is not demonstration and does not satisfy the requirement that EPA offer a "'satisfactory explanation'" and take a "'hard look at the salient problems.'" *Portland Cement*, 665 F.3d at 187 (citations omitted).

EPA also cites instances where trading has been successfully employed in connection with federal clean air programs. *See* 80 Fed. Reg. at 64,696-97, JA__-__; Legal Memorandum Accompanying Clean Power Plan for Certain Issues at 105-10, EPA-HQ-OAR-2013-0602-36872, JA__-__. But in each case, individual sources could comply without relying on trading if it so chose. That distinction overwhelms any possible comparison to the Rule, where trading is the only way to achieve compliance.

Regardless, the mere fact that trading programs have been used before hardly means trading programs will arise here, or that there will be sufficient credits for sources to comply. Moreover, in each of those instances, an overarching set of federal statutory or regulatory requirements established the trading program. *See* CAA §§ 401-416. The NO_x State Implementation Plan Call, Clean Air Implementation Rule, and Cross-State Air Pollution Rule are all *EPA-imposed* federal implementation plans that set up trading programs for States that contribute significantly to downwind

nonattainment. 80 Fed. Reg. at 64,696, JA__. The Clean Air Mercury Rule established a cap-and-trade program based on mercury reductions that could be achieved by controls installed at individual units. *Id.* at 64,697, JA__. In stark contrast, the Rule here does not establish any trading program, or even require States to allow for trading in their individual State plans. At the same time, the Rule's performance rates cannot be met without ERCs, and EPA acknowledges trading is "integral" to BSER.

Additionally, the Rule imposes affirmative restrictions that will inhibit—rather than encourage the development of—sufficiently robust trading mechanisms. These restrictions include: requiring States to either enter into a formal multi-state plan or adopt emission standards equal to the sub-category performance rates in order to engage in interstate trading, 40 C.F.R. § 60.5750(d); prohibiting issuance of ERCs for resources operating prior to January 1, 2013, *id.* § 60.5800(a)(1), *see infra* at III.B requiring that the credit generating resource be located in a rate-based State, except under limited circumstances, *id.* § 60.5800(a)(3); limiting ERC generation in mass-based States to wind, solar, geothermal, hydro, wave, and tidal sources, *id.* § 60.5800(a)(3); prohibiting credits for CO_2 emission reductions that occur outside the electric power sector, *id.* § 60.5800(c)(3); and offering no meaningful way to take advantage of unit retirements as a means of creating ERCs. These restrictive provisions limit the ability of States to create a trading environment in which adequate ERCs will be available at a reasonable price.

EPA's whole plan collapses if new trading programs do not germinate, yet EPA has not shown they will ever do so.

C. EPA Imposes on States an Impossible Task of Implementing BSER to Achieve Required Emission Reductions.

Section 111(d) obligates the States to establish performance standards that reflect the BSER. However, EPA's BSER is a house of cards that collapses under the weight of reality.

Given EPA's failure to establish the adequate demonstration or achievability of its three individual Building Blocks, it is hardly surprising that the Rule's performance rates are *manifestly* unachievable under "the range of relevant conditions" that affect different sources in different States. *Nat'l Lime Ass'n,* 627 F.2d at 433. Many States lack the resources that EPA's BSER assumes or have unique geographic or infrastructure limitations that prohibit or severely limit their potential to shift generation to lower- or zero- emitting generation. *See* Section II.B.2., *supra*, Section V, *infra*. These States cannot apply the Building Blocks that comprise BSER to even approach the performance rates EPA is imposing on the States and their sources.

For instance, Montana must achieve a nearly 50% reduction in coal unit CO_2 emissions by 2030.[21] But Montana sources cannot apply BSER to achieve this level of

[21] For Montana, the final rate-based CO_2 emission goal for 2030 is 1,305 lbs CO_2/MWh (compared to a baseline rate of 2,481 lbs CO_2/MWh), for a 47.4% emissions rate reduction goal; and the final mass-based goal is 11,303,107 short tons (Continued...)

emission reduction because there are no gas units (or associated transmission) in the State. Goal Computation TSD Appendix 5, JA__. Additionally, while Montana has renewable energy potential, its sources cannot build enough renewable energy to replace 50% of the State's baseload generation or build the necessary transmission capability by 2030. Montana Public Service Comm'n Comments at 9, EPA-HQ-OAR-2013-0602-23936 ("MPSC Comments"), JA__. Its neighbor North Dakota is in a comparable situation, with 99.4% of the fossil-fuel generation in the State coming from coal in 2013.[22] The State faces a 44.9% emission reduction requirement but has no gas units in the State. Goal Computation TSD Appendix 5, JA__.

Similarly, Kentucky faces massive CO_2 reduction requirements, but sources cannot achieve those reductions within the State's borders. Coal generation provides over 90% of the State's electricity needs, LG&E and KU Energy LLC Comments at 3, JA__; the *only* gas unit in Kentucky was under construction during the Rule's comment period, *id.* at 14, JA__; and Kentucky has little wind and solar potential, UARG Comments at 243, JA__.

Kansas, North Dakota, West Virginia, and Wyoming face similar situations, where 90% of their in-state fossil generation comes from coal units but sources within those States have limited ability to replace that generation with gas and renewable

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of CO_2 (compared to an adjusted baseline level of 19,147,321 short tons of CO_2), a 41% emissions reduction goal. Goal Computation TSD, Appendix 5, JA__.

[22] http://www.eia.gov/electricity/state/NorthDakota/.

generation. Wyoming Comments at 14-20, JA__; Kansas Department of Health & Environment Comments at 7, EPA-HQ-OAR-2013-0602-23255, JA__; West Virginia Department of Environmental Protection at 41-42, JA__. Similarly, Texas (operating primarily within the limited ERCOT region) has significantly higher renewable generation than the U.S. average and has already utilized the most promising sites for renewable generation. Luminant Comments at 63-64, JA__-__.

Finally, as discussed above, the fact that EPA would allow States to develop emissions trading systems under their state laws to achieve compliance does not save the Rule. The Act requires States to establish performance standards for existing sources within their own borders. § 111(d). EPA has not shown that it can require States to rely on extraterritorial emissions credits in setting and achieving the performance standards for sources within their borders. While EPA may consider the electric power industry a "highly integrated" and "complex machine," state laws are not. EPA cannot impose on individual States the obligation to look beyond their borders.

EPA therefore has failed to show that all States can apply the BSER to approach EPA's mandated emission guidelines.

III. The Rule Arbitrarily Penalizes Many Sources Of Low- And Non-Emitting Generation Along With Companies And States That Have Already Taken Costly Actions To Reduce Emissions Of Greenhouse Gases.

To justify the Rule's radical approach, EPA asserts the electric industry is unique, that all its sources form an interconnected, "complex machine"—the electric supply system. 80 Fed. Reg. at 64,725, JA__. Thus, it reasons, increases in generation from one source affect generation from other sources, and electrons can freely flow to wherever they are needed when existing units shut down. *Id.* For that reason, EPA invented its new "system" of emission reduction based on forcing the industry to shift to EPA's favored sources of electricity.

EPA's approach is arbitrary and capricious in two ways. First, it ignores a significant part of the existing mix of electric generating sources that plays a substantial role in how fossil fuel-fired units are dispatched and operated. Second, it arbitrarily penalizes zero- and low-emitting generating facilities (including wind, solar, and nuclear) that began operating before 2013. 40 C.F.R. § 60.5800(a)(1). In doing so, EPA significantly disadvantages the States and companies that have been at the forefront of addressing climate change.

A. EPA Arbitrarily Ignores A Large Part Of The Electric Supply System For Compliance Purposes.

It is hypocrisy for EPA to claim its system is based on the whole grid while it ignores large parts of that grid: existing renewable energy, nuclear generation that

provides approximately 20% of the nation's power[23] with zero emissions, hydro-electric generation that supplies the majority of electricity in many regions of the country, co-generation units, and waste-to-energy facilities with very low carbon footprints. All are critical to the electric supply system and to reducing the demand for electricity from fossil fuels. EPA arbitrarily excludes them as compliance options.

The existence of these EPA-disfavored non-fossil resources has driven many companies' electric supply resource decisions. For example, hydroelectric generation dominates the supply of electricity in the Pacific Northwest, giving those States the lowest average emission rates per megawatt hour in the country. *See* Portland General Electric Comments at 18, EPA-HQ-OAR-2013-0602-23507, JA__. The seasonal and variable nature of hydroelectric generation also dominates the other resource decisions in the region. *Id.* at 33, JA__; 80 Fed. Reg. at 64,815, JA__. Yet, EPA failed to consider the importance of maintaining existing hydroelectric power and its unique characteristics in its analysis for Rule compliance. 80 Fed. Reg. at 64,735, JA__. Similarly, companies that have invested in nuclear generation over the years have kept their emission rates lower; yet EPA ignored the huge benefit nuclear units contribute to zero-emission generation. *Id.*; Entergy Comments at 21-22, EPA-HQ-OAR-213-0602-22874, JA__-__ . EPA essentially assumes these generation resources will

[23] EIA, What is U.S. electricity generation by energy source, https://www.eia.gov/tools/faqs/faq.cfm?id=427&t=3 (Mar. 2015).

continue operating at similar levels in perpetuity, and fails to recognize the significant role their continued operation will play in future dispatch and emissions performance of the electricity sector.

Because EPA effectively ignored these resources, it "failed to consider an important aspect of the problem." *Motor Vehicle Mfrs. Ass'n. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983). EPA cannot base a rule on the assumption that a large part of the "system" it is regulating does not exist or that its status as of 2012 will remain static forever.

B. The Rule Arbitrarily Discriminates Between Low- and Zero-Emitting Sources Built Before And After January 1, 2013.

No good deed goes unpunished. This Rule bears that out. In determining whether a resource can count toward compliance, the Rule discriminates between identical resources based on whether they were constructed before or after January 1, 2013. The existence of *any* cut-off date is arbitrary. It punishes entities that chose to invest in zero- and lower-emission resources early to address the very problem EPA seeks to tackle. It also creates harmful and perverse incentives for the future operation of early-built resources. EPA acknowledges the "clearly emerging growth in clean energy innovation, development and deployment," 80 Fed. Reg. at 64,663; JA__, as critical to reducing greenhouse gas emissions. Yet the Rule makes no allowance for this early action. To the contrary, it uses these early actions as a way to impose on those companies and States even more stringent performance rates.

Several States' experiences are illustrative:

- Over the past fourteen years, New Jersey entities invested $3.27 billion in renewable energy and energy efficiency. New Jersey Department of Environmental Protection Comments at 2, EPA-HQ-OAR-2013-0602-22758; JA__; *see also* New Jersey Technical Comments at 5, EPA-HQ-OAR-2013-0602-22758; JA__.
- In 2012, Kansas entities increased the State's wind generation capacity exponentially. *See* Existing Kansas Wind Farms, http://kansasenergy.org/wind_projects.htm.
- Between 2005 and 2012, Minnesota entities invested $4 billion to reduce CO_2 emissions by almost 21%. Xcel Energy Inc. Comments at 9-10, EPA-HQ-OAR-2013-0602-22748; JA__.
- In the past 15 years, Washington State has invested more than $8 billion in renewable energy sources. Pacific Coast Collaborative Comments at 2, EPA-HQ-OAR-2013-0602-22947, JA__.
- Texas—which produced 23% of all wind energy produced in the United States and more than twice as much wind energy as the next highest wind energy producing state in 2012—is likewise being punished as a first mover in this area. TCEQ Comments at 2, JA__.

Other examples abound.

EPA's arbitrary discrimination between identical power generation resources is contrary to the Administrative Procedure Act and creates perverse market incentives. *See Indep. Petrol. Ass'n of Am. v. Babbitt*, 92 F.3d 1248, 1258 (D.C. Cir. 1996). Even though pre-2013 zero-emission sources provide precisely the same environmental benefit as post-2013 sources, the Rule significantly disadvantages pre-2013 sources without a plausible justification. EPA assumes that resources constructed before 2013 will continue operating at their present rates indefinitely, partially alleviating the need for fossil fuel-based power. *See* 80 Fed. Reg. at 64,737, 64,897, JA__, __. Yet the Rule will lead to the opposite result. EPA's rule discounts the value of existing renewable energy, incentivizes owners to defer or stop maintenance and helps create a fleet of stranded renewable energy assets.

This trend will only increase when pre-2013 generators face diminishing value as the full implementation of the Rule causes ERC value to increase. EPA simply fails to recognize that in creating economic advantage for newer resources, it will render less viable existing resources of *identical* environmental value. EPA should not be in the business of picking winners and losers arbitrarily.

The discriminatory impact of EPA's arbitrary cutoff date for compliance tools is underscored by the circumstances confronting waste-to-energy facilities. Although these facilities provide significant carbon emission reductions—every ton of municipal solid waste directed to a waste-to-energy facility rather than a landfill avoids

more than one ton of greenhouse gas emissions[24]—the technology is expensive, 64.6% more costly than landfilling. LGCRE Comments at 9-11, JA__, __.

That cost disparity jeopardizes communities' continued reliance on waste-to-energy, and ERC eligibility could be pivotal for sustained operation versus shutdown. Pre-2013 facilities need revenue incentives such as ERCs "to make investments to continue producing clean energy." Absent such incentives, operators "may ultimately choose to retire facilities rather than extend their lives." *Id.* at 7-11, JA__, __; *see* http://www.mprnews.org-/story/2010/10/12/ground-level-cities-in-crisis-red-wing (Minnesota waste-to-energy facility closes due to high operating expense and low-cost landfill alternative); http://energyrecoverycouncil.org/wpcontent/uploads/2016/02/DMS-3307817-v3-CREA_Minutes-April_9_2015.pdf (waste-to-energy facility in Los Angeles County faces possible shutdown due to declining electric revenues). Moreover, while EPA acknowledges the role of waste-to-energy and other pre-December 31, 2012 renewables in "keeping CO_2 emissions lower than they would otherwise be," it speculates that denying these sources ERC eligibility will not affect the net carbon reduction EPA projects. 80 Fed. Reg. at 64737, JA __. EPA's speculation is not supported by the record, and such arbitrary "unsupported

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[24] *See Air Emissions from MSW Facilities*, EPA, http://www3.epa.gov/epawaste/nonhaz/municipal/wte/airem.htm#7; *see also Bridging the Gap*, UNEP at 37-38 http://www.unep.org/pdf/UNEP_bridging_gap.pdf (United Nations advises that waste sector emissions can be reduced 80% through significant diversion of landfilled waste to waste-to-energy).

suppositions" require reversal. *McDonnell Douglas Corp. v. U.S. Dept. of the Air Force*, 375 F.3d 1182, 1186-87 (D.C. Cir. 2004).

EPA compounds these problems by imposing a discount on waste-to-energy-produced electricity. Although waste-to-energy's throughput is biogenic (paper, food waste, etc.) as well as anthropogenic (e.g., non-recyclable plastics), throughput is typically at least 40% anthropogenic. http://www.ecomaine.org/education/NAWTEC%20Maritatopercent20Hewes%20paper.pdf. Under the Rule, State plans will be allowed to qualify *only the biogenic portion* as renewable. 40 C.F.R. § 60.5800(a)(4)(iii). Aside from contradicting the greenhouse gas emission reduction objective at the heart of the Rule and EPA's recognition of the significant reductions waste-to-energy achieves, the discount will mean lower energy revenues for these facilities and further jeopardize local governments' ability to sustain their higher cost. EPA's rationale for discounting waste-to-energy electricity is nowhere stated. EPA acknowledged comments opposing such a discount, *see* RTC Ch. 3 §§ 3.5-3.12 at 360-63, JA__-__, but did not respond. That failure requires reversal. *Del. Dep't of Natural Res*, 785 F.3d at 11.

The same is true of the nuclear industry. Companies have invested millions of dollars in recent years to increase both the capacity and the capacity factors from nuclear units. For example, Entergy undertook a 178 MW uprate of its Grand Gulf nuclear station in 2012 and began operating at close to its new, higher capacity in September of that year. Entergy's Comments at 21-22, JA__, __. Because nuclear

units operate as baseload generators, the 178 MW of new generation creates over three times the benefit of, for example, wind generation that achieves only a 33% capacity factor. Yet, under the Rule, because Entergy undertook the uprate in 2012 instead of three months later, it receives no credit and never will. New Jersey also made large investments toward increasing the three nuclear power plants' output prior to 2013. *See* New Jersey Department of Environmental Protection Comments at 2, 4, JA__, __; *see also* New Jersey Technical Comments at 22-24, JA__-__.

All these investments produced environmental benefits, reduced emissions and helped spur the renewable energy industry. The cost for those benefits is already being borne by the ratepayers in these States. Yet EPA's Rule provides them with no benefit. Further, EPA simply presumes that all of these good acts will remain in place forever. But EPA's own Rule effectively discourages that outcome.

EPA's date cutoff also arbitrarily penalizes renewable resources that were installed during 2012 and only generated for a portion of the year. EPA states that "generation from . . . [renewable energy] capacity installed prior to 2013 has been excluded from the EPA's calculation of the CO_2 emission performance rates in the emission guidelines." 80 Fed. Reg. at 64,897, JA__. This explanation does not account for renewables that became operational during 2012 because generation from such renewables would not have been present during the entire year. A portion of generation from these sources is completely lost: it is neither part of the baseline nor is eligible to generate compliance credits.

C. EPA Unlawfully Prohibits The Use of Enhanced Oil Recovery That Also Results In Associated CO_2 Storage.

The Rule limits the injection of CO_2 from affected facilities to Subpart RR-compliant facilities. *See* 40 C.F.R. § 60.5860(f)(2). Enhanced oil recovery operators inject CO_2 into oil- and gas-bearing formations to recover stranded hydrocarbons, reporting the quantity of CO_2 injected under 40 C.F.R. Part 98, Subpart UU. The Rule limits the storage of CO_2 from affected units to operations that report under the far more burdensome requirements of Subpart RR. It thus functionally prohibits facilities from using CO_2 in enhanced oil recovery. 40 C.F.R. § 60.5860(f)(2). That is unlawful for two reasons.

First, this requirement was nowhere in the Proposed Rule. In fact, EPA maintained that it was not considering carbon sequestration as a BSER component. *See* 79 Fed. Reg. at 34,857, JA__.

Second, the restriction tramples state mineral property laws and private mineral leases. *See* 58 C.J.S. Mines and Minerals § 403. Compliance is impracticable for many operations that commingle CO_2 from affected units and other sources. And the Rule conflicts with prior EPA statements advocating enhanced oil recovery for carbon sequestration. *See* 79 Fed. Reg. at 1,473-74; *id.* at 1,478-479. Indeed, it undermines the government- and ratepayer-funded plan to use enhanced oil recovery at a first-of-its-kind integrated gasification combined cycle power plant in Kemper County, Mississippi. *See id.* at 1,435. EPA dismissed these concerns as a matter of cost alone.

See 80 Fed. Reg. at 64,884, JA__. That was error. The Subpart RR condition should be vacated.

IV. EPA Has Failed To Consider Important Aspects Of The Rule.

The Supreme Court has repeatedly recognized that an agency decision is arbitrary and capricious where the agency has "failed to consider an important aspect of the problem." *State Farm*, 463 U.S. at 43. "[J]udicial review can occur only when agencies explain their decisions with precision, for '[i]t will not do for a court to be compelled to guess at the theory underlying the agency's action….' *Am. Lung Ass'n. v. EPA*, 134 F.3d 388, 392 (D.C. Cir. 1998) (citing *SEC v. Chenery Corp.*, 332 U.S. 194,196-97 (1947)). EPA has failed to consider important aspects of the Rule and made critical errors in its emission guidelines as a result.

A. The Rule Impermissibly Regulates New Units.

The Rule requires that mass-based state plans include provisions to prevent "leakage," or "shifts in generation to unaffected fossil fuel-fired sources that result in increased emissions, relative to what would have happened had generation shifts consistent with the [BSER] [] occurred." 80 Fed. Reg. at 64,822-23; JA__-__. "Unaffected fossil fuel-fired sources" refers to new units subject to EPA's performance standards under section 111(b). CAA § 111(b). The leakage requirement must be vacated, as EPA has no authority under section 111(d) to require that States prevent the increased dispatch of new units.

Measures to prevent the dispatch of new units unlawfully subject such units, which are regulated under Section 111(b), to a state plan under section 111(d). This violates the plain language of the CAA. *See also* 80 Fed. Reg. at 65,039; JA__. The CAA establishes two avenues for applying performance standards to sources: (i) regulation of "new sources" under section 111(b), or (ii) regulation of "existing source[s]" under section 111(d). These two avenues are mutually exclusive, as a unit cannot be both a new unit and an existing unit. Under section 111(a)(6), "[t]he term 'existing source' means any stationary source *other than a new source*." CAA § 111(a)(6) (emphasis added). In contrast, section 111(a)(2) defines a "new source" as "any stationary source, the construction or modification of which is commenced after the publication of regulations (or, if earlier, proposed regulations) prescribing a standard of performance under this section which will be applicable to such source." *Id.* § 111(a)(2). This statutory language clearly and unambiguously establishes non-overlapping definitions of "new" and "existing" units, leaving no room for any alternative interpretation. *See Chevron v. Natural Res. Def. Council*, 467 U.S. 837, 842-43 (1984). Even EPA recognizes that sources may be subject only to section 111(b) *or* section 111(d), and not both. Proposed Federal Plan, 80 Fed. Reg. at 65,039. Accordingly, EPA has no authority to regulate the dispatch of new units under section 111(d), and the leakage requirement must be vacated. EPA cannot require States to implement rule elements the Agency itself has no authority to implement.

B. EPA Failed to Establish The Necessary Subcategories For Coal Types And Generation Technologies.

For new sources, the Act permits EPA to establish different emissions limitations for subcategories of units, and EPA regularly does so. CAA § 111(b)(2) (EPA "*may* distinguish among classes, types, and sizes within categories" (emphasis added)); *see* 80 Fed. Reg. at 64,760, JA__. EPA's section 111(d) rules go further for existing sources, *mandating* adoption of subcategories where existing sources have unique characteristics. 40 C.F.R. § 60.22(b)(5) (EPA "*will* specify different emission guidelines or compliance times or both for different sizes, types, and classes of designated facilities when costs of control, physical limitations, geographical location, or similar factors make subcategorization appropriate." (emphasis added)).[25] EPA acted arbitrarily and capriciously by failing to do so here, particularly for lignite coal-fired units.

EPA's own past rulemakings and unique lignite unit characteristics demonstrate the necessity of subcategorization. For example, EPA previously established subcategories for lignite-fired coal units in the Mercury and Air Toxics Standards rule under section 112. 77 Fed. Reg. 9,304, 9,379 (Feb. 16, 2012); *see* Luminant Comments at 82-86, JA__-__.

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[25] This provision contrasts with others that simply *allow* EPA to subcategorize. *Cf.* CAA § 111(b)(2).

Here, the record shows that mine-mouth lignite units have significantly higher costs of control (i.e., retirement or curtailment) compared to other units in the category. Luminant Comments at 83-84, JA__-__. Lignite-fired units are always located at or near the mine that feeds it due to transportation cost constraints, and retirement of the unit is thus certain to cause shutdown of the mine and breach of long-term fuel supply contracts, with magnified economic impacts on the surrounding communities. *See* NACoal Comments at 20-22, JA__-__. EPA nonetheless treated all coal units the same in the Rule, reasoning that "each affected [unit] can achieve the performance rate by implementing the BSER." 80 Fed. Reg. at 64,760, JA__. Given the unique constraints faced by lignite-fired units, the failure to subcategorize was arbitrary and capricious.

C. EPA Failed to Consider Renewable Energy's Limitations.

EPA failed to consider the inherent limitations on generation and distribution of energy from renewable energy sources in electric markets. The Rule fails to address various issues associated with incorporating substantial amounts of renewable generation into the electric grid, including its substantial reliability impacts (including voltage support, system inertia, and stability issues), as well as transmission planning, siting, and construction issues. Southern Company Comments at 153-56, JA__-__. States like Texas have seen these limitations firsthand. Wind generation in Texas generally produces only a fraction of its output during times of peak demand, thereby making the availability of fossil generation critical for maintaining reliability; the Rule

fails to accommodate this shortcoming. PUCT Comments at 61, JA__ (EPA used a capacity factor for Texas wind of between 39 and 41%, in contrast to a prior ERCOT estimate of 8.7% availability during summer peak demand); Luminant Comments at 71, JA__ (wind generation is volatile); Montana Public Service Comm'n Comments at 11-12, JA__-__ (renewables' transmission constraints). EPA assumed unrealistically optimistic and unsupported capacity factors for renewable energy generation. *See* "What's In a Target," *supra*, at 17-20. It also gamed its analysis to show much lower cost associated with renewables by lowering coal generation substantially below the levels of the Base Case in the Proposed Rule and substantially below EIA's long Term Coal Generation forecast as well. EVA Report 17-24, 64-68, http://www.nma.org/pdf/EVA-Report-Final.pdf.

D. EPA's Cost-Benefit Analysis Is Fundamentally Flawed.

Section 111(a) requires consideration of costs. EPA, however, diminishes the Rule's costs by inflating its purported benefits in a manner outside the CAA's scope. The Rule is therefore arbitrary and capricious. *See Michigan v. EPA*, 135 S. Ct. 2699, 2707 (2015) (it is not "rational … to impose billions of dollars in economic costs in return for a few dollars in health or environmental benefits").

EPA monetizes the Rule's climate-related benefits using the Global Social Cost of Carbon. The Global Social Cost of Carbon's flaws are well known: the Interior Department calls it "misleading" because it excludes "the social benefits of energy production." Dep't of Interior, Federal Coal Leases COC-0123475 01 and COC-

68590, at 4-26 (Jan. 2016), http://www.wrcc.osmre.gov/initiatives/colowyo/documents/Colowyo_Collom_EA_CH%201-7.pdf. The National Academy of Sciences says it is outdated, inaccurate, and uncertain. Nat'l Academy of Sciences, *Assessment of Approaches to Updating the Social Cost of Carbon*, at 1 (2016). Academics characterize it as "meaningless," "close to useless," and "arbitrary." Robert S. Pindyck, *Climate Change Policy: What Do the Models Tell Us?*, J. Econ. Lit. 51(3), 860-72 (2013), http://dspace.mit.edu/openacces-disseminate/1721.1/88036. EPA's reliance on this flawed tool is fatal.

Further, the CAA expressly forecloses use of the Global Social Cost of Carbon because foreign benefits exceed the cost-benefit analysis' permissible scope. The Act's purpose is exclusively domestic: "[T]o protect and enhance the quality of *the Nation's* air resources [for] … *its* population." CAA § 101(b) (emphases added). EPA has acknowledged this. 74 Fed. Reg. 66,496, 66,514 (Dec. 15, 2009). Congress explicitly says when EPA may consider foreign benefits. *E.g.*, CAA § 115.

Only 10% of the claimed global benefits from reducing CO_2 emissions accrue to the United States. UARG Comments, Supp. No. 12, Social Cost of Carbon TSD at 11, EPA-HQ-OAR-2013-0602-22768, JA __. Stripping foreign benefits from the Rule's cost-benefit analysis reduces climate-related benefits to, at most, $0.3 billion in 2020 and $2.0 billion in 2030. *See* Regulatory Impact Analysis ("RIA") at ES-22, EPA-HQ-OAR-2013-0602-37105, JA__. The Rule's claimed (and underestimated) costs ($2.5 billion in 2020 and $8.4 billion in 2030) dwarf these domestic benefits.

EPA also failed to account for real-world effects that suppress the claimed benefits, further skewing the cost-benefit analysis. The Rule does not account for emissions resulting from the Clean Energy Incentive Program, which enables States to emit up to 300 million tons of CO_2 without it counting against their emission goals. 80 Fed. Reg. at 64,829, JA__. This further diminishes the Rule's benefits. EPA admits this program "is not reflected" in its cost-benefit analysis. RIA at 3-45, JA__.

The Rule also overstates emissions reductions by ignoring that industries respond to energy price increases by shifting production abroad. This depresses benefits because those businesses do not reduce—and may increase—emissions. This result will inevitably occur because the Rule will raise electricity costs. Rather than account for this issue, EPA simply notes the phenomenon and moves on. *Id.* at 5-6, JA__-__.

EPA also failed to consider the 30,000 premature deaths associated with the loss of disposable income resulting from the Rule. Oil and Gas Industry Organizations and Participants-II Comments at 18-20, EPA-HQ-OAR-2013-0602-25423, JA__-__.

Because EPA "entirely failed to consider" these "important aspect[s] of the problem," *State Farm*, 463 U.S. at 43, EPA's cost-benefit analysis cannot support the Rule, and the Rule should be vacated. *Nat'l Ass'n of Home Builders v. EPA*, 682 F.3d 1032, 1040 (D.C. Cir. 2012) ("[A] a serious flaw undermining [cost-benefit] analysis can render the rule unreasonable.").

V. The Rule Should Have Been Tailored To Individual State Circumstances.

The arbitrariness of EPA's actions is demonstrated by the unique harm that will befall many States under the Rule because EPA failed to take into account individual States' circumstances. The resulting harm is exemplified by the following experiences of Arizona, New Jersey, North Carolina, Utah, Wisconsin, and Wyoming.

A. In Calculating Wisconsin's Baseline Emissions, EPA Improperly Disregarded A Nuclear Plant's Imminent Retirement.

EPA improperly disregarded the imminent retirement of a nuclear power plant in using 2012 data to calculate Wisconsin's starting point from which the Plan's reductions are based. 80 Fed. Reg. at 64,813-27, JA__-__. The Kewaunee plant—which EPA acknowledged represented over 7% of Wisconsin's generation in 2012, EPA's RTC Ch. 4, §§ 4.5-4.9 at 25, JA__—was decommissioned in May 2013. Wis. Dep't of Nat. Res. Comments, pt. 3 at 1, EPA-HQ-OAR-2013-0602-23541, JA__ ("WDNR Comments"). The majority of that lost generation was replaced with fossil-fuel generation from the existing fleet in 2013 and beyond.

EPA recognized the retirement in the proposal, 79 Fed. Reg. at 34,870, JA__, but failed to increase the baseline to account for the replacement generation after 2012 in either the Proposed or Final Rule. 80 Fed. Reg. at 64,813-19, JA__-__; *see also* RTC Ch. 4, §§ 4.5-4.9 at 25, JA__. EPA did increase other States' baselines, such as Minnesota's, based on a coal-fired generation unit that was temporarily offline in 2012 but resumed operation in 2013. 80 Fed. Reg. at 64,815, JA__; RTC Ch. 4 §§ 4.5-4.9 at

8-9, JA__. Had EPA applied this approach to Wisconsin's final goal, its target would have been approximately 6.5% higher. Wisconsin raised this issue to EPA, WDNR Comments, pt. 3 at 1, JA__, but EPA ignored it.

EPA's willful blindness is unlawful in three respects. First, its failure to account for the known issues with Kewaunee's retirement, EPA's RTC Ch. 4 §§4.5-4.9 at 25, JA___, demonstrates a failure to "articulate a satisfactory explanation for its action including a rational connection between the facts found and the choice made." *State Farm*, 463 U.S. at 43. Second, failing to treat similarly situated States alike (that is, Wisconsin like Minnesota)—without giving a rational explanation—contravenes the principle that "[a]n agency must treat similar cases in a similar manner unless it can provide a legitimate reason for failing to do so." *Indep. Petrol. Ass'n v. Babbitt*, 92 F.3d 1248, 1258 (D.C. Cir. 1996); *accord Kreis v. Sec'y of Air Force*, 406 F.3d 684, 687 (D.C. Cir. 2005). Finally, by failing to respond to Wisconsin's comments regarding Kewaunee, the agency failed to respond to all "relevant" and "significant" public comments. *Home Box Office, Inc. v. FCC*, 567 F.2d 9, 35-36 & n.58 (D.C. Cir. 1977).

B. EPA Failed To Truly Account For Trading Between States And Indian Tribes in Arizona And Utah.

Even if the Court finds that a trading platform is a lawful basis for establishing BSER under section 111(d), EPA's failure to recognize a uniform method of trading between mass-based and rate-based jurisdictions imposes an arbitrary, capricious, and unlawful hardship on States like Arizona and Utah. In determining States' obligations,

EPA contends it can derive mass-based targets from rate-based targets. 80 Fed. Reg. at 64,743, JA__. If EPA can fairly convert a rate-based goal to a mass-based goal for establishing state carbon emission targets, it follows that these same conversions could be used to facilitate trading between rate- and mass-based States. EPA's failure to allow for such trading prohibits rate- and mass-based States and sovereign Tribes from working together.

This impediment works a unique harm in Arizona, where a substantial component of the State's energy is generated on tribal lands belonging to the Navajo Nation, which will be directly regulated by EPA. 80 Fed. Reg. at 65,033, JA __ (proposing to find it "necessary and appropriate for EPA to regulate units on tribal land). Whatever emission standards are imposed on Arizona's generation will foreclose many potential regulatory avenues that ought to be available. For example, if EPA regulates the Navajo Nation under a mass-based plan, Arizona would be compelled to also adopt a mass-based plan or else forfeit any ability to coordinate with this major aspect of the State's basic infrastructure. Trading between types of plans is critical, if trading is approved by this Court as part of the BSER.[26]

The Bonanza Power Plant owned by Utah-based Deseret Power Electric Cooperative is also located on Tribal lands and is therefore under federal jurisdiction.

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[26] This is also important for Utah, a part of the Pacifcorp service territory, which includes States that are currently planning both rate- and mass-based compliance. www.pacificorp.com/about/co.html.

See 80 Fed. Reg. at 64,705, JA__. The plant is an essential part of the Utah power system, and trading between types of plans (if lawful) will be critical.

C. EPA Ignored Wyoming's Unique Circumstances.

EPA's nationally-applicable guidelines ignore a number of State-specific circumstances in Wyoming. 80 Fed. Reg. at 64,816-19, JA__-__. First, EPA's significant changes to the BSER Building Blocks disproportionately imposed stringent emission reduction goals on Wyoming—the 6% reduction it was asked to meet in the Proposed Rule nearly doubled in the Final Rule. *Compare* 79 Fed. Reg. at 34,895, JA__, *with* 80 Fed. Reg. at 64,824, JA__. For Wyoming's coal fleet, with higher emission rates from air-cooled plants, the initial overall rate is 2,331 lbs/MWh, which requires an 11.57% reduction to reach the eastern interconnection rate adjusted for Building Block 1. Wyoming Public Service Comm'n at 34-38, JA__-__ (discussing the impossibility of attaining either set of goals).

EPA also failed to take into account Endangered Species Act concerns specific to Wyoming. In analyzing the Building Blocks, EPA relied on data from the National Renewable Energy Laboratory ("NREL"), 80 Fed. Reg. at 64,807, JA __despite the fact that the NREL explicitly states it did not capture "site-specific challenges of building electricity infrastructure." 2015 Standard Scenarios Annual Report: U.S. Electric Sector Scenario Exploration. National Renewable Energy Laboratory at 19, http://www.nrel.gov/docs/fy15osti/64072.pdf. EPA's goal thus did not take into account the difficulties for Wyoming in developing renewables in the protected sage

grouse corridor. Wyoming Department of Environmental Quality Comments at 20, EPA-HQ-OAR-2013-0602-22977, JA__.

To avoid those difficulties, EPA should have formally consulted under the Endangered Species Act ("ESA"), 16 U.S.C. §§ 1531-1544, to determine whether the Rule would jeopardize threatened and endangered species. Under the ESA, federal agencies must ensure "any action authorized, funded, or carried out by such agency" is not likely to jeopardize the continued existence of any endangered or threatened species. *Id.* § 1536(a)(2).

The Rule is no typical CAA rulemaking. EPA designed the Rule to envelop non-jurisdictional assets, like wind farms, and to fundamentally transform the electric sector, resulting in significant new solar and wind power generation projects with the potential to significantly impact threatened and endangered species. 80 Fed. Reg. at 64,926, JA __. Yet EPA refused to consult under the ESA, asserting that the Rule's impacts were not "sufficiently certain to occur so as to require consultation." *Id.* at 64,925-27, JA __-__. This was error. *E.g., Conner v. Burford*, 848 F.2d 1441, 1453 (9th Cir. 1988) (lack of fulsome information not sufficient to justify failure to consult).

EPA's excuse is also belied by past agency actions. For example, when the federal government considered the environmental impacts from siting and authorizing wind farms throughout the Upper Great Plains, the authorizing agency consulted with the Fish and Wildlife Service on a programmatic level, despite the fact that (i) the study area spanned all or part of six States, (ii) the exact location of the possible wind

farms was unknown, and (iii) the proposed action did not authorize planning, construction, or operation of any specific projects. 80 Fed. Reg. 24,914, 24,915 (May 1, 2015).[27] Moreover, the Services' implementing regulations allow an agency to consult with the Services in incremental steps, which EPA neglected to consider. 50 C.F.R. § 402.14(k). Such "[i]ncremental step consultation is most appropriate for long-term, multi-staged activities for which agency actions occur in discrete steps[]." Endangered Species Consultation Handbook at 5-8 (Mar. 1998). That is precisely the situation here. 80 Fed. Reg. 64,663-82, JA __-__. EPA's failure to do so, especially in light of Wyoming's specific concerns, was arbitrary and capricious.

D. The Rule Would Cause Particular Harm to Utah.

Utah also will experience unique harms that demonstrate EPA's arbitrary and capricious actions here: EPA based Utah's emission limits on erroneous and unrepresentative baseline data and the Rule interferes with the State's ability to protect its most sensitive air shed.

1. Utah's Targets Are Unrepresentative Of Historic Utah Emissions.

EPA's Utah CO_2 emission baselines and targets do not represent Utah's true baseline emissions because EPA failed to account for a five-month outage at the State's largest coal-fired power plant, thus unfairly penalizing Utah. Goal

[27] *See generally* http://plainswindeis.anl.gov/documents/fpeis/UGP_Wind_BA.pdf (Apr. 2015).

Computation TSD Appendix, JA__. EPA's arbitrary approach resulted in the establishment of unrepresentative baseline emissions and unfairly stringent performance standards for Utah.

Because EPA used only 2012 emissions to establish the State baselines and goals, it failed to account for the fact that Unit 1 at the Intermountain Power Project ("IPP") plant had a significant outage of five months during 2012. Intermountain Power Agency Comments at 5, EPA-HQ-OAR-2013-0602-24053, JA __. IPP is Utah's largest coal plant and typically represents almost one-third of Utah's annual electric generation, making the outage's impact on EPA's 2012 baseline and Utah's final goal significant. Goal Computation TSD Appendix, JA __. The Intermountain Power Agency and Utah raised this issue with EPA, IPA Comments at 5, JA__; Utah Comments at 9, EPA-HQ-OAR-2013-0602-23100, JA__, but EPA was unresponsive and wrongly assumed that other state power plants had compensated for the outage. In fact, the vast majority of power produced at IPP is sent to California, and Utah plants were not deployed to make up the shortfall. IPA Comments at 6, JA __.

EPA set Utah's 2030 mass-based emissions target at 23,778,193 tons of CO_2. *See* 80 Fed. Reg. at 64,825, JA__. Adjusting Utah's baseline upwards to account for the significant outage at IPP would add potentially two-and-a-half million tons to the target. *See* Goal Computation TSD Appendix, JA__. EPA has imposed arbitrarily more stringent CO_2 goals on Utah that will substantially increase compliance costs. The Rule has set targets for some States that are above their current emissions, *see* 80

Fed. Reg. at 64,825, JA__, Statewide Mass-Based CO_2 Emission Performance Goals, JA__, potentially providing them tradeable value that States like Utah that have limits below their current emissions will need to purchase.

2. The Rule Unlawfully Impedes Utah's Ability to Protect Its Most Sensitive Air Shed.

In developing Utah's targets, EPA arbitrarily assumed Utah's natural gas plants could increase their usage 40 to 50% to run at 75% of summer capacity, interfering with Utah's ability to manage its most sensitive air shed in protection of the health and welfare of its citizens. *See* 80 Fed. Reg. at 64,795, JA__. Utah's coal-fired power plants are located in sparsely populated areas. *See* Utah's Energy Landscape, Utah Geological Survey, Circular 117 at 40 (2014), http://energy.utah.gov/wp-content/uploads/Utahs-Energy-Landscape-3rd-Edition.pdf. All of Utah's major gas plants are located in Utah's most urbanized area, the Wasatch Front, where over 70% of Utah's citizens live.[28] By requiring greater usage of those gas-fired plants, the Rule would increase the emissions directly affecting over 70% of Utah's citizens, and unlawfully interfere with the State's ability to protect its citizens' health and welfare. Indeed, as part of its state implementation plan, Utah has agreed to run its gas units at lower (moderate) capacities. *See e.g.* Utah State Implementation Plan, Control

[28] Utah Legislature Population Briefing Paper (2014 Session), Office of Legislative Research and General Counsel, le.utah.gov/lrgc/briefings/PopulationBriefing2014.pdf.

Measures for Area and Point Sources, Fine Particulate Matter, PM 2.5 SIP for the Provo, Utah Nonattainment Area, Section IX, Part A.22.[29] This creates numerous legal and practical conflicts with the Rule. All four of Utah's existing gas-fired plants are located in or adjacent to non-attainment areas for $PM_{2.5}$ that face strict limits on NOx emissions as a result. *Id.* Requiring redispatch to higher levels of gas utilization conflicts with the state plan and other environmental requirements. Moreover, EPA recently finalized a more stringent ozone standard, 79 Fed. Reg. 65,292 (Oct. 26, 2015), creating additional uncertainty and constraints.

E. EPA Failed To Take Into Account States Like New Jersey That Have Chosen To Deregulate Energy Services.

The Rule fails to consider the positions of the numerous energy-deregulated States in assuming that state utility regulators can impose the Rule's requirements on affected units. *See, e.g.*, RTC Ch. 1 §§ 1.11-1.15 28-29, 33, 135, JA__- __, __, ___. The Rule will require each energy-deregulated State to pass new legislation specific to its unique energy market structure, infringing upon the States' sovereignty. *See* Core Issues Brief at Section IV.

For example, New Jersey in 1999 deregulated its energy regulatory structure, limiting the jurisdiction of the New Jersey Board of Public Utilities (NJBPU) to the regulation of electric and gas distribution companies. *See* Electric Discount & Energy

[29] http://www.deq.utah.gov/Pollutants/P/pm/pm25/.

Competition Act, N.J.S.A. 48:3-49 *et seq.* (the "N.J. Act"). NJBPU no longer exercises authority over generating units and will therefore require significant legislative and regulatory changes to comply with the Rule. New Jersey Technical Comments at 8, JA__. Other States, like Texas, face similar issues. Luminant Comments at 48-49, JA__-__.

New Jersey would also have to enact new legislation to order the implementation of energy efficiency measures related to the electric transmission system to comply with the Rule. As an energy-deregulated state, New Jersey is a member of PJM Interconnection, LLC, the federally-authorized regional transmission organization. *Id.* at 27, JA__. Implementation of the Rule would involve an extensive reorganization of the power grid and electric distribution within New Jersey and across the entire PJM region.

Additionally, at a minimum, NJBPU would require amendments to New Jersey's existing statutes and regulations governing its renewable portfolio standard. Those regulations[30] require electric suppliers to include minimum renewable energy amounts in the electricity they sell. N.J. Stat. Ann. 48:3-87(d); N.J. Admin. Code 14:8-2.3. The rules specify separate minimum requirements for solar electric generation, Class I renewable energy, and Class II renewable energy. N.J. Admin. Code 14:8-2.3(a), (k). A renewable energy credit or solar renewable energy credit represents all of

[30] Found at N.J.A.C. 14:8-2.1, *et seq.* and authorized by N.J.S.A. 48:3-49, *et seq.*

the environmental benefits or attributes of one megawatt hour of generation from either a Class I or Class II renewable energy or solar energy facility. N.J. Stat. Ann. 48:3-51. By contrast, the Rule provides for an emission reduction credit for only CO_2, which is but one of the environmental benefits in the New Jersey renewable or solar energy credit system. Moreover, the Rule does not account for the out-of-state purchase of RECs. New Jersey's statutes and regulations would need to be revised because the same megawatt hour could not satisfy both requirements.

F. EPA Arbitrarily Excluded From Consideration Prior Emissions Reductions Achieved In North Carolina.

EPA failed to recognize the substantial emission reductions achieved in North Carolina under its 2002 Clean Smokestacks Act ("CSA"). The CSA required stringent emission reductions on coal units to be achieved within ten years. N.C. Gen. Stat. § 143-215.107D(b)-(e). The CSA allowed regulated operators to determine for the units in their systems how to achieve the reductions, rather than imposing specific emission limitations on a unit-by-unit basis. *Id.* § 143-215.107D(f). Additionally, the North Carolina utilities decided starting in 2009 to invest in new gas generating units and close small, inefficient and uncontrolled coal units. N.C. Utilities Comm'n Docket No. E-2, sub 960, Progress Energy Carolina Application To Construct a 950-MW Combined Cycle Natural Gas Fueled Electric Generation Facility in Wayne County (Aug. 18, 2009), JA__.

EPA arbitrarily ignored these emission reductions when it set North Carolina's emission goals. For example, in 2005, the first year in which measures were beginning to be implemented to comply with the CSA, statewide CO_2 emissions from affected North Carolina units totaled 78,000,000 tons. EPA Clean Air Markets Program Data, http://ampd.epa.gov/ampd/. Those same sources' CO_2 emissions dropped to just under 58 million tons in 2012, the Rule's baseline year, a decrease of nearly 25%. Goal Computation TSD Appendix, JA__.

The final mass goal set for North Carolina is 51,266,234 tons of CO_2 annually. 80 Fed. Reg. at 64,825, JA__. But most of the CO_2 emission reductions that can reasonably be achieved have already been achieved through coal retirements and natural gas conversion. Implementation of the "Clean Smokestacks Act": Report to N.C. Envtl. Review Comm'n (May 30, 2014), http://daq.state.nc.us/news/leg/2014_Clean_Smokestacks_Act_Report.pdf. Yet, North Carolina received no credit for this pioneering work.

The aggregate rate goal set for North Carolina is 1,136 lbs CO_2/MWh. *See* 80 Fed. Reg. at 64,824, JA__. In 2012, the baseline year, North Carolina's aggregate rate of CO_2 emissions per megawatt-hour was 1,778. Goal Computation TSD Appendix, JA__. In 2005, the aggregate rate was 1,986. Clean Air Markets Program Data: EIA, form EIA-923 and detailed data, www.eia.gov/electricity/data/eia923. EPA gave no credit to that 11% rate decrease, despite the fact that, in 2012, the North Carolina rate

for coal units was the lowest in the country and its rate for gas facilities the eighth lowest.

North Carolina is being penalized for its exemplary record of clean energy generation well in advance of EPA's efforts a decade later.

CONCLUSION

For the foregoing reasons, as well as those set forth in the Core Issues Brief, the petitions should be granted and the Rule vacated.

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CERTIFICATE OF COMPLIANCE

Pursuant to Rule 32(a)(7)(C) of the Federal Rules of Appellate Procedure and Circuit Rules 32(a)(1) and 32(a)(2)(C), I hereby certify that the foregoing Opening Brief of Petitioners on Procedural and Record-Based Issues contains 19,723 words, as counted by a word processing system that includes headings, footnotes, quotations, and citations in the count, and therefore is within the word limit set by the Court.

Dated: February 19, 2016 /s/ Thomas A. Lorenzen
Thomas A. Lorenzen

CERTIFICATE OF SERVICE

I hereby certify that, on this 19th day of Februar y 2016, a copy of the foregoing Opening Brief of Petitioners on Procedural and Record-Based Issues was served electronically through the Court's CM/ECF system on all ECF-registered counsel.

/s/ Thomas A. Lorenzen

Thomas A. Lorenzen

To: Jordan, Deborah[Jordan.Deborah@epa.gov]
From: Goffman, Joseph
Sent: Mon 2/22/2016 10:29:11 PM
Subject: FW: Meeting Request for Group of Agricultural Producers
WAPA Meeting Request- Joe Goffman Office of Air and Radiation.docx

I've always wanted to be Debbie Jordan when I grew up and it looks like this is my chance...

From: Crescinda Pinskey [mailto:cpinskey@cj-lake.com]
Sent: Monday, February 22, 2016 5:27 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Priscilla Rodriguez <priscilla@agprocessors.org>
Subject: Meeting Request for Group of Agricultural Producers

Good Afternoon Joe,

Attached is a meeting request for President of the Western Agricultural Processors Association (WAPA) Roger Isom, WAPA Director of Technical Services Chris McGlothlin, WAPA Safety Specialist Priscilla Rodriquez, President of the Central California Almond Growers Association Michael Kelley, and Grower Relations Manager of Horizon Nut Company Kirk Squire.

They will be in DC on Wednesday, March 2nd and available for meetings between 9:00 am and 12:00 pm.

The representatives from these four major agricultural producers would like to discuss the ozone standard and what it means for the California Valley Air District and more specifically, for agriculture.

Please let me know if you are available on this day and preferred time.

Thank you for your attention to this request,

--

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MEMORANDUM

Date: February 22, 2016

To: Senior Counsel, EPA Office of Air & Radiation
Joseph Goffman

Email: goffman.joseph@epa.gov

From: Lynn Jacquez

Re: Meeting Request

Representatives from four major agricultural producers will be in Washington, DC on Wednesday, March 2nd, 2016 and would like to discuss the ozone standard and what it means both for the California Valley Air District and more specifically, for agriculture.

Representatives that will be in attendance:

- Michael Kelley, Central California Almond Growers Association
- Kirk Squire, Horizon Nut Company
- Roger A. Isom, Western Agricultural Processors Association
- Christopher McGlothlin, Western Agricultural Processors Association
- Priscilla Rodriquez, Western Agricultural Processors Association

The group will be available for a meeting Wednesday morning between 9:00 am and 12:00 pm.

From: Goffman, Joseph
Location: 1150 Connecticut Avenue, NW, Washington, DC 20036
Importance: Normal
Subject: PCA Environment & Energy Committee Meeting
Categories: Green Category
Start Date/Time: Wed 2/10/2016 7:30:00 PM
End Date/Time: Wed 2/10/2016 8:15:00 PM
FW: PCA Environment Committee Meeting
Joseph Goffman Event Form_10 15.docx

Joseph Goffman Event Form_10 15.docx

From: Goffman, Joseph
Location: 1150 Connecticut Avenue, NW, Washington, DC 20036
Importance: Normal
Subject: PCA Environment & Energy Committee Meeting
Categories: Green Category
Start Date/Time: Wed 2/10/2016 7:30:00 PM
End Date/Time: Wed 2/10/2016 8:15:00 PM
FW: PCA Environment Committee Meeting
Joseph Goffman Event Form_10 15.docx

Joseph Goffman Event Form_10 15.docx

To: Tsirigotis, Peter[Tsirigotis.Peter@epa.gov]; Niebling, William[Niebling.William@epa.gov]
From: Goffman, Joseph
Sent: Thur 2/4/2016 7:06:27 PM
Subject: Fwd: Final Supplemental Declaration
Harvey_SuppDecl_SupCt_2.3.16_final_signed.pdf
ATT00001.htm

For awareness

- Joseph Goffman
Sent from my iPhone

Begin forwarded message:

From: "Drinkard, Andrea" <Drinkard.Andrea@epa.gov>
Date: February 4, 2016 at 12:51:07 PM EST
To: "McCabe, Janet" <McCabe.Janet@epa.gov>, "Goffman, Joseph" <Goffman.Joseph@epa.gov>
Subject: Fwd: Final Supplemental Declaration

Andrea Drinkard
(o) 202.564.1601
Personal cellphone number

Begin forwarded message:

From: "Zenick, Elliott" <Zenick.Elliott@epa.gov>
Date: February 4, 2016 at 12:10:02 PM EST
To: "Schmidt, Lorie" <Schmidt.Lorie@epa.gov>, "Millett, John" <Millett.John@epa.gov>, "Drinkard, Andrea" <Drinkard.Andrea@epa.gov>
Subject: FW: Final Supplemental Declaration

From: Schramm, Daniel
Sent: Thursday, February 04, 2016 9:59 AM
To: Shenkman, Ethan <Shenkman.Ethan@epa.gov>
Cc: Zenick, Elliott <Zenick.Elliott@epa.gov>
Subject: Final Supplemental Declaration

Ethan,

This is the final, signed version of the declaration. Enjoy!

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U.S. EPA Office of General Counsel

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The contents of this message may be subject to the attorney-client, work-product, or deliberative process privileges.

IN THE SUPREME COURT OF THE UNITED STATES OF AMERICA

STATE OF WEST VIRGINIA, ET AL. Applicants, v. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, ET AL. Federal Respondents.	)	No. 15A773 (and consolidated cases)

SUPPLEMENTAL DECLARATION OF REID P. HARVEY

Introduction

1. I, Reid P. Harvey, declare under penalty of perjury under the laws of the United States of America that the following statements are true and correct to the best of my knowledge and belief and that they are based upon my personal knowledge, or on information contained in the records of the United States Environmental Protection Agency (EPA), or on information supplied to me by EPA employees.

2. I am the Director of the Clean Air Markets Division in the Office of Atmospheric Programs within the Office of Air and Radiation at EPA. I am familiar with the records and files in the Division's possession relating to the modeling for the Clean Power Plan. The remainder of my qualifications, education, and experience are set out in my declaration filed with EPA's Opposition to Motions to Stay Final Rule,

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before the D.C. Circuit Court of Appeals, No. 15-1363 (filed Dec. 3, 2015).

3. My declaration to the D.C. Circuit Court of Appeals explained the modeling the Agency conducted for the Clean Power Plan (the Rule or CPP) and responded to a number of mischaracterizations of the modeling in the Movants' motions and attached declarations. The purpose of this declaration is to provide a brief response to the Stay Applicants' continued assertions before this Court that the modeling for the Rule somehow demonstrates that irreparable harm will occur, particularly in the form of power plant retirements during the pendency of litigation. First, I will explain the results of a high-level review we conducted regarding the units identified by an industry consultant as retiring in 2016; we could not locate any information suggesting planned closures of the vast majority of these units, and none that were attributed to the Rule. Second, I will summarize the comments just submitted by many of the Utility Applicants on the Cross-State Air Pollution Rule (CSAPR) Update proposed rule published on Dec. 3, 2015[1]; contrary to their representations in this litigation, the utilities specifically identify units they allege our modeling shows as retiring, which they now make clear they have no intention of actually retiring.

Review of Alleged Retirements in EVA Report Exhibit 29

4. Applicants cite to the Schwartz Declaration and a report by Energy Ventures Analysis, Inc., Evaluation of the Immediate Impact of the Clean Power Plan Rule on

[1] U.S. EPA, Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS, Proposed Rule (EPA-HQ-OAR-2015-0500), 80 Fed. Reg. 75706 (Dec. 3, 2015).

ED_000738_00004335-00002

the Coal Industry (October 2015) ("EVA Report"). *See* Utility Stay Appl. at 3. In the EVA Report, Mr. Schwartz claims to have identified specific plants that EPA's model, the Integrated Planning Model (IPM), predicts will shut down as a result of the Clean Power Plan in 2016. EVA Report, at 62 (Exhibit 29). Schwartz uses these units in a section of the EVA Report titled "…Specific and Immediate Harm to Coal Companies" and presents them as evidence of real world immediate harm implications. My staff have conducted a thorough review of public information, regarding these plants and determined that, while there is a continuing trend of some aging unit retirements due to market conditions and non-CPP related factors, the vast majority of these units will continue to be available to generate power and have not retired nor have announced plans to retire. First, we looked at the latest EIA 923 monthly data available on February 2, 2016 and determined that many of these units continued to report generation post-Clean Power Plan signature date of August 3, 2015.[2] Next, EPA reviewed its latest National Electricity Energy Dataset (NEEDS) which reflects research by EPA and ICF, as well as recent public comments and feedback. This included feedback on the Notice of Data Availability (NODA) of EPA's inventory of available units used in our interstate ozone transport modeling.[3] This NODA provided an inventory of units that EPA anticipated to be available for

[2] U.S. Energy Information Administration (EIA), http://www.eia.gov/electricity/data/eia923/ (last visited Feb. 2, 2016).
[3] Comments available at www.regulations.gov under docket EPA-HQ-OAR-2015-0500.

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load service in 2016.[4] Stakeholders had the opportunity to comment on the operating status (including whether retired) of each unit. Next, EPA contacted SNL Financial, an energy company research service that provides energy information by integrating news, data, and analytics in real time on a web-based platform.[5] EPA used SNL data sources to research the operating status (e.g., retired, operating, etc.) of each unit listed in Exhibit 29. In an effort to identify any real-time or breaking announcements, EPA also conducted internet searches on each plant listed and the word "retirement" and reviewed press articles containing those two keywords. Upon completion of this initial review, we had other staff complete an independent review of these and other possible sources of information for purposes of preparing this declaration, in order to ensure the highest accuracy possible (recognizing the inherent difficulty of proving a negative).

5. This examination of four different data and news sources and other public information, through two separate reviews, leads me to believe that most of these units have neither retired nor announced any plans to retire. Moreover, EPA's review of available information suggests that not one of the units that the EVA Report lists in Exhibit 29 has actually retired or announced a retirement due to the Rule. Only a very small number of plants appear to have publicly announced a closure in 2016, and

[4] U.S. EPA, Notice of Data Availability of the Environmental Protection Agency's Updated Ozone Transport Modeling Data for the 2008 Ozone National Ambient Air Quality Standard (NAAQS), 80 Fed. Reg. 46,271 (Aug. 4, 2015).
[5] SNL, www.snl.com (last visited Feb. 2, 2016).

in each of those cases, the cause was not the Clean Power Plan. The only unit on the list that has announced a retirement post-Rule promulgation is the Martin Drake unit, slated for retirement in 2018 under an Electric Integrated Resource Plan for Colorado Springs initiated in 2014.[6] Another closure, the Plant Barry retirement and coal-to-gas switch was announced well in advance of the Rule, and company representatives cited non-Rule related motivating factors including legal actions dating back to 1999.[7] EPA also found that units at Alabama Power's Greene County Steam Plant announced intentions to shift to natural gas in 2014, well before the final Rule.[8] Based on our review, and because changes in a power plant's status are often announced well in advance of actual closure or modifications, it appears that few, if any plants, listed in Exhibit 29 will actually retire in the near future, and for those that may, the reasons are not attributable to the Rule.

Summary of Utility Comments Submitted on the CSAPR Update Rule

6. To make its case that the Rule will cause imminent coal plant shutdowns, the Utilities' Application further relies on declarations filed by certain specific companies in the court below. For example, the Application cites to declarations filed by the

---

[6] Colorado Springs Utilities, Electric Integrated Resource Plan, https://www.csu.org/Pages/eirp-r.aspx (last visited Feb. 2, 2016).

[7] Dennis Pillion, AL.com, *Alabama Power agrees to shutter 3 coal-fired units, convert 4 others to natural gas in EPA deal* (June 25, 2015), http://www.al.com/news/index.ssf/2015/06/epa_alabama_power_agree_to_set.html (last visited Feb. 2, 2016).

[8] Justin Averette, Demopolis Times, *Greene County Steam Plant to switch to Natural Gas, Cut Staff in Half* (Aug. 1, 2014), http://www.demopolistimes.com/2014/08/01/greene-county-steam-plant-to-switch-to-natural-gas-reduce-staff-size-in-half/ (last visited Feb. 2, 2016).

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Southern Company and its subsidiaries, Georgia Power, Alabama Power, Gulf Power, and Mississippi Power, to make the case that the Rule could cause "the immediate closure of 20% of the Southern Company's existing coal-fired fleet." Utility Stay Appl. at 16. This assertion appears to be predicated on an incorrect interpretation of near-term Model projections and not the requirements under the Rule. My declaration to the D.C. Circuit explains why the Model results cannot be used in that fashion. The latest information available to the agency (as summarized in the paragraphs to follow) further shows that this prediction has not been borne out in the real world.

7. I will highlight comments EPA just received on the proposed CSAPR Update rule published December 3, 2015, in which a number of Utility Applicants specifically identify plants that they say they have no intention of retiring, but which they claimed in this litigation will be forced to shut down by the Rule. These comments were submitted in response to our discussion in the CSPAR Update proposed rule of whether to include the CPP in the CSAPR modeling in light of the uncertainties regarding near-term modeling projections for the CPP.[9] EPA received comments on

[9] These comments belie a misstatement in the Second Schwartz Declaration, cited in Utility Stay Appl. at 19, that the agency is not taking comment and that the CPP "will" be included in EPA's modeling for a separate rulemakings, the Cross-State Air Pollution Rule (CSAPR) Update. Utility Applicants assert that EPA is "relying" on CPP modeling to set more stringent emission budgets in the CSAPR Update. *See id.* (citing Schwartz Second Decl. ¶¶ 28-31). In fact, Mr. Schwartz was quoting a pre-final version of the regulatory text without citation. The text published in the Federal Register actually says that EPA "may include updated or different assumptions about the inclusion of the CPP." 80 Fed. Reg. 75706, 75722 (Dec. 3, 2015). As I stated in my declaration, Harvey Decl. ¶ 29 n. 5, ¶ 38 n. 6, the agency *is* taking comment on this issue, and is seriously weighing whether to include the CPP in the CSAPR modeling.

this issue from numerous utilities who are Applicants in this litigation, who identified results derived from a disaggregation analysis of the near term IPM modeling outputs that they believe do not accurately reflect their units' status in the near-term period of 2016-2019.[10]

8. In general, virtually all utilities or their representative trade groups, requested the agency not to include the Clean Power Plan in the base case modeling for the CSAPR Update final rule due to the inherent uncertainties in CPP implementation, and they identified unit-specific modeled retirements occurring in 2016 or 2018 included in the modeling for the CSAPR Update proposed rule that are not currently expected to occur. In the Arkansas Electric Cooperative's view, "any effects from the CPP prior to 2020 are essentially nonexistent." Ark. Elec. Coop. CSAPR Comments (EPA-HQ-OAR-2015-0500-0260), at 5-6.[11]

9. The Utility Air Regulatory Group (UARG) requested that the CPP not be included in the base case modeling for the CSAPR Update final rule because the CPP modeling assumes the retirement of an amount of coal-fired generation by 2018 "that in fact will *not* be retired by that time." UARG CSAPR Update Comments (EPA-HQ-OAR-2015-0500-0253), at 38 (emphasis in original). UARG's comments also included

[10] As explained in my first declaration, detailed plant-level modeling results do not impinge the overall reasonableness and usefulness of the model in providing EPA and the public a broader assessment of the potential impacts of its regulatory actions. It is perfectly consistent to use the model to provide illustrative scenarios of the Rule's effects in the 2020-2030 timeframe, while recognizing unit operators may make different choices than the model simulates for model plants. *See* Harvey Decl. ¶¶36-38.

[11] All comments discussed in this section were received by the Agency on February 1, 2016.

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an expert report (as an Appendix to Attachment 2) which canvassed UARG's utility membership regarding which units identified as retiring in EPA's modeling would, in fact, be either operating as a coal unit or converting to natural gas in the 2016-2018 time frame. My staff compared the units identified in the UARG expert report with the list of the fifty-six units identified by Mr. Schwartz in his Exhibit 29. Of those fifty-six units, the UARG Appendix contained information on thirty-eight. Of those thirty-eight, all but one were listed as expecting to continue operating as coal units in 2016 and 2018. In other words, UARG's own submission to EPA demonstrates that of the units on which it has information that form the basis for the Utility Applicant's theory of irreparable harm due to a modeled retirement in 2016, 97% will in fact continue to be operating as coal units at least until 2018. *See* UARG CSAPR Update Comments, Attachment 2, Appendix.

10. In addition, specific utilities submitted comments on the CSAPR Update proposal regarding the status of their units that are not consistent with their characterization of the imminent consequences of the Rule set forth in their declarations in this litigation. The Southern Company, for example, identified several plants in its comments on the proposed CSAPR Update rule that they say they are not planning on retiring by 2018, such as Bowen Units 1-4 and Hammond Units 1-4. Southern Company CSAPR Comments (EPA-HQ-OAR-2015-0500-0290), at 39. These same units were listed in Southern subsidiary Georgia Power's declaration in this litigation as retiring in 2016 under the Rule. *See* Pemberton Decl. ¶ 13. But

according to its comments on the proposed CSAPR Update, Southern Company has no intention of actually retiring these or a number of other units it identifies, belying their declarants' expectations of the irreparable harm that will befall them imminently due to the Rule.

11. Similarly, Luminant's comments on the CSAPR Update proposed rule request not including CPP in the final CSAPR modeling due to the uncertainties relative to the CPP in implementation, which are magnified "by the fact that [state] implementation plans have not been proposed." Luminant CSAPR Comments (EPA-HQ-OAR-2015-0500-0262), at 14. In particular Luminant points out the model used in the CSAPR Update proposal "assumes too many coal-fired retirements in 2016, including assuming that Luminant's Monticello units are retired, *when they are not.* EPA's base case must factor in real-world retirements instead of incorrect assumptions …." *Id.* (emphasis added). However, in Luminant's representative's declaration in this litigation, the alleged retirement of the Monticello units is portrayed as an irreparable harm caused by the Rule. *See* Frenzel Decl. ¶ 40.

12. Utilities owning a number of units included in the industry consultant's Exhibit 29 list (see above), also submitted comments on the CSAPR Update proposal identifying units that they say will not be retiring in 2016. *See, e.g.,* OGE CSAPR Comment (EPA-HQ-OAR-2015-0500-0265), at 4 ("Muskogee Units 4 and 5 will be capable of firing coal in 2017 and 2018 and available … for dispatch."); TVA CSAPR Comment (EPA-HQ-OAR-2015-0500-0261), at 7 ("[T]he following units . . . are

indicated as retired in 2016 which will in fact be operational in 2017: Shawnee units 1-9, Johnsonville units 1-4, Allen units 1-3, and Gallatin units 1-4."); Entergy CSAPR Comment (EPA-HQ-OAR-2015-0500-0252), at 14 ("The [modeling] results predict several [Entergy-owned] EGU retirements by 2018 . . . . However, . . . *none of these plants have any plans to retire coal by 2018*.") (emphasis added).

13. Further, a number of other utilities commenting on the CSAPR Update proposed rule took the position that it was inappropriate to factor in modeled unit closures from CPP since "compliance with the CPP is not required until 5 years after the 2017 compliance date for the update to CSAPR." Wisconsin Electric Power Company and Wisc. Public Service Corp. CSAPR comment (EPA-HQ-OAR-2015-0500-0297), at 9. Further, the American Public Power Association (APPA) notes that it "has surveyed several of its members potentially impacted by the Proposed Rule; none have reported plans to retire affected EGUs in the 2016 and 2017 time frame." APPA CSAPR Comment (EPA-HQ-OAR-2015-0500-0259), at 5.[12]

[12] *See also* The American Electric Power (AEP) Company (EPA-HQ-OAR-2015-0500-0256), at 4-5; DTE Energy (EPA-HQ-OAR-2015-0500-0272), at 2; Talen (EPA-HQ-OAR-2015-0500-0257), at 8; Louisville Gas & Electric/Kentucky Utilities (EPA-HQ-OAR-2015-0500-0271), at 2; Duke Energy (EPA-HQ-OAR-2015-0500-0274), at 5-8; Consumers Energy (EPA-HQ-OAR-2015-0500-0276), at 1-2; Alliant Energy (EPA-HQ-OAR-2015-0500-0244), at 2-3; Dynegy (EPA-HQ-OAR-2015-0500-0275), at 2; Dominion (EPA-HQ-OAR-2015-0500-0258), at 8-9; Ohio Utilities (including AEP, Buckeye Power, Dayton Power & Light, FirstEnergy, Duke Energy, Dynegy and the Ohio Valley Electric Corporation) (EPA-HQ-OAR-2015-0500-0255), at 2; and Class of '85 Regulatory Response Group (representing numerous utilities) (EPA-HQ-OAR-2015-0500-0264), at 14-16.

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Consistency of the Rule with Industry Trends

14. Stay Applicant Utilities state, "EPA estimates that, as a result of the rule, coal-fired generation will fall nearly 50% from current levels," and they cite to EPA's Regulatory Impact Analysis (RIA) for the Rule, at 2-3, 3-24 (Aug. 2015).[13] *See* Utility Stay Appl. at 7. The assertion that the Rule will cause coal-fired generation to fall nearly 50% from current levels is incorrect and not derivable from the RIA or the cited sources. On the contrary, the analysis conducted by EPA indicates that the Rule is in line with current trends in the industry. For example, coal fired generation has fallen from 50% of total generation in 2005 to as low as 37% in 2012.[14] In fact, 2015 will likely produce the lowest levels of coal generation since 2001. In the first eleven months of 2015 (for which EIA has reported data publicly as of January 30, 2016), coal fired generation accounted for 34% of the total, not very different from EPA's projections. This coincides with historically low natural gas prices in 2015, the lowest prices seen domestically since 1999.[15]

15. Similarly, renewable energy is projected to be built at approximately the same rate with or without the CPP. RIA Tables 3-12 and 3-14. The trend towards more renewable energy was reinforced by Congress at the end of last year, when it extended

[13] U.S. EPA, CPP RIA, available at www.epa.gov/cleanpowerplan/clean-power-plan-final-rule-regulatory-impact-analysis (last visited Feb. 2, 2016).
[14] U.S. EIA, Electricity Data, http://www.eia.gov/electricity/data.cfm (last visited Feb. 2, 2016).
[15] U.S. EIA, Today in Energy (Jan. 5, 2016), http://www.eia.gov/electricity/data.cfm (last visited Feb. 2, 2016).

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the tax credits for wind and solar electricity generation. The tax credits, valued at about $25 billion over five years, are expected to drive $38 billion of investment in solar and $35 billion in wind through 2021 irrespective of the CPP, according to Bloomberg New Energy Finance (BNEF). ""This is massive,' said Ethan Zindler, head of U.S. policy analysis at BNEF. In the short term, the deal will speed up the shift from fossil fuels more than the global climate deal struck this month in Paris and more than Barack Obama's Clean Power Plan that regulates coal plants, Zindler said."[16]

16. EPA projects that with the Rule, in 2030 coal-fired generation will represent 27.4% of total generation—only 5.4% less than projected without the Rule, *see* RIA 3-27, Table 3-11. Further, this anticipated decrease is less than the decrease in annual coal-fired generation that has been observed in the power sector over the last 10 years.

February 3, 2016

Reid P. Harvey

[16] Tom Randall, BloombergBusiness, *What Just Happened in Solar is a Bigger Deal than Oil Exports* (Dec. 17, 2015), http://www.bloomberg.com/news/articles/2015-12-17/what-just-happened-to-solar-and-wind-is-a-really-big-deal (last visited Feb. 2, 2016).

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To: McCoy, Britney[McCoy.Britney@epa.gov]; Cyran, Carissa[Cyran.Carissa@epa.gov]
Cc: McCabe, Janet[McCabe.Janet@epa.gov]
From: Goffman, Joseph
Sent: Wed 2/3/2016 7:27:51 PM
Subject: CSAPR Date Change FR revised 2016-02-02 redline_v2 jg
CSAPR Date Change FR revised 2016-02-02 redline_v2 jg.docx

A tweak to reduce further the risk of the response on the comment coming across as harsh. Thanks.

To: Stewart, Lori[Stewart.Lori@epa.gov]; Niebling, William[Niebling.William@epa.gov]; Dunham, Sarah[Dunham.Sarah@epa.gov]; Harvey, Reid[Harvey.Reid@epa.gov]; Culligan, Kevin[Culligan.Kevin@epa.gov]; Tsirigotis, Peter[Tsirigotis.Peter@epa.gov]
From: Goffman, Joseph
Sent: Tue 1/26/2016 2:11:48 PM
Subject: Fwd: CEIP_preamble_1 21 16_FAR djjm.docx
CEIP_preamble_1 21 16_FAR djjm.docx
ATT00001.htm

- Joseph Goffman
Sent from my iPhone

Begin forwarded message:

From: "McCabe, Janet" <McCabe.Janet@epa.gov>
Date: January 25, 2016 at 7:32:04 PM EST
To: "Jordan, Deborah" <Jordan.Deborah@epa.gov>, "Goffman, Joseph" <Goffman.Joseph@epa.gov>, "McCoy, Britney" <McCoy.Britney@epa.gov>
Subject: CEIP_preamble_1 21 16_FAR djjm.docx

Here are my comments on top of Debbie's (randomly chosen). While this is clearly written, it is very complicated to explain—I found myself having to read sections two and three times to follow them. Not sure what we do about that…..

Deliberative

Britney, can you please forward this along to whatever person or group of persons is waiting for it?

Thanks.

To: joegoffman Personal email address
From: Goffman, Joseph
Sent: Thur 1/21/2016 11:07:42 PM
Subject: FW: API and AFPM Petition for Initial Reconsideration and Targeted Stay Request of Refinery Sector Rule
removed.txt
2016 01 19 API and AFPM Refinery Sector Rule Initial Reconsideration and Stay Request Final.pdf

From: Howard Feldman [mailto:Feldman@api.org]
Sent: Thursday, January 21, 2016 5:18 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: John Wagner <Wagner@api.org>; Matthew Todd <ToddM@api.org>
Subject: FW: API and AFPM Petition for Initial Reconsideration and Targeted Stay Request of Refinery Sector Rule
Importance: High

Joe,

Hope you are doing well in 2016. Somehow you were not on our list to receive the attached stay request -- sorry. Let me know if you have a few minutes to discuss this request with us. (I'm sure I have no meetings tomorrow ;-).

Howard

Howard J. Feldman

Senior Director

Regulatory & Scientific Affairs
1220 L Street, NW
Washington, DC 20005-4070
USA
Telephone 202-682-8340
Fax 202-682-8270
E-mail feldman@api.org

From: Matthew Todd
Sent: Tuesday, January 19, 2016 1:32 PM
To: Gina McCarthy (mccarthy.gina@epa.gov)
Cc: Howard Feldman; John Wagner; David Friedman (dfriedman@afpm.org); Richard Moskowitz (RMoskowitz@afpm.org); Janet McCabe (McCabe.janet@Epa.gov); Steve Page (page.steve@epa.gov); Peter Tsirigotis (tsirigotis.peter@epa.gov); Penny Lassiter (lassiter.penny@epa.gov); Brenda Shine (shine.brenda@epa.gov)
Subject: API and AFPM Petition for Initial Reconsideration and Targeted Stay Request of Refinery Sector Rule
Importance: High

Dear Administrator McCarthy:

The American Petroleum Institute and the American Fuel & Petrochemical Manufacturers respectfully submit the attached request that the EPA reconsider certain aspects of the final rule entitled "Petroleum Refinery Sector Risk and Technology Review and New Source Performance Standards; Final Rule," published at 80 FR 75178. In addition to our request for administrative reconsideration of the issues described in the attached, we also ask for an administrative stay of those requirements pursuant to section 307(d)(7)(B) of the Clean Air Act. We further request that EPA expedite the reconsideration proceeding so that it can be completed prior to expiration of the 3-month stay authorized by § 307(d)(7)(B).

We appreciate the hard work that EPA has put into understanding our operations throughout the development of this rule and appreciate your consideration of this request.

Sincerely,

Matthew Todd, on behalf of Howard Feldman and AFPM's David Friedman

Matthew Todd

API

202.682.8319

To: Niebling, William[Niebling.William@epa.gov]
From: Goffman, Joseph
Sent: Thur 1/21/2016 8:18:28 PM
Subject: Fwd: January 20 -- E&E Daily is ready

Can somebody please look at this report and find EEI's submission? Thanks

- Joseph Goffman
Sent from my iPhone

Begin forwarded message:

From: "McCabe, Janet" <McCabe.Janet@epa.gov>
Date: January 20, 2016 at 11:10:12 PM EST
To: "Goffman, Joseph" <Goffman.Joseph@epa.gov>
Subject: FW: January 20 -- E&E Daily is ready

NOTE THE PASSAGE I MARKED BELOW—EEI?

REGULATIONS:

Groups slam EPA rules in scathing Senate report

Hannah Hess, E&E reporter

Published: Wednesday, January 20, 2016

The Senate Homeland Security and Governmental Affairs Committee found environmental regulations ranked chief among the concerns of industry leaders in a monthslong outreach project.

U.S. EPA's recently adopted ozone standard, the Waters of the U.S. (WOTUS) rule and permitting rules for greenhouse gases drew the most criticism from 49 private-sector stakeholders who offered feedback on the federal government's expansive regulatory system in response to a request from the Senate watchdogs.

Since Republicans took control of the chamber last January, panel Chairman Ron Johnson (R-Wis.) has been exploring how to cut red tape (*E&E Daily*, Jan. 23, 2015). The 1,036-page report released last week represents an effort to better understand the "real-world" effects of rulemaking and inform legislative proposals for regulatory reform.

In March, leaders of the subcommittee with jurisdiction over regulatory affairs, Sens. James Lankford (R-Okla.) and Heidi Heitkamp (D-N.D.), joined Johnson and full committee ranking member Tom Carper (D-Del.) to solicit input from organizations representing industry, labor unions and environmental advocates. They sent letters asking stakeholders to identify older rules that needed to be updated or eliminated, explain the impact of any significant rulemaking delays on "your business or members of your organization," and suggest improvements.

Fifteen respondents noted concerns about the National Ambient Air Quality Standards, including the National Association of Manufacturers, Society of the Plastics Industry, Brick Industry Association and American Farm Bureau Federation, which warned the stringent air standards would make it "harder to stay in business."

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Twelve respondents commented negatively on the expanded definition of WOTUS, noting it "vastly expands the regulatory scope of the federal government beyond protectable downstream U.S. waters," according to the report. ConocoPhillips Co., the U.S. Chamber of Commerce, the American Petroleum Institute and the National Black Chamber of Commerce were among the critics.

"Only after the proposed rule was published did affected entities understand that the proposed WOTUS definition clarifies nothing, and actually makes it more difficult (if not impossible) to understand if and how the rule would apply in the real world," wrote Harry Alford, the black chamber's president. "This significant uncertainty will delay, or stop altogether, projects across the country; and will add untold investigation, engineering and permitting costs for projects that are ultimately pursued."

On greenhouse gas reporting requirements and attempts to reduce emissions, the American Iron and Steel Institute's Thomas Gibson expressed concern that the new regulations "will lead to a less affordable and reliable electricity supply."

The Edison Electric Institute, representing all U.S.-investor-owned electric companies, and 10 other groups submitted similar responses on the Clean Power Plan.

Groups representing labor organizations, environmental protection and consumers, like the Natural Resources Defense Council and Waterkeeper Alliance, weighed in with strong support for the value of many regulations to protect public health and public safety. Several of them also raised concerns about the regulatory process, including implementation timelines, pointing to instances when delays led to adverse impacts.

United Steelworkers blasted the timetable for the long-delayed Occupational Safety and Health Administration regulation on exposure to crystalline silica.

"The passage of time and the advances in science and technology have rendered the 1971 standard weak and inadequate to properly protect worker health," said Anna Fendley, the group's legislative representative. "Unfortunately, the updated silica standard is a classic example of delays in the regulatory process that cost lives."

Respondents also took aim at workplace regulations from the Labor Department and financial regulations arising from the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act. But the bulk of the comments related to EPA mandates.

"In recent years, EPA has used the [Clean Air Act] as a battering ram to further the administration's ambitious environmental agenda. In the Agency's rush to promulgate as many pollution control rules as possible in a short period of time, mistakes have been made and deliberate oversights have gone

uncorrected," the Council of Industrial Boiler Owners responded.

Exxon Mobil Corp. complained that regulations for the renewable fuel standard are "unrealistic, unworkable and should be repealed." The company cited Congressional Research Service estimates that by 2022, the RFS could increase food costs for Americans by $4 billion annually.

National Mining Association President Hal Quinn slammed the Mercury and Air Toxics Standards' rulemaking process.

"The MATS regulation -- the most expensive in EPA history -- is a poster child for unbalanced regulations that dismiss the real costs and inflate the benefits to convince the public that the enormous expense is justified," Quinn stated in his response.

Though the committee's report does not suggest specific legislation, Johnson noted it was "just the start of our important work on regulatory issues." After four full committee hearings and several subcommittee roundtables in 2015, he said he hopes to move reform proposals forward with bipartisan support in the next year.

"Though we may disagree on specific points, many of us fundamentally agree that the current regulatory system is just too burdensome to the American economy and in need of common-sense changes," Johnson said.

From: E&E Publishing [mailto:ealerts@eenews.net]
Sent: Wednesday, January 20, 2016 7:53 AM
To: McCabe, Janet <McCabe.Janet@epa.gov>
Subject: January 20 -- E&E Daily is ready

Read today's E&E Daily on the web

AN E&E PUBLISHING SERVICE

E&E DAILY — Wed., January 20, 2016

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Bishop's Utah bill aims big on conservation, development

House Natural Resources Chairman Rob Bishop (R-Utah) today will unveil a draft bill for eastern Utah to designate roughly 2.2 million acres of wilderness, create vast motorized recreation areas and expedite the development of oil, gas and minerals, according to a draft obtained by *E&E Daily*.

ON THE HILL

2. ENERGY POLICY:

Iran oil angst may surface on Senate floor this week

3. ENDANGERED SPECIES:

Amendment to sportsmen's bill would delist wolves

4. REGULATIONS:

Groups slam EPA rules in scathing Senate report

5. COAL:

Republicans launch war on mine leasing moratorium

6. BUDGET:

Rising deficit could make tax change a long shot in 2016

7. PUBLIC LANDS:

Grijalva seeks changes to how CBO scores sales

8. WATER POLLUTION:

Colo. delegation floats bipartisan mine cleanup bill

9. CLEAN WATER RULE:

Obama vetoes resolution blocking new standards

POLITICS

10. FLINT CRISIS:

Dem senators want state to act first, as governor apologizes

11. CAMPAIGN 2016:

Iowa governor rejects Cruz over ethanol mandate

E&ETV'S ONPOINT

12. OIL AND GAS:

API's Gerard talks future of U.S. industry amid market, regulatory challenges

UPCOMING HEARINGS AND MARKUPS

13. CALENDAR:

Activity for January 18 - January 24, 2016

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To: McCabe, Janet[McCabe.Janet@epa.gov]
From: Goffman, Joseph
Sent: Thur 1/21/2016 4:30:16 AM
Subject: Re: January 20 -- E&E Daily is ready

Yes, so the article estates, but presumably it is possible to find the EEI contribution without reading all 1000 pages. Senate
Committees do not have the resources to draft 1000 pages of anything. So, let's
start with the hypothesis that the report includes a lengthy appendix reproducing the stakeholder submissions or failing that a list of citations to those submissions. I would rather do that first than simply call Brian
without seeing the report.

- Joseph Goffman
Sent from my iPhone

On Jan 20, 2016, at 11:25 PM, McCabe, Janet <McCabe.Janet@epa.gov> wrote:

It's 1000+ pages!

From: Goffman, Joseph
Sent: Wednesday, January 20, 2016 11:14 PM
To: McCabe, Janet <McCabe.Janet@epa.gov>
Subject: Re: January 20 -- E&E Daily is ready

Let's look at the report

- Joseph Goffman

Sent from my iPhone

On Jan 20, 2016, at 11:10 PM, McCabe, Janet <McCabe.Janet@epa.gov> wrote:

NOTE THE PASSAGE I MARKED BELOW—EEI?

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Hannah Hess, E&E reporter

Published: Wednesday, January 20, 2016

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Fifteen respondents noted concerns about the National Ambient Air Quality Standards, including the National Association of Manufacturers, Society of the Plastics Industry, Brick Industry Association and American Farm Bureau Federation, which warned the stringent air standards would make it "harder to stay in business."

Advertisement

Twelve respondents commented negatively on the expanded definition of WOTUS, noting it "vastly expands the regulatory scope of the federal government beyond protectable downstream U.S. waters," according to the report. ConocoPhillips Co., the U.S. Chamber of Commerce, the American Petroleum Institute and the National Black Chamber of Commerce were among the critics.

"Only after the proposed rule was published did affected entities understand that the proposed WOTUS definition clarifies nothing, and actually makes it more difficult (if not impossible) to understand if and how the rule would apply in the real world," wrote Harry Alford, the black chamber's president. "This significant uncertainty will delay, or stop altogether, projects across the country; and will add untold investigation, engineering and permitting costs for projects that are ultimately pursued."

On greenhouse gas reporting requirements and attempts to reduce emissions, the American Iron and Steel Institute's Thomas Gibson expressed concern that the new regulations "will lead to a less affordable and reliable electricity supply."

The Edison Electric Institute, representing all U.S.-investor-owned electric companies, and 10 other groups submitted similar responses on the Clean Power Plan.

Groups representing labor organizations, environmental protection and consumers, like the Natural Resources Defense Council and Waterkeeper Alliance, weighed in with strong support for the value of many regulations to protect public health and public safety. Several of them also raised concerns about the regulatory process, including implementation timelines, pointing to instances when delays led to adverse impacts.

United Steelworkers blasted the timetable for the long-delayed Occupational Safety and Health Administration regulation on exposure to crystalline silica.

"The passage of time and the advances in science and technology have rendered the 1971 standard weak and inadequate to properly protect worker health," said Anna Fendley, the group's legislative representative. "Unfortunately, the updated silica standard is a classic example of delays in the regulatory process that cost lives."

Respondents also took aim at workplace regulations from the Labor Department and financial regulations arising from the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act. But the bulk of the comments related to EPA mandates.

"In recent years, EPA has used the [Clean Air Act] as a battering ram to further the administration's ambitious environmental agenda. In the Agency's rush to promulgate as many pollution control rules as possible in a short period of time, mistakes have been made and deliberate oversights have gone uncorrected," the Council of Industrial Boiler Owners responded.

Exxon Mobil Corp. complained that regulations for the renewable fuel standard are "unrealistic, unworkable and should be repealed." The company cited Congressional Research Service estimates that by 2022, the RFS could increase food costs for Americans by $4 billion annually.

National Mining Association President Hal Quinn slammed the Mercury and Air Toxics Standards' rulemaking process.

"The MATS regulation -- the most expensive in EPA history -- is a poster child for unbalanced regulations that dismiss the real costs and inflate the benefits to convince the public that the enormous expense is justified," Quinn stated in his response.

Though the committee's report does not suggest specific legislation, Johnson noted it was "just the start of our important work on regulatory issues." After four full committee hearings and several subcommittee roundtables in 2015, he said he hopes to move reform proposals forward with bipartisan support in the next year.

"Though we may disagree on specific points, many of us fundamentally agree that the current regulatory system is just too burdensome to the American economy and in need of common-sense changes," Johnson said.

From: E&E Publishing [mailto:ealerts@eenews.net]
Sent: Wednesday, January 20, 2016 7:53 AM
To: McCabe, Janet <McCabe.Janet@epa.gov>
Subject: January 20 -- E&E Daily is ready

Read today's E&E Daily on the web

E&E DAILY — Wed., January 20, 2016

READ FULL EDITION

1.PUBLIC LANDS:

Bishop's Utah bill aims big on conservation, development

House Natural Resources Chairman Rob Bishop (R-Utah) today will unveil a draft bill for eastern Utah to designate roughly 2.2 million acres of wilderness, create vast motorized recreation areas and expedite the development of oil, gas and minerals, according to a draft obtained by *E&E Daily*.

ON THE HILL

2.ENERGY POLICY:
Iran oil angst may surface on Senate floor this week

3.ENDANGERED SPECIES:
Amendment to sportsmen's bill would delist wolves

4.REGULATIONS:
Groups slam EPA rules in scathing Senate report

5.COAL:
Republicans launch war on mine leasing moratorium

6.BUDGET:
Rising deficit could make tax change a long shot in 2016

7.PUBLIC LANDS:
Grijalva seeks changes to how CBO scores sales

8.WATER POLLUTION:
Colo. delegation floats bipartisan mine cleanup bill

9.CLEAN WATER RULE:
Obama vetoes resolution blocking new standards

POLITICS

10.FLINT CRISIS:
Dem senators want state to act first, as governor apologizes

11.CAMPAIGN 2016:
Iowa governor rejects Cruz over ethanol mandate

E&ETV'S ONPOINT

12.OIL AND GAS:
API's Gerard talks future of U.S. industry amid market, regulatory challenges

UPCOMING HEARINGS AND MARKUPS

13.CALENDAR:

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To: McCabe, Janet[McCabe.Janet@epa.gov]; Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]; Vaught, Laura[Vaught.Laura@epa.gov]; Rennert, Kevin[Rennert.Kevin@epa.gov]; Garbow, Avi[Garbow.Avi@epa.gov]
From: Goffman, Joseph
Sent: Thur 1/7/2016 3:49:52 PM
Subject: DOI PEIS TPs 1 7 16 v2
DOI PEIS TPs 1 7 16 v2.docx

With Cynthia's point added as bullet under Communications Approach

To: McCabe, Janet[McCabe.Janet@epa.gov]; Vaught, Laura[Vaught.Laura@epa.gov]; Garbow, Avi[Garbow.Avi@epa.gov]; Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]; Rennert, Kevin[Rennert.Kevin@epa.gov]; Distefano, Nichole[DiStefano.Nichole@epa.gov]
From: Goffman, Joseph
Sent: Thur 1/7/2016 3:21:12 PM
Subject: DOI PEIS TPs 1 7 16
DOI PEIS TPs 1 7 16.docx

To: McCabe, Janet[McCabe.Janet@epa.gov]
From: Goffman, Joseph
Sent: Thur 1/7/2016 1:00:30 AM
Subject: DOI PEIS TPs 1 6 16
DOI PEIS TPs 1 6 16.docx

To: Stewart, Lori[Stewart.Lori@epa.gov]
Cc: McCabe, Janet[McCabe.Janet@epa.gov]
From: Goffman, Joseph
Sent: Wed 12/9/2015 1:10:05 AM
Subject: EOYM OAR narrative and list 12 8 15jg
EOYM OAR narrative and list 12 8 15jg.docx

Some edits and comments, not including the changes Janet suggested. Thanks.

To: Davis, Alison[Davis.Alison@epa.gov]; Niebling, William[Niebling.William@epa.gov]
Cc: Cyran, Carissa[Cyran.Carissa@epa.gov]; Tsirigotis, Peter[Tsirigotis.Peter@epa.gov]; Cozzie, David[Cozzie.David@epa.gov]
From: Goffman, Joseph
Sent: Thur 12/3/2015 5:24:31 PM
Subject: O_G Hill draft letter v4 jg
O_G Hill draft letter v4 jg.docx

Great letter. Just a few typos and a CAA reference added. Thanks.

To: McCabe, Janet[McCabe.Janet@epa.gov]
Cc: Atkinson, Emily[Atkinson.Emily@epa.gov]; Cyran, Carissa[Cyran.Carissa@epa.gov]
From: Goffman, Joseph
Sent: Fri 11/6/2015 5:03:13 PM
Subject: OG_Path_Forward Options 11 4 15.pptx
OG_Path_Forward Options 11 4 15.pptx

To: Stewart, Lori[Stewart.Lori@epa.gov]
From: Goffman, Joseph
Sent: Fri 10/30/2015 2:56:39 AM
Subject: Fwd: Methane Piece(s)
OG Why not just turn the CTGs into 111(d) 10 29 15.docx
ATT00001.htm
OG_Path_Forward 10 29 2015 jgv3.pptx
ATT00002.htm
OG BLM-EPA_Crosswalk_10-08-15.docx
ATT00003.htm
OG Path Forward Supplemental 10 29 2015_final.pdf
ATT00004.htm

The three documents that are not the PowerPoint are the ones that it would be good to have a couple of copies of for our own reference. Thanks.

- Joseph Goffman
Sent from my iPhone

Begin forwarded message:

From: "Goffman, Joseph" <Goffman.Joseph@epa.gov>
Date: October 29, 2015 at 7:16:58 PM EDT
To: "McCabe, Janet" <McCabe.Janet@epa.gov>
Subject: Methane Piece(s)

1. PPT to present - AND FOR YOU TO EDIT THIS EVENING AND PASS ON TO GINA

2. BLM comparison for EPA reference

3. Q/A for EPA reference

4. Table of covered sources for EPA reference.

Joseph Goffman

Associate Assistant Administrator for Climate

and Senior Counsel

Office of Air and Radiation

US EPA

Washington, DC.

To: McCabe, Janet[McCabe.Janet@epa.gov]
From: Goffman, Joseph
Sent: Thur 10/29/2015 11:16:59 PM
Subject: Methane Piece(s)
OG Why not just turn the CTGs into 111(d) 10 29 15.docx
OG_Path_Forward 10 29 2015 jgv3.pptx
OG BLM-EPA_Crosswalk_10-08-15.docx
OG Path Forward Supplemental 10 29 2015_final.pdf

1. PPT to present - AND FOR YOU TO EDIT THIS EVENING AND PASS ON TO GINA

2. BLM comparison for EPA reference

3. Q/A for EPA reference

4. Table of covered sources for EPA reference.

Joseph Goffman

Associate Assistant Administrator for Climate

and Senior Counsel

Office of Air and Radiation

US EPA

Washington, DC.

To: Stewart, Lori[Stewart.Lori@epa.gov]
From: Goffman, Joseph
Sent: Thur 10/29/2015 10:55:40 PM
Subject: OG_Path_Forward 10 29 2015 jg.pptx
OG_Path_Forward 10 29 2015 jg.pptx

To: Stewart, Lori[Stewart.Lori@epa.gov]
From: Goffman, Joseph
Sent: Thur 10/29/2015 10:22:48 PM
Subject: Draft_OG_Path_Forward 10 29 2015 (00000002).pptx
Draft_OG_Path_Forward 10 29 2015 (00000002).pptx

To: Page, Steve[Page.Steve@epa.gov]
From: Goffman, Joseph
Sent: Thur 10/29/2015 4:40:07 PM
Subject: Fwd: Is there a chart comparing BLM to us?
Draft_BLM-EPA_Crosswalk_10-08-15.docx
ATT00001.htm

We will want to have a few copies of the available at our WH Methane meeting tomorrow, although not necessarily to distribute. So, let's put this in Gina's book with a note that this is for reference and is not the main presentation, which is still being worked on and will be delivered later today. Thanks.

- Joseph Goffman
Sent from my iPhone

Begin forwarded message:

From: "Gunning, Paul" <Gunning.Paul@epa.gov>
Date: October 29, 2015 at 12:35:32 PM EDT
To: "Cozzie, David" <Cozzie.David@epa.gov>, "Goffman, Joseph" <Goffman.Joseph@epa.gov>
Cc: "Tsirigotis, Peter" <Tsirigotis.Peter@epa.gov>, "Waltzer, Suzanne" <Waltzer.Suzanne@epa.gov>, "Franklin, Pamela" <Franklin.Pamela@epa.gov>
Subject: RE: Is there a chart comparing BLM to us?

He is the latest one that we used for our previous discussion with Janet a few weeks ago

From: Cozzie, David
Sent: Thursday, October 29, 2015 12:33 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Gunning, Paul <Gunning.Paul@epa.gov>; Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>
Subject: FW: Is there a chart comparing BLM to us?

Is this chart to which you were referring?

From: Moore, Bruce
Sent: Monday, October 26, 2015 10:50 AM
To: Cozzie, David <Cozzie.David@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>

Subject: RE: Is there a chart comparing BLM to us?

Yep. Suzie had put one together (attached) but may have updated it.

B

Bruce Moore

Senior Technical Advisor - Oil & Natural Gas Sector

Office of Air Quality Planning and Standards

U.S. Environmental Protection Agency

Research Triangle Park, NC 27711

(919) 541-5460

moore.bruce@epa.gov

For information, visit: www.epa.gov/airquality/oilandgas

From: Cozzie, David
Sent: Monday, October 26, 2015 10:46 AM
To: Moore, Bruce <Moore.Bruce@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Fwd: Is there a chart comparing BLM to us?

I know we had one based on what we thought would be in the proposal, but we have one updated to reflect the proposal, correct? Could you foreword to me?

Thanks,

David

Sent from my iPhone

Begin forwarded message:

From: "Tsirigotis, Peter" <Tsirigotis.Peter@epa.gov>
Date: October 26, 2015 at 9:39:22 AM EDT
To: "Cozzie, David" <Cozzie.David@epa.gov>
Subject: Is there a chart comparing BLM to us?

To: McCabe, Janet[McCabe.Janet@epa.gov]
Cc: Mitchell, Ken[Mitchell.Ken@epa.gov]
From: Goffman, Joseph
Sent: Thur 10/29/2015 4:23:16 PM
Subject: FW: Updated Briefing package
Draft_OG_Path_Forward 10 29 2015.pptx
OG Path Forward Supplemental 10.29.2015_final.pdf

Janet – I have some additional items I am going to talk to Peter about adding and I have already suggested that we have available the chart we did comparing our rulemakings with BLM's draft package. That said, given the press of time and notwithstanding that we may be adding a couple of slides the capture the question of "what is left to do?" perhaps you can get these printed out before you leave the R4 office to look at during the course of the afternoon. Just fyi, the three pictorial slides in this deck showing the progression of rule-coverages starting in 2012 are intended to be responsive to something Gina mentioned to me as a point she wanted to make. Thanks

PS Ken—could you please assist in getting print-outs of these into Janet's hands?

Thanks.

From: Cozzie, David
Sent: Thursday, October 29, 2015 12:12 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Gunning, Paul <Gunning.Paul@epa.gov>; Franklin, Pamela <Franklin.Pamela@epa.gov>
Subject: Updated Briefing package

Joe,

Attached is the update slide deck and consolidated table showing what we are covering.

Let me know if there are any additional changes you would like made.

David

To: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Goffman, Joseph
Sent: Wed 10/21/2015 7:22:26 PM
Subject: FW: O&G Path Forward
Oil and Gas Sector Path Forward_McCabe_100915 (2).docx
OG NextSteps Supplemental2 (2).pdf
OG NextSteps Supplemental1.pdf
Oil and Gas Sector Path Forward_WH10-21-15.docx

From: Gunning, Paul
Sent: Wednesday, October 21, 2015 3:12 PM
To: McCabe, Janet <McCabe.Janet@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>; Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Dunham, Sarah <Dunham.Sarah@epa.gov>
Subject: O&G Path Forward

Attached is (1) the path forward options paper we presented to Janet (2) a revised version of the options paper significantly stripped down to one page. I included only 3 options (removed litigation and NPRM), removed the sections on regulatory gaps, focused discussion on "key points" instead of pros and cons (removing some of the cons as we raise these as part of the discussion if needed) and (3) the two tables/PDF files that show current and proposed regulatory coverage (NSPS and CTG)

Paul

To: joegoffman **Personal email address**
From: Goffman, Joseph
Sent: Fri 10/16/2015 8:00:17 PM
Subject: FW: PBS NEWSHOUR Methane interview request
Four Corners Methane Plume 8-11-15.docx
OG Overview FS FINAL.8 17 15.pdf
OG Rules Draft Qs As INTERNAL DRAFT UPDATED 9.15.15 V10.docx
Oil and Gas Press Release V13.doc

From: McMichael, Nate
Sent: Friday, October 16, 2015 3:59 PM
To: Goffman, Joseph
Cc: Millett, John; Davis, Alison; Drinkard, Andrea; DeLuca, Isabel
Subject: RE: PBS NEWSHOUR Methane interview request

Joe – Here are the materials that you asked for from the rollout, along with some info on the Four Corners study that Isabel passed along. I am also including her note on our emission estimates:

The original PBS article noted that the study's authors had suggested that EPA's methane estimates may be too low. In case that question comes up, here's our standard response

Substantial amounts of new information on the oil and gas sector have become available recently and additional information will become available in the coming years from a number of channels, including EPA's GHGRP, industry organizations, and research studies by government, academic, and industry researchers. In addition, the actions in the White House methane strategy, which target both bottom-up and top-down measurement approaches, will improve the overall level of confidence in methane emissions data. EPA will continue to refine its emission estimates to reflect the most robust and up to date information available.

Please let me know if you need anything else.

Nate McMichael

US EPA Office of Air and Radiation

202-564-0382 (Office)

Personal cellphone number

From: Goffman, Joseph
Sent: Friday, October 16, 2015 2:31 PM
To: McMichael, Nate
Cc: Millett, John; Davis, Alison; Drinkard, Andrea; DeLuca, Isabel
Subject: RE: PBS NEWSHOUR Methane interview request

Sure thing. Thanks.

From: McMichael, Nate
Sent: Friday, October 16, 2015 2:30 PM
To: Goffman, Joseph
Cc: Millett, John; Davis, Alison; Drinkard, Andrea; DeLuca, Isabel
Subject: FW: PBS NEWSHOUR Methane interview request

Hi Joe – Would you be interested in doing this backgrounder with PBS Newshour? If so, it looks like there are a few open time slots on your calendar Monday morning.

Nate McMichael

US EPA Office of Air and Radiation

202-564-0382 (Office)

Personal cellphone number

From: Allen, Laura
Sent: Friday, October 16, 2015 2:21 PM
To: Millett, John; McMichael, Nate
Subject: PBS NEWSHOUR Methane interview request

Hey- PBS Newshour producer is looking for a background interview on the recent methane oil and gas announcement. This will be on background (agency official) and I wanted to see if Joe G. could do it. Reporter is talking to industry and enviro groups, and wants to make sure she understands what EPA has proposed. I'm sending her background info from the announcement. She would like to do the call on Mon.

Let me know if Joe is interested and what time would be best. Thanks!

Here's more on the story:

I'm working on a story about methane gas emissions: the extent and what's being done about them. I was intrigued by the NASA/JPL photographs about a year ago showing a hot spot over the Four Corners area in NW New Mexico (they did a recent web story on this). See recent story on similar topic below. Our story is focused on the San Juan Basin in New Mexico. I intend to start filming there on Wednesday (Oct 21). The story will air this fall.

Her questions:

- What was the agency's motivation for doing this?
- What is the timeline for implementation
- What will the impact be on climate? (is oil and gas the most significant source of methane emissions?)
- Why hasn't the issue received much media coverage?
- I've also learned recently that some companies are using technology to detect and reduce these emissions. What kind of technology? Does the rule require that technology?

Monday, Oct 19.

Time: 15 minutes max

On the Phone

KATHLEEN McCLEERY

Producer, Writer and Media Consultant

Special Correspondent, PBS NewsHour

RECENT STORY:

(Pbs newshour web story)

Why is there a huge methane hotspot in the American Southwest?

BY LAURA SANTHANAM June 3, 2015 at 12:40 PM EDT

The Four Corners region of the southwest United States is a magnificent, otherworldly place, marked by red rock vistas, ancient cliff dwellings and sweeping blue sky. The names alone paint a picture of the landscape: The Painted Desert. The Petrified Forest. Monument Valley.

This image shows methane hotspot, highlighted in red, in the Four Corners area. This map shows how much methane emissions varied from average background concentrations from 2003-2009 (dark colors are lower than average; lighter colors are higher. (AP Photo/NASA, JPL-Caltech, University of Michigan)

But billowing above the rust-colored earth is the country's largest concentration of methane, according to satellite data. That's because this spot where Utah, Colorado, Arizona and New Mexico meet is also home to one of the nation's most productive natural

gas fields and coalbed methane basins. About 10 percent of the country's estimated methane emissions from natural gas is found in this region, according to recent scientific research and the Environmental Protection Agency.

Methane is odorless, colorless and invisible to the naked eye. Following carbon dioxide, methane ranks as the second most prevalent greenhouse gas emitted by human activity in the United States. But in the short term, atmospheric methane is more than 100 times more potent than carbon dioxide at holding the sun's heat, according to Colm Sweeney, the lead scientist for the NOAA Earth System Research Lab Aircraft Program.

"It's a very strong greenhouse gas and traps heat really effectively," he said. "It's like putting an inch of insulation in your attic versus putting 100 inches of insulation in your attic with the same amount of CO2."

Scientists first realized methane was flooding the Four Corners after a satellite in 2003 detected higher-than normal amounts of the gas. A year earlier, the European Space Agency had launched Envisat, an eight-ton, sun-powered satellite the size of a school bus. While orbiting the planet, its mission was to track ocean temperature and ozone depletion, improving environmental studies.

Onboard was SCIAMACHY, an image spectrometer that monitored gases in the Earth's atmosphere, including methane, and created novel data maps. For years, the satellite captured images of sunlight reflecting off the Earth's surface. Absorptions of methane in the data revealed its distribution around the globe.

But one day in April 2012, for reasons still unclear, ESA ground control crews lost all contact with Envisat and its instruments.

The satellite had disappeared, but the data remained.

A startling red spot of methane hovered over the U.S. Southwest, burning brighter than any other hotspot in the United States.

In that data, Christian Frankenberg, a scientist with NASA's Jet Propulsion Laboratory, found what he initially thought might be an error. A startling red spot of methane hovered over the U.S. Southwest, burning brighter, he said, than any other hotspot in the United States.

Atmospheric scientist Eric Kort of the University of Michigan plumbed the data further, using satellite images produced between 2003 and 2009. The team collected air samples,

conducted on-the-ground observations, performed simulations and analyzed readings before concluding that the methane floating above the Four Corners represented the country's largest concentration of the gas. In findings they published in October in the journal Geophysical Research Letters, the scientists also suggested that the EPA was underestimating methane emissions nationwide, including in the Four Corners.

Still, they puzzled over the source of the hotspot.

HOW METHANE KILLED THE CANARY IN THE COAL MINE

The Four Corners is part of the San Juan Basin, a region that covers 7,500 square miles and is "the most productive coalbed methane basin in North America," according to the EPA. For years, oil and gas companies have tapped into this massive energy stash in the middle of the desert. About 60,000 wells are scattered across the area.

But scientists don't understand how such massive amounts of methane are getting released into the air. Is it coming from natural sources, like the exposed coal seam jutting above the earth's surface in parts of the San Juan Basin? Is it coming from open mine shafts or leaking equipment that belongs oil and gas companies? Is it a combination of these factors, or none of these factors?

"The interesting part of the Four Corners is that there's a lot of stuff coming out of these coal beds. I'm not going to say natural because we're not sure how much that is going into production is influencing how much seepage is coming up," Sweeney said.

Methane is generally harmless, but it can be problematic when it exists in extremely dense quantities or confined areas. Under sustained conditions for a long period of time, studies have found that people may have trouble breathing or even lose consciousness.

In cramped spaces like a coal mine, methane is dangerous and can ignite easily. That's where the term "canary in a coal mine" came from. If a caged canary in a mineshaft stopped singing and died, that signaled that there was too little oxygen and too much methane, carbon monoxide and other gases, and miners needed to get out, stat.

That's also why coal mines typically pump fresh air into the shaft and use ventilation systems to dilute the gas.

Often when industrial sources emit methane, they also release volatile organic compounds into the air, said Mary Uhl, an environmental protection specialist with the federal Bureau of Land Management. These compounds trigger chemical reactions thatcreate ozone, which can harm people with asthma or respiratory conditions. Ozone levels in the Four Corners hover at 0.071 parts per million, which means they just barely meet the Environmental Protection Agency's national air quality standards of 0.075 parts per million. And if federal standards drop to 0.065 to 0.070 parts per million, as proposed, the Four Corners would no longer meet the legal rate.

That's a problem normally seen in urban areas with far more people and cars than what you would find in the Four Corners, Uhl said. "Rural areas of the country haven't typically bumped up against the federal air quality standard for ozone," she said.

A reduction in methane emissions would likely reduce volatile organic compounds along with ozone levels, Uhl said.

U.S. RegionsOzone Levels (PPM)Ozone levels in U.S. cities and the Four Corners region

Data from U.S. Environmental Protection Agency, Graphic by Megan Hickey

In April, a team of scientists traveled to the Four Corners to study methane in this region. They flew five aircraft with equipment designed to detect the gas and drove two research vehicles roughly 3,000 miles — the distance between Los Angeles and Portland, Maine. Ultimately, they collected hundreds of air samples of methane that will be analyzed for 55 different trace gases and two methane isotopes.

Now the scientists are sifting through terabytes of data, searching for answers. Air samples must be analyzed, and maps studied further to identify the origins of the gas.

"This is where the detective work comes in, and where the fun of it comes in," Sweeney with NOAA said.

It will take months, but Frankenberg said he hopes that the team can produce findings by the end of the year.

"It's really rare that we get to observe an anomaly like this, but at the same time have measurements on the ground that confirm it," he said.

THE HEALTH FALLOUT

Meanwhile, people who live in the Four Corners have mobilized to address the issue. Residents in the region have long reported respiratory problems. High ozone days when ground-level ozone blankets parts of the region are not uncommon, and lead to frequent emergency room visits.

Community and government leaders have formed the Four Corners Air Quality Group, which meets periodically to figure out how to mitigate the effects of methane and the ozone that its presence aggravates.

San Juan County, which is in the affected area, got a C grade for ozone-related air quality, according to the American Lung Association's 2015 State of the Air report. But the link between ozone and respiratory problems extends beyond the Four Corners region. Studies have shown that visits to the emergency room for asthma are more frequent on high-ozone days, according to the EPA. Those with asthma may be more sensitive to ozone, this online report states, and "the injury, inflammation, and increased airway reactivity induced by ozone exposure may result in a worsening of a person's underlying asthma status, increasing the probability of an asthma exacerbation or a requirement for more treatment."

About 200 people attended a public forum in San Juan County's city of Farmington in April. Participants included members of the oil and gas industry, the local scientific community, nearby tribal communities and the general public.

Julia Madrid, 31, a baker in Durango, Colorado, was among them. She suffers from lupus and said she has wondered if the region's air has aggravated her illness. Her mother alerted her to a map of the region's methane hotspot in the local newspaper. Madrid's father mined coal, and her brother drilled for oil and gas.

Proposed Climate, Air Quality and Permitting Rules for the Oil and Natural Gas Industry: Fact Sheet

Overview

- On August 18, 2015, the U.S. Environmental Protection Agency (EPA) proposed a suite of commonsense requirements that together will help combat climate change, reduce air pollution that harms public health, and provide greater certainty about Clean Air Act permitting requirements for the oil and natural gas industry.

- The proposals are a key component, under the President's Climate Action Plan, needed to set the Administration on track to achieve its goal to cut methane emissions from the oil and gas sector by 40 to 45 percent from 2012 levels by 2025. These commonsense standards will reduce emissions from this rapidly growing industry, helping ensure that development of these energy resources is safe and responsible.

- Today's proposals would require methane and VOC reductions from hydraulically fractured oil wells, some of which can contain a large amount of gas along with oil, and would complement the agency's 2012 standards addressing emissions from this industry. A key component of the 2012 rules was a requirement to capture emissions from hydraulically fractured and refractured natural gas wells – a step estimated to yield a 95 percent reduction in VOCs, and a similar methane reduction as a co-benefit.

- In addition to reducing emissions from hydraulically fractured oil wells, the new proposals would extend emission reduction requirements further "downstream", covering equipment in the natural gas transmission segment of the industry that was not regulated in the agency's 2012 rules.

- EPA also is proposing to require owners/operators to find and repair leaks, which can be a significant source of both methane and VOC pollution.

- In addition to the requirements for new and modified emissions sources, draft guidelines for states will reduce VOC emissions from existing oil and gas sources in areas with smog problems. And two proposals would clarify permitting requirements in states and Indian country and make them more efficient.

- EPA sought input from states, tribes, industry and environmental groups as it developed the proposed methane and VOC requirements, including through a series of meetings with states and tribes over several months. A number of states regulate, or are considering regulating, air pollution from the oil and natural gas industry, and today's proposals would allow them to continue to do so. Under the Clean Air Act, states have

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the authority to regulate air emissions from sources within their boundaries, provided their requirements are not weaker than federal rules.

- The standards for new and modified sources are expected to reduce 340,000 to 400,000 short tons of methane in 2025, the equivalent of reducing 7.7 to 9 million metric tons of carbon dioxide. EPA estimates the rule will yield net climate benefits of $120 to $150 million in 2025.

- EPA will take comment on the proposals for 60 days after they are published in the Federal Register. The agency will hold public hearings. Details will be announced shortly.

Why Reducing Methane is Important

Combatting Climate Change

- Methane -- the key constituent of natural gas -- is a potent greenhouse gas with a global warming potential more than 25 times greater than that of carbon dioxide. Methane is the second most prevalent greenhouse gas emitted in the United States from human activities, and nearly 30 percent of those emissions come from oil production and the production, transmission and distribution of natural gas.

- In January, EPA and the Obama Administration announced a strategy for reducing methane emissions from the rapidly growing oil and gas industry, noting that, while methane emissions from the oil and gas sector have declined 16 percent since 1990, they are projected to significantly increase over the next decade without additional actions to lower them.

- EPA's proposed actions will complement the methane reductions the country is seeing today as co-benefits of the agency's 2012 rules to reduce VOC emissions from the oil and gas industry. These rules, along with the agency's proposed voluntary Natural Gas STAR Methane Challenge Program, and upcoming actions from other federal agencies, such as the Department of Interior's Bureau of Land Management, will help ensure safe and responsible oil and natural gas development.

Improving air quality

- Methane from the oil and gas industry comes packaged with other pollutants: VOCs, which are a key ingredient in ground-level ozone (smog); and a number of pollutants known as "air toxics" – in particular, benzene, toluene, ethylbenzene and xylene.

- Ozone is linked to a variety of serious public health effects, including reduced lung function, asthma attacks, asthma development, emergency room visits and hospital admissions, and early death from respiratory and cardiovascular causes. Air toxics are known or suspected to cause cancer and other serious health effects.

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SUMMARY OF PROPOSED ACTIONS

The proposed actions are:

- Proposed updates to the agency's New Source Performance Standards that would set methane and VOC requirements for additional new and modified sources in the oil and gas industry;
- Draft guidelines for reducing VOC emissions from existing oil and gas sources in certain ozone nonattainment areas as well as in the mid-Atlantic and northeastern states in the Ozone Transport Region;
- Proposed updates to clarify the agency's air permitting rules as they apply to the oil and natural gas industry; and
- A proposed Federal Implementation Plan to implement minor New Source Review permitting in Indian country.

Reducing Methane and VOCs from New and Modified Sources

- Building on its 2012 New Source Performance Standards (NSPS) for VOC emissions for the oil and natural gas industry, EPA's proposed updates would require that the industry also reduce methane. Sources already subject to the 2012 NSPS requirements for VOC reductions that also would be covered by the proposed 2015 methane requirements would not have to install additional controls, because the controls to reduce VOCs reduce both pollutants.
- The proposed updates also add emissions reduction requirements for sources of methane and VOC pollution that were not covered in the 2012 rules. These include requirements that owners/operators:
  - **Find and repair leaks,** which can be a significant source of both methane and VOCs. The proposal also includes incentives to spur the oil and gas industry to minimize leaks.
  - **Capture natural gas from the completion of hydraulically fractured oil wells.** Many hydraulically fractured wells that are drilled primarily for oil also contain natural gas. This gas contains methane, VOCs and a number of air toxics. Owners/operators of hydraulically fractured and refractured oil wells would be required to capture the gas using a proven process known as a "reduced emissions completion" or "green completion."
    - In a green completion, special equipment separates gas and liquid hydrocarbons from the flowback that comes from the well as it is being prepared for production. The gas and hydrocarbons can then be treated and used or sold, avoiding the waste of natural resources that cannot be renewed. EPA required green completions for hydraulically fractured natural gas wells in its 2012 rules.

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- **Limit emissions from new and modified pneumatic pumps**, which are used throughout the industry from well sites to transmission compressor stations.
- **Limit emissions from several types of equipment used at natural gas transmission compressor stations and at gas storage facilities, including compressors and pneumatic controllers.** These agency did not cover these in the 2012 rules.

- For details on the proposed requirements by site, see http://www.epa.gov/airquality/oilandgas/actions.html

Reducing VOCs from Existing Source in Areas with Smog Problems

- EPA also is issuing draft Control Techniques Guidelines (CTGs) for reducing VOC emissions from existing equipment and processes in the oil and natural gas industry.

- CTGs are not regulations and do not impose legal requirements on sources; rather, they provide recommendations for state and local air agencies to consider in determining reasonably available control technology (RACT) for reducing emissions from covered processes and equipment. States may use different technology and approaches, subject to EPA approval and provided they achieve the required pollution reductions. The draft CTGs include information on cost-effective control technologies to help states in making their RACT determinations.

- Under the Clean Air Act, RACT applies in ozone nonattainment areas classified as "Moderate" and above, and throughout the Ozone Transport Region. Affected areas and states would have to address the sources covered in the CTGs as part of state plans for meeting EPA's ozone health standards. Oil and gas development occurs in a number of these areas and states.
    - The Ozone Transport Region encompasses 11 northeast states and the metropolitan statistical area that includes Washington D.C. and portions of northern Virginia. The states are: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont.

- The draft guidelines include EPA's RACT recommendations for storage tanks, pneumatic controllers, pneumatic pumps, centrifugal and reciprocating compressors, equipment leaks from natural gas processing plants, and other equipment leaks that are known as "fugitive emissions." Many of the RACT recommended levels of control are similar to the VOC requirements under the 2012 NSPS and today's proposal.

- The draft CTG includes detailed information on the costs of available controls to help states as they determine RACT for the affected sources in their areas. The draft CTGs also include model rule language that states could adopt if they choose reduce VOCs from their oil and gas sources using EPA's recommended controls.

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- In November 2014, EPA proposed to strengthen the ozone health standard to improve public health protection. The agency intends to issue a final rule by October 1, 2015; however designations of attainment and nonattainment areas would not be made until October 2017. Those designations likely would be based on air quality data from 2014-2016. Actions taken today that improve air quality will help lower ozone in 2015 and 2016 – two of the three years that will be considered in determining attainment areas.

- For details on the sources covered by the draft CTG, by site, see http://www.epa.gov/airquality/oilandgas/actions.html

Clarifying permitting requirements

- EPA is issuing two proposals to clarify permitting requirements in the states and in Indian country and make them more efficient.

- The proposed ***Source Determination Rule*** seeks broad public feedback on options for determining when multiple pieces of equipment and activities in the oil and gas industry must be deemed a single source that is subject to requirements under Clean Air Act air permitting programs.

- Those programs are the Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review preconstruction permitting programs and the Title V Operating Permits program. EPA previously addressed this definition through policy interpretation and guidance.

- A proposed ***federal implementation plan (FIP) would implement the Minor New Source Review Program in Indian Country*** for oil and natural gas production. The proposed plan would limit emissions of harmful air pollution while making the preconstruction permitting process more efficient for this rapidly growing industry.
- The proposed FIP would be used instead of site-specific minor New Source Review (NSR) preconstruction permits in Indian country and would incorporate emissions limits and other requirements from six federal air standards to ensure air quality is protected. These include the 2015 proposed updates to the New Source Performance Standards for the oil and natural gas industry, along with standards for stationary engines, boilers and liquid storage tanks.
- The FIP would apply throughout reservation areas in Indian country and any other areas of Indian country for which a tribe or EPA has demonstrated that the tribe has jurisdiction. It would apply in areas designated attainment or unclassifiable for a National Ambient Air Quality Standard. Requirements in the FIP would apply to all new and modified true minor sources in the production segment of the oil and natural gas industry.
- For more information on the proposed FIP, see

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http://www.epa.gov/airquality/oilandgas/actions.html

COSTS AND BENEFITS – NEW SOURCE PERFORMANCE STANDARDS

- EPA conducted a regulatory impact analysis (RIA) that looks at illustrative benefits and costs of the proposed NSPS for the years 2020 and 2025. The 2020 estimates reflects a single year of benefits and costs for sources that become affected in that year. The 2025 estimates are larger, because they include sources that become affected in 2025 as well as sources that become affected in the 2020-24 time period and are assumed to be in continued operation in 2025, thus incurring compliance costs and emissions reductions in 2025.

- The estimated climate benefits reflect a net reduction in climate change damages, which include human health impacts, property damages from flood risk, and the value of ecosystem services, among other effects.

- Reductions in other pollutants, including volatile organic compounds and air toxics, also are expected to yield benefits; however, EPA was not able to quantify those. Those benefits include reductions in health effects related to fine particle pollution, ozone and air toxics, along with improvements in visibility.

- In 2020, EPA estimates the proposal will have climate benefits of $200 million to $210 million (2012$), which outweigh the costs of $150 to $170 million. Net benefits are estimated at $35 million to $42 million.

- In 2025, EPA estimates the proposal will have climate benefits of $460 million to $550 million, which outweigh the costs of $320 to $420 million. Net benefits are estimated at $120 million to $150 million.

- EPA estimates a range of costs and benefits because of uncertainty in how many well sites might be affected by a proposed exclusion from fugitive emission requirements for low production well sites.

- EPA did not conduct an RIA for the Control Techniques Guidelines, because CTGs are not regulations; they are RACT recommendations for states. The agency estimates that the CTGs would reduce about 82,000 tons of VOCs a year, if affected states were to implement the recommendations as outlined in the guidelines. Those VOC reductions would yield about 220,000 tons of methane reductions as a co-benefit. States have flexibility in determining what measures to implement to meet RACT requirements.

- The estimated costs of the control measures outlined in the guidelines are $76 million annually. These costs could change based on the steps states take to reduce pollution from the covered sources in their areas.

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BACKGROUND

- In 2009, EPA determined that greenhouse gas pollution threatens Americans' health and welfare by leading to long-lasting changes in our climate that can have a range of negative effects on human health and the environment.

- Climate change is one of the greatest environmental and public health challenges we face. Climate impacts affect all Americans' lives – from stronger storms and longer droughts to increased insurance premiums, food prices and allergy seasons.

- The most vulnerable among us – including children, older adults, people with heart or lung disease and people living in poverty – may be most at risk from the impacts of climate change.

- In March 2014, the Obama Administration issued the Climate Action Plan: Strategy to Reduce Methane Emissions. As part of that strategy, EPA developed a series of five technical white papers that focused on technical issues covering emissions, and mitigation techniques that targeted methane and VOCs. The agency sought independent peer review of the white papers, and received more than 43,000 comments from the public.

- In January 2015, EPA and the Administration announced a broad-based strategy for reducing methane and VOCs from the rapidly growing oil and gas industry. Focusing on the equipment and processes covered in the white papers, EPA asked states and tribes to volunteer to participate in a series of discussions on approaches the agency should consider in setting standards. Today's proposals reflect those discussions.

FOR MORE INFORMATION

- For more information on today's proposed actions and instructions on submitting comments, visit http://www.epa.gov/airquality/oilandgas/actions.html

- To read the Climate Action Plan – Strategy to Reduce Methane Emissions, visit https://www.whitehouse.gov/blog/2014/03/28/strategy-cut-methane-emissions

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FOR IMMEDIATE RELEASE
August XXX, 2015

EPA Proposes New Commonsense Measures to Cut Methane Emissions from the Oil and Gas Sector

Proposal Cuts GHG Emissions, Reduces Smog-Forming Air Pollution and Provides Certainty for Sources

WASHINGTON – Continuing the Obama Administration's commitment to take action on climate change and protect public health, the U.S. Environmental Protection Agency (EPA) is announcing commonsense proposed standards that would reduce greenhouse gas (GHG) and volatile organic compounds (VOC) emissions from the oil and natural gas industry.

"Today, through our cost-effective proposed standards, we are underscoring our commitment to reducing the pollution fueling climate change and protecting public health while supporting responsible energy development, transparency and accountability," said EPA Administrator Gina McCarthy. "Cleaner-burning energy sources like natural gas are key compliance options for our Clean Power Plan and we are committed to ensuring safe and responsible production that supports a robust clean energy economy."

The proposed standards will complement voluntary efforts, including EPA's Methane Challenge Program, and are based on practices and technology currently used by industry. To cut methane and VOC emissions, the proposal would require:

- Finding and repairing leaks;
- Capturing natural gas from the completion of hydraulically fractured oil wells;
- Limiting emissions from new and modified pneumatic pumps;
- And limiting emissions from several types of equipment used at natural gas transmission compressor stations, including compressors and pneumatic controllers.

The proposed standards for new and modified sources are expected to reduce 340,000 to 400,000 short tons of methane in 2025, the equivalent of reducing 7.7 to 9 million metric tons of carbon dioxide. EPA estimates the rule will yield net climate benefits of $120 to $150 million in 2025. Those standards also are expected to reduce 170,000 to 180,000 tons of ozone-forming VOCs in 2025, along with 1,900 to 2,500 tons of air toxics, such as benzene, toluene, ethylbenzene and xylene. Ozone is linked to a variety of serious public health effects, including reduced lung function, asthma attacks, asthma development, emergency room visits and hospital admissions, and early death from respiratory and cardiovascular causes. Air toxics include chemicals that are known or suspected to cause cancer and other serious health effects.

The proposal is part of the Administration's strategy under the President's Climate Action Plan to reduce methane emissions fueling climate change, and will put the Administration on track to achieve its goal of cutting methane emissions from the oil and gas sector by 40 to 45 percent from 2012 levels by 2025.

Methane, the key constituent of natural gas, is a potent GHG with a global warming potential more than 25 times greater than that of carbon dioxide. Methane is the second most prevalent greenhouse gas emitted in the United States from human activities, and nearly 30 percent of those emissions come from oil production and the production, transmission and distribution of natural gas.

Earlier this year, EPA proposed the Methane Challenge Program, which would expand on the successful Natural Gas STAR program to serve as a platform for companies who want to make ambitious and transparent commitments to address methane emissions. This flexible program has the potential to foster significant cost-effective emission reductions across the oil and gas sector and to provide transparency on the progress partner companies are making to reduce emissions.

As part of the proposal, the agency is updating the 2012 New Source Performance Standards (NSPS) to address methane as well as VOC emissions for the sources covered in that rule. EPA's proposal would also require that industry reduce VOC and methane emissions from hydraulically fractured and refractured oil wells, which can contain significant amounts of natural gas along with oil. In addition, the proposal would achieve methane and VOC reductions "downstream" from wells and production sites, covering equipment in the natural gas transmission segment of the industry that was not regulated in the agency's 2012 oil and natural gas rules. Additionally, the agency proposes to clarify and streamline Clean Air Act permitting requirements in states and Indian country.

Today's proposal also includes proposed guidelines for states to reduce VOC emissions from existing oil and gas sources in certain ozone nonattainment areas as well as mid-Atlantic and Northeast states that are part of the Ozone Transport Region.

EPA will take comment on the proposals for 60 days after they are published in the Federal Register. The agency will hold public hearings and will announce details soon.

More information, including technical fact sheets, is available at http://www.epa.gov/airquality/oilandgas/actions.html

To: joegoffman **Personal email address**
From: Goffman, Joseph
Sent: Fri 10/16/2015 3:59:32 PM
Subject: FW: CPP Analysis
ERCOT_Analysis_of_the_Impacts_of_the_Clean_Power_Plan-Final_Rule_Update.pdf

-----Original Message-----
From: Kurlansky, Ellen
Sent: Friday, October 16, 2015 10:39 AM
To: Harvey, Reid; Goffman, Joseph; Stenhouse, Jeb; Meroney, William; Sims, Ryan; adam.eldean@ferc.gov; Culligan, Kevin
Subject: FW: CPP Analysis

FYI

Ellen Kurlansky
Office of Air and Radiation
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue NW
Washington, DC 20460

202-564-1669

-----Original Message-----
From: Lasher, Warren [mailto:Warren.Lasher@ercot.com]
Sent: Friday, October 16, 2015 8:00 AM
To: Kurlansky, Ellen
Cc: Lazarus, Dana
Subject: CPP Analysis

Ellen -

Our updated CPP analysis report is attached. Please note this document will not be public until 10 AM Eastern.

Let us know if you have any questions. Otherwise we can discuss it on Wednesday.

Thanks -

Warren

Warren Lasher
Director, System Planning
ERCOT, Inc.
512-248-6379
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ERCOT Analysis of the Impacts of the Clean Power Plan

Final Rule Update

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ERCOT Analysis of the Impacts of the Clean Power Plan

Final Rule Update

In August 2015, the U.S. Environmental Protection Agency (EPA) released the Clean Power Plan (CPP) final rule, which sets limits on carbon dioxide (CO_2) emissions from existing fossil fuel-fired power plants. EPA had originally proposed the rule in June 2014, and the Electric Reliability Council of Texas (ERCOT) subsequently evaluated the potential implications for the resource mix and grid reliability in the ERCOT Region.[1] However, the final rule made adjustments to the emissions limits, as well as to the deadlines for compliance. Because the timing and magnitude of the required reductions for Texas have changed in the final rule, ERCOT updated its CPP analysis to reflect these changes.

Based on this analysis, ERCOT continues to see the potential for significant impacts on the planning and operation of the ERCOT grid resulting from compliance with the CPP. ERCOT estimates that the final CPP, by itself, will result in the retirement of at least 4,000 MW of coal generation capacity. This amount of unit retirements could pose challenges for maintaining grid reliability, and these impacts are likely to intensify and occur earlier when the effects of the CPP are combined with other environmental regulations, particularly EPA's proposed Regional Haze Federal Implementation Plan (FIP) for Texas. If ERCOT does not receive adequate notification of these retirements, and if multiple unit retirements occur within a short timeframe, there could be periods of reduced system-wide resource adequacy and localized transmission reliability issues.

A recent reliability analysis conducted by ERCOT of potential retirement scenarios resulting from compliance with the Regional Haze requirements showed that the retirement of 4,200 MW of coal-fired capacity, comparable to the amount expected to retire due to the CPP alone, would have a significant impact on the reliability of the transmission system. Model results indicated the exceedance of thermal capacities of 10 circuits (143 miles) of 345 kV transmission lines, 31 circuits (147 miles) of 138 kV transmission lines, 6 circuits (39 miles) of 69 kV transmission lines, and 11 transformers. As a general estimate, new 69 kV and 138 kV lines cost on the order of one million dollars per mile and new 345 kV lines cost on the order of three million dollars per mile. Additionally, in the ERCOT Region, it takes at least five years for a new major transmission project to be planned, routed, approved, and constructed.

As with ERCOT's analysis of the proposed rule, this study predicts a sizeable amount of renewable capacity additions, due both to the improving economics of these technologies as well as the impacts of regulating CO_2 emissions. The need to maintain operational reliability (i.e., sufficient committed and dispatchable capacity and ramping capability) could require the curtailment of renewable generation resources. Curtailment would reduce production from renewable resources, and could delay achievement of compliance with the CPP limits.

The CPP will also result in increased wholesale and retail energy costs in the ERCOT Region. Based on ERCOT's analysis, energy costs for customers may increase by up to 16% by 2030 due to the CPP alone, without accounting for the associated costs of transmission upgrades, higher natural gas prices caused by increased gas demand, procurement of additional ancillary services, and other costs associated with the retirement or decreased operation of coal-fired capacity in the ERCOT Region. Consideration of these factors would result in even higher energy costs for customers.

[1] Electric Reliability Council of Texas, Inc. *ERCOT Analysis of the Impacts of the Clean Power Plan*, November 2014. Available at http://www.ercot.com/content/news/presentations/2015/ERCOTAnalysis-ImpactsCleanPowerPlan.pdf.

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1. Introduction

The EPA proposed the CPP in June 2014. Under the proposed rule, Texas would have been required to meet an interim CO_2 emissions limit of 853 lb CO_2/MWh on average during the period from 2020 to 2029, and a final limit of 791 lb CO_2/MWh on average from 2030 onward. Following the publication of the proposed rule, ERCOT evaluated the potential implications of compliance with the CPP proposal for the resource mix and grid reliability. ERCOT published a report on the results of the analysis in November 2014.[2] That analysis found that implementation of the CPP *as proposed* would have a significant impact on the planning and operation of the ERCOT grid. Specifically, ERCOT estimated that the proposed rule could result in the retirement or seasonal mothballing of up to 8,700 MW of coal generation capacity, result in potential transmission reliability issues due to the loss of generation resources in and around major urban centers, and strain ERCOT's ability to integrate additional renewable generation resources.

EPA released details of the CPP final rule on August 3, 2015. In the final rule, several changes were made to the proposal, including modifications to the emissions limit calculation and the compliance deadlines. Under the CPP final rule, Texas will be required to meet a final CO_2 emissions rate limit of 1,042 lb CO_2/MWh on average from 2030 onwards, or 190 million tons of CO_2. EPA calculated these limits based on assumptions about coal plant efficiency improvements, increased production from natural gas combined cycle units, and growth in generation from renewable resources. EPA also modified the compliance deadlines in the final rule, phasing in the reductions over three interim compliance periods between 2022 and 2029, referred to as the "glidepath."

Changes to the calculation methodology make it difficult to compare the emissions rates in the final rule directly to the rates in the proposed rule, but overall the final limits for Texas are less stringent than in the proposal. Though EPA made a number of modifications in the final rule, the most impactful for the stringency of the limits for Texas is EPA's shift to a uniform national approach for setting the standards in the final rule, rather than the state-by-state approach used in the proposal.

Because the timing and magnitude of the required reductions for Texas have changed in the final rule, ERCOT updated its analysis of the potential impacts for the ERCOT Region's resource mix and grid reliability. To do so, ERCOT conducted a modeling analysis using similar assumptions and methods as the 2014 study. This report describes the results of the modeling analysis and discusses the implications for grid reliability.

2. Modeling Analysis

As with ERCOT's previous modeling analysis of the CPP, this analysis uses stakeholder-vetted planning processes and methodologies consistent with ERCOT's regional Long-Term System Assessment (LTSA) studies. This analysis is focused on evaluating the potential impacts of the CPP, in combination with the Cross-State Air Pollution Rule (CSAPR) and the currently proposed Regional Haze FIP for Texas. It does not consider the impacts of other pending environmental regulations affecting generation resources, including the Mercury and Air Toxics Standards (MATS), which have more limited or unit-specific implications and are unlikely, by themselves, to impact overall trends on the ERCOT system. However, these other regulations, in combination with the CPP, CSAPR, and the Regional Haze FIP, could result in additional grid operational impacts and reliability challenges. For example, a number of coal-fired units in the ERCOT region have compliance extensions until April 2016 from the Texas Commission on Environmental Quality (TCEQ) for MATS compliance. There remains a risk that owners may choose to

[2] Ibid.

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retire the affected units rather than comply with MATS next year, especially in light of the proposed Regional Haze FIP and eventual compliance with the Clean Power Plan. The implications of potential MATS-related retirements in 2016 are *not* considered in this analysis. Information about other environmental regulations affecting generation resources is available in ERCOT's December 2014 report, *Impacts of Environmental Regulations in the ERCOT Region.*[3]

2.1. Modeling Methodology

This analysis uses the same model (PLEXOS) and modeling approach as ERCOT's environmental regulatory impact study completed in 2014. A complete description of this methodology is provided in ERCOT's December 2014 report.[4] Certain assumptions have been updated for this analysis based on more recent information currently being developed for the 2016 LTSA[5] and the Future Ancillary Services Cost Benefit Analysis,[6] including natural gas prices and renewable capacity capital costs. Figure 1 shows the updated natural gas prices, in nominal dollars, used in this analysis.

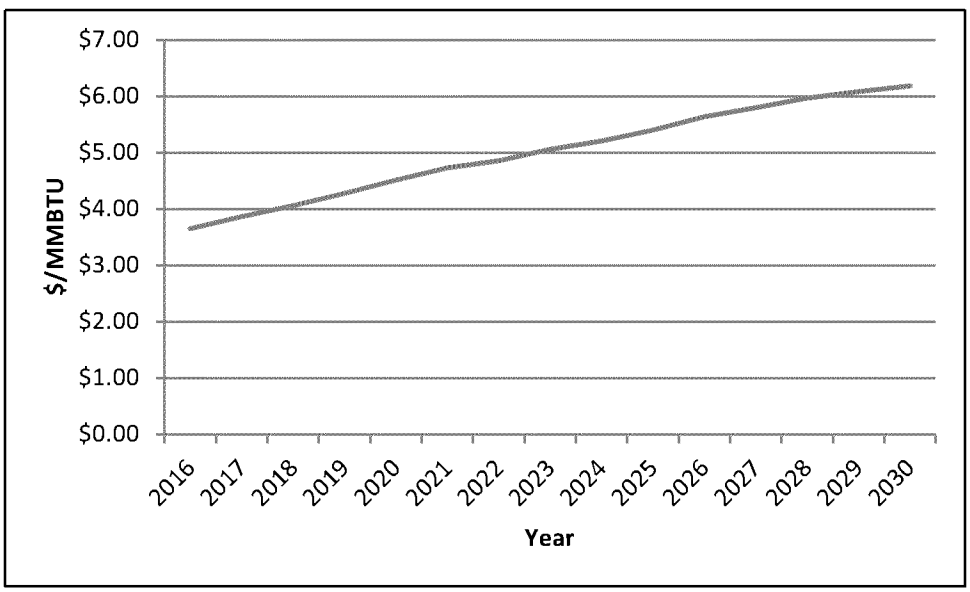

Figure 1: Natural Gas Price Assumptions

In this analysis, ERCOT models compliance with the mass-based CO_2 limits that EPA finalized for Texas. This is a departure from the 2014 study, where ERCOT modeled compliance with the rate-based standards proposed by EPA. In the final rule, EPA published both the rate- and mass-based forms of the CO_2 emissions standards, and states may choose to comply with either form of the standard. Compliance with a rate-based standard would allow overall emissions to increase as generation increases and new renewable energy and energy efficiency are added. Conversely, a mass-based standard would require emissions to remain under a set amount. Though the relative stringency of either form of the standard will depend on program design and availability of emissions reduction credits from renewable energy, energy efficiency, etc., in general modeling the mass-based form of the standard results in a slightly more stringent requirement, and thus provides a conservative estimate of

[3] Electric Reliability Council of Texas, Inc. *Impacts of Environmental Regulations in the ERCOT Region*, December 2014. Available at http://www.ercot.com/content/news/presentations/2015/Impacts%20of%20Environmental%20Regulations%20in%20the%20ERCOT%20Region.pdf.

[4] Ibid.

[5] These assumptions are available at http://www.ercot.com/content/wcm/key_documents_lists/75283/2016_LTSA_Scenario_Assumptions.pptx.

[6] Information on the proposal for a new framework for ancillary services in ERCOT and the cost benefit analysis is available at http://www.ercot.com/committees/other/fast/index.html.

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the impacts of compliance. ERCOT scaled the mass limits for Texas based on the relative amount of load served in the ERCOT Region within Texas to derive ERCOT-specific limits. Figure 2 shows the mass-based emissions limits for Texas published in the CPP final rule and the ERCOT-specific limits modeled in this study.

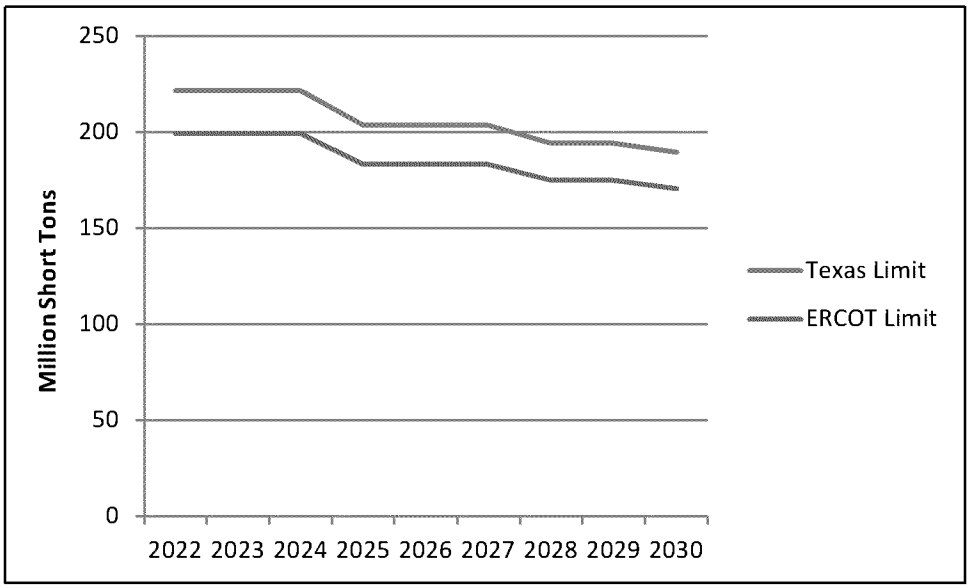

Figure 2: Carbon Dioxide Mass-Based Emissions Limits

As in the previous study, ERCOT modeled scenarios in which the CPP limits are achieved through a system CO_2 emissions constraint and a price per ton of CO_2. These scenarios were developed to evaluate the potential reliability implications of CPP compliance; they do not indicate any assessment of the policy merits or legal permissibility of either compliance approach. In addition to the CPP, the current requirements of CSAPR are included in all of the modeled scenarios, and the proposed Regional Haze FIP is included in one of the modeled scenarios.

The CSAPR program seeks to address cross-state air pollution through a cap and trade program for annual nitrogen oxide (NO_x) and sulfur dioxide (SO_2) emissions, and ozone season (summer) NO_x emissions. In the 2014 study, ERCOT modeled scenarios that included CSAPR as both an emissions limit and an emissions price, but did not include CSAPR in the baseline. Since the rule came into effect on January 1, 2015, this analysis includes CSAPR in both the baseline and CPP scenarios at current allowance prices to reflect the current status of the program.[7] CSAPR allowance prices have been relatively low since the rule came into effect, and therefore the inclusion of these prices in the modeled scenarios is likely to have minimal impacts on unit operations and retirements in the modeling results.

ERCOT modeled four scenarios over the timeframe 2016 to 2030 to evaluate the implications of the CPP on reliability in the ERCOT region:

1. **Baseline** – This scenario estimates a baseline of the ERCOT system under current market trends against which anticipated CPP changes are compared.
2. **CO_2 Limit** – This scenario applies the limits in the CPP to the ERCOT system to determine the least-cost way to comply with the limits. This scenario does not place a price on CO_2 emissions.
3. **CO_2 Price** – This scenario applies a CO_2 emissions price that causes the ERCOT system to achieve compliance with the limits.

[7] ERCOT did not consider any potential future changes to the CSAPR program that could result from recent legal proceedings.

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4. **CO_2 Price & Regional Haze** – This scenario adds the impacts of compliance with the proposed Regional Haze FIP to the CO_2 price scenario.

It should be noted that the CO_2 limit scenario allows the simulation model to select the least-cost way to achieve CPP compliance from electric generating resources. While this approach minimizes the overall system costs, it may not be achievable within the current electricity market design in ERCOT. Electric supply is deregulated in the ERCOT region at the wholesale and retail level. As a result, electric generation and construction of new capacity is driven by market forces, and there is no mechanism to force the ERCOT system to achieve compliance with environmental regulations in a specific manner. Resource owners will make decisions about how to operate existing resources and whether to add new capacity based on market forces. In contrast, the CO_2 price scenarios rely on price signals to obtain emissions compliance rather than direct control of plant emissions, and thus may represent a potential approach to compliance.

To ensure that the price scenarios captured operational and economic constraints not considered by the model, ERCOT reviewed capacity factors and operating revenues from the modeling results in the two CO_2 price scenarios, and assumed that any coal unit operating below a 20% capacity factor annually would retire.[8] This retirement criterion was not applied to the CO_2 limit scenario in order to allow the model to select the least-cost way to achieve compliance for the ERCOT system.

In the two scenarios that implemented the CPP using an emissions price, ERCOT calculated a price for each year that would put carbon dioxide emissions from affected units below the mass-based emissions limit for that year. As shown in Figure 3, the prices in both scenarios follow a similar trend, increasing as the emissions limits tighten in each of the performance periods. The prices required for initial compliance in 2022 are relatively low, at \$1.00/ton CO_2 in the CO_2 Price scenario. In the CO_2 Price & Regional Haze scenario, unit retirements driven by the Regional Haze requirements put ERCOT-wide emissions below the emissions limit for the first interim performance period, resulting in a \$0.00/ton CO_2 price for the first three years of compliance. These prices then increase in the subsequent performance periods as the CO_2 emissions limits become more stringent. To meet the final emissions limit in 2030, a price of \$22.50/ton CO_2 is required, or \$21.00/ton CO_2 in the scenario that also includes Regional Haze.

[8] To account for this in the 2014 analysis, ERCOT reviewed capacity factors and operating revenues in the model output to determine additional units at risk of retirement, and reported a range of potential impacts in the 2014 report.

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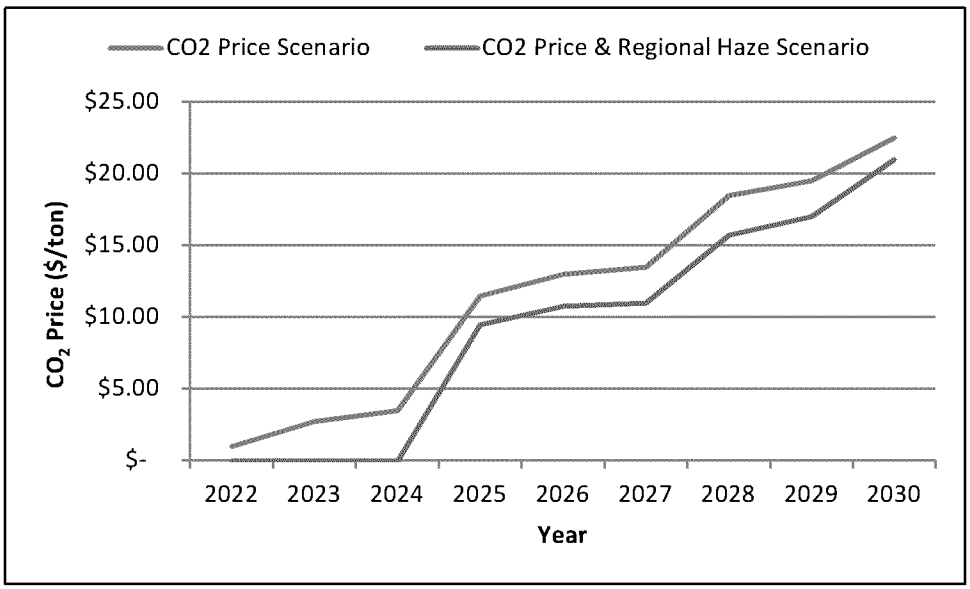

Figure 3: Carbon Dioxide Emissions Prices

In November 2014, EPA proposed a FIP disapproving portions of the Texas state implementation plan for Regional Haze, and setting SO_2 emissions limits for certain coal-fired units in Texas. EPA's proposed FIP would require seven coal-fired units in Texas to upgrade their existing scrubbers, and seven units (five of which are located in ERCOT) to install new scrubber retrofits. To model the proposed Regional Haze FIP requirements, ERCOT added the costs of scrubber upgrades and retrofits to units' fixed costs, as described in the December 2014 report.

In the 2014 study, ERCOT had modeled a 5% energy efficiency savings in scenarios that included the CPP. In this updated analysis, all four scenarios assume energy efficiency savings at 1% of load for all modeled years. At this time, it is unclear how the CPP will be implemented in Texas and how energy efficiency savings might be leveraged for compliance. If, for example, Texas becomes subject to a Federal Plan, it is unclear whether and how energy efficiency could be counted towards compliance. Therefore, the assumption that energy efficiency savings remain at current levels provides a conservative scenario for analysis, and is consistent with the current status of these programs in Texas. However, because energy efficiency remains a potentially cost-effective method for CPP compliance, ERCOT also modeled a scenario where energy efficiency may be used to help achieve compliance, discussed in Section 2.3.

2.2. Modeling Results

ERCOT's modeling of the CPP final rule suggests a different magnitude of impacts compared to the proposed rule. While these modeling results continue to indicate the potential for shifts in the generation mix away from coal and towards natural gas and renewables, the timing and magnitude of these trends differ. The modeling results indicate the potential retirement of at least 4,000 MW of coal-fired capacity due specifically to compliance with the CPP, occurring starting in 2025. However, when the impacts of the CPP are considered in combination with the requirements of EPA's proposed Regional Haze FIP, there are additional unit retirements, many of which occur before the start of CPP compliance in 2022. As with the proposed rule, the modeling predicts a sizeable amount of renewable capacity additions, due both to the improving economics of these technologies as well as impacts of regulating CO_2 emissions. Whereas the previous study saw customer costs increase as early as 2020, due to the stringency of the proposed interim compliance requirements, this analysis sees negligible increases in customer costs by 2022, but sizeable increases in 2030.

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Table 1 shows the existing and planned capacity included in the model as the starting point for this analysis. The modeled scenarios resulted in different amounts of unit retirements and capacity additions relative to this baseline. Table 2 summarizes cumulative unit retirements in 2030 by scenario. The modeling results predict 2,300 MW of unit retirements in the baseline, including 800 MW of gas steam retirements and 1,500 MW of coal unit retirements.[9] The unit retirements estimated in the baseline are due to economics, and not compliance with environmental regulations. The next three scenarios consider the CPP, implemented either as a system emissions limit or an emissions fee. When the CPP is imposed as a limit, there are no additional unit retirements above the baseline scenario. When imposed as a price in the next scenario, however, compliance with the CPP results in 4,000 MW of additional coal unit retirements. These retirements occur starting in 2025, at the beginning of the second CPP interim performance period. Finally, the combined impacts of the CPP and Regional Haze result in 4,700 MW of additional coal retirements relative to the baseline. In this scenario, many of the units retire before 2022 due to the timing of the Regional Haze requirements. The number of gas steam unit retirements remains the same across all four scenarios.

Table 1: Baseline Capacity Assumptions

Fuel Type	Capacity (MW)
Nuclear	5,200
Coal	19,900
Natural Gas	59,300
Wind	19,400
Solar	250
Hydro	500
Other	1,000
Total	**105,500**

Table 2: Unit Retirements by 2030

Generation Technology Type	Baseline	CO_2 Limit	CO_2 Price	CO_2 Price & Regional Haze
Retired Gas Steam (MW)	800	800	800	800
Retired Coal (MW)	1,500	1,500	5,500	6,200
Total Retirements (MW)	**2,300**	**2,300**	**6,300**	**7,000**

Table 3: Capacity Additions by 2030

Generation Technology Type	Baseline	CO_2 Limit	CO_2 Price	CO_2 Price & Regional Haze
Wind (MW)	1,000	4,600	9,400	9,100
Solar (MW)	13,000	13,400	13,700	14,100
Combined Cycle (MW)	0	700	0	0
Combustion Turbine (MW)	1,100	700	2,600	2,900
Total Additions (MW)	**15,100**	**19,400**	**25,700**	**26,100**
Capital Costs of new capacity (billions of $2016)	**16**	**21**	**29**	**29**

The model added new capacity to replace retiring units and meet forecasted demand. Table 3 summarizes the cumulative capacity additions and associated capital costs (in real 2016 dollars) by 2030 for each scenario. In the baseline scenario, the model added 13,000 MW of solar capacity, 1,000 MW of wind capacity, and 1,100 MW of natural gas combustion turbines. It should be noted that this analysis assumes the expiration of the Production Tax Credit (PTC) and step-down of the Investment Tax Credit (ITC), as per current law. In the scenarios with the CPP, the model added an additional 4,000 to 9,200 MW of renewable capacity. There are also 1,500 to 1,800 MW of additional natural gas combustion turbines added in the CO_2 price scenarios.

Figure 4 summarizes the capacity additions and retirements in the modeled scenarios. The observed reserve margins resulting from these changes to the resource mix are comparable across all four scenarios.

[9] This includes the announced mothballing of CPS Energy's J.T. Deely units 1 and 2 in 2018.

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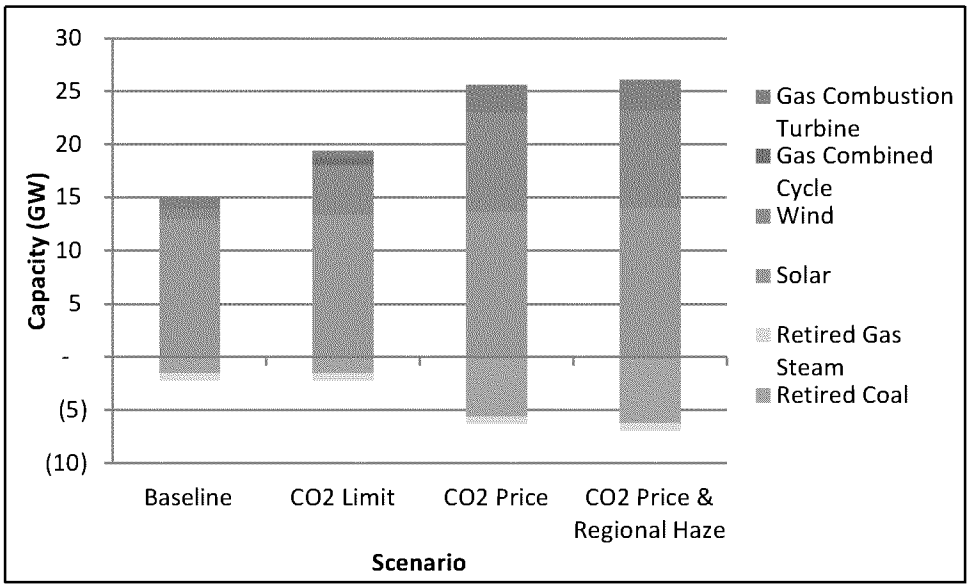

Figure 4: Capacity Additions and Retirements by 2030

Compliance with the CPP results in shifts in the generation mix away from coal and towards natural gas and renewables. Tables 4 and 5 show the annual generation by fuel in 2022 and 2030, respectively, in each of the scenarios. In 2022, the annual generation by fuel is very similar across the first three scenarios. In the fourth scenario, CO_2 Price & Regional Haze, a decrease in generation from coal is made up by increased generation from natural gas and solar resources. By 2030, the generation mix shifts more significantly as the CPP limits become more stringent. The share of generation provided by coal-fired capacity in the CPP scenarios is lower compared to the baseline, at 14 to 16%, versus 27% in the baseline. The difference is made up by increases in generation from natural gas and wind resources. As a result of increased generation from natural gas-fired capacity, in 2030 consumption of natural gas (in MMBTUs) is 14 to 18% higher compared to the baseline in the CPP scenarios.

Figure 5 shows the carbon dioxide emissions from units subject to the CPP in 2022 and 2030 for each scenario.[10] In 2022, CO_2 emissions in the baseline scenario are just above the CO_2 emissions limit for

Table 4: 2022 Annual Generation by Fuel

Fuel Type	Baseline	CO_2 Limit	CO_2 Price	CO_2 Price & Regional Haze
Natural Gas (%)	46	46	47	49
Coal (%)	27	27	26	24
Wind (%)	15	15	15	15
Solar (%)	2	2	2	3
Nuclear (%)	10	10	10	10
Other (%)	<1	<1	<1	<1

Table 5: 2030 Annual Generation by Fuel

Fuel Type	Baseline	CO_2 Limit	CO_2 Price	CO_2 Price & Regional Haze
Natural Gas (%)	43	51	50	50
Coal (%)	27	16	14	15
Wind (%)	14	16	20	20
Solar (%)	7	7	7	7
Nuclear (%)	9	9	9	9
Other (%)	<1	<1	<1	<1

[10] Figure 5 includes emissions only from those units that are subject to the CPP, it does *not* reflect total CO_2 emissions for the ERCOT generating fleet. Only existing fossil steam and combined cycle units subject to certain criteria are regulated under the CPP.

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the first performance period. As noted previously, emissions in the CO_2 Price & Regional Haze scenario are below the limit in 2022 due to Regional Haze-related retirements. In 2030, the projected baseline CO_2 emissions are above the final CO_2 emissions limit, and the two price scenarios require a price of \$22.50/ton CO_2 and \$21.00/ton CO_2, respectively, to attain compliance with the limits.

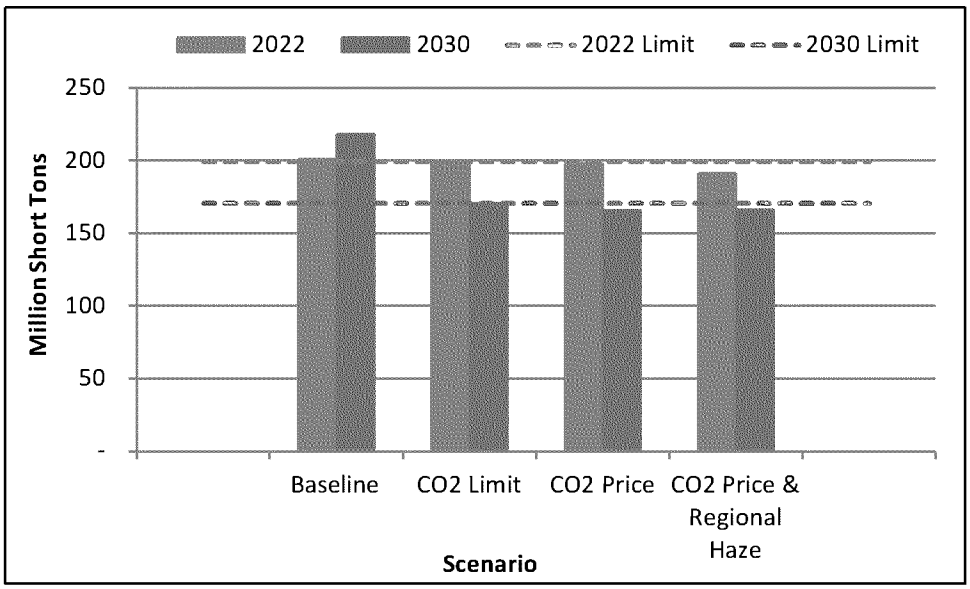

Figure 5: Carbon Dioxide Emissions from Clean Power Plan Affected Units

Compliance with the CPP will impact electricity prices in the ERCOT Region. Table 6 shows the impacts of CPP compliance on average locational marginal prices (LMPs) compared to the baseline scenario. In 2022 the average LMPs are similar across all four scenarios. By 2030 compliance with the CPP results in a 20 to 44% increase in LMPs relative to the baseline. As a general estimate, if wholesale power is 40% of the customer bill, these increases in average LMPs would result in a retail energy price increase of 8 to 18% in 2030. These results do not include the associated costs of building or upgrading transmission infrastructure, natural gas infrastructure upgrades, ancillary services procurement, or potential reliability-must-run contracts.

Table 6: Locational Marginal Prices

Locational Marginal Price	Baseline	CO_2 Limit	CO_2 Price	CO_2 Price & Regional Haze
2022 LMP (\$/MWh)	\$43.35	\$43.08	\$44.12	\$43.25
2030 LMP (\$/MWh)	\$57.20	\$68.53	\$79.78	\$82.59
2022 LMP % change from baseline	n/a	-1%	2%	<1%
2030 LMP % change from baseline	n/a	20%	39%	44%
2022 retail energy bill % change	n/a	<1%	<1%	<1%
2030 retail energy bill % change	n/a	8%	16%	18%

2.3. Energy Efficiency Scenario

As discussed in Section 2.1, energy efficiency is a potential tool that could be used to assist with CPP compliance, but at this time it remains uncertain what role energy efficiency could play in a state or Federal plan for Texas. For this reason, ERCOT did not assume any energy efficiency savings incremental to current levels in the four scenarios described in the previous section. However, because energy

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efficiency is a potentially cost-effective method for CPP compliance, ERCOT modeled an additional scenario in which greater deployment of energy efficiency measures may be used to help achieve compliance.

In this scenario, a cumulative energy efficiency savings of 7% by 2030 is assumed, which is consistent with the amount EPA assumed for Texas in the Regulatory Impact Analysis (RIA) of the CPP final rule.[11] To construct the energy efficiency scenario, ERCOT customized the energy efficiency assumptions used by EPA to the ERCOT load forecast. The scenario with energy efficiency savings applies the CO_2 limits in the final CPP as a system constraint, comparable to the CO_2 limit scenario.

Tables 7 and 8 summarize the unit retirements and capacity additions, respectively, for this scenario. The number of unit retirements in the energy efficiency scenario is the same as the baseline and CO_2 limit scenarios. However, the number of capacity additions is lower, due to the energy efficiency measures offsetting increases in demand. The annual generation by fuel, shown in Table 9, is similar to that of the other scenarios in 2022. The differences in the generation mix compared to the other scenarios in 2030 are, again, attributable to the reduced demand resulting from energy efficiency measures, which leads to fewer wind and solar capacity additions, and thus slightly lower generation from those technologies.

The 2022 average LMP in the energy efficiency scenario is $43.48/MWh, which is similar to the results in the other scenarios. In 2030, the LMP is $63.75/MWh, representing an 11% increase above the baseline or a 5% increase in retail energy prices. However, these estimates do not account for the capital costs of investments in energy efficiency measures. Although ERCOT has not estimated these costs, EPA's estimates from the RIA can be illustrative of the potential costs. Based on inflating EPA's estimates to real 2016 dollars and scaling the costs to the level of estimated ERCOT savings, the capital costs to achieve the specified savings would be approximately $31 billion ($2016) by 2030.

Table 7: Unit Retirements by 2030

Generation Technology Type	CO_2 Limit & Energy Efficiency
Retired Gas Steam (MW)	800
Retired Coal (MW)	1,500
Total Retirements (MW)	**2,300**

Table 8: Capacity Additions by 2030

Generation Technology Type	CO_2 Limit & Energy Efficiency
Wind (MW)	2,200
Solar (MW)	10,200
Combined Cycle (MW)	0
Combustion Turbine (MW)	900
Total Additions (MW)	**13,300**
Capital Costs of new capacity (billions of $2016)	**14**

Table 9: Annual Generation by Fuel

Fuel Type	2022	2030
Natural Gas (%)	46	51
Coal (%)	27	18
Wind (%)	15	16
Solar (%)	2	6
Nuclear (%)	10	9
Other (%)	<1	<1

3. Discussion

As with ERCOT's 2014 analysis of the CPP proposed rule, this modeling analysis indicates that compliance with the CPP is likely to result in the retirement of existing generation capacity and require significant amounts of generation from renewable sources. Though the specific amounts of unit retirements and capacity additions differ from ERCOT's previous study of the CPP proposal – due both to changes to the emissions limits and timing in the CPP final rule as well as changing market economics – ERCOT continues to see potential challenges to grid reliability resulting from these resource mix changes, as well as associated impacts to the transmission system.

[11] U.S. Environmental Protection Agency. *Demand-Side Energy Efficiency Technical Support Document*, August 2015. Available at http://www3.epa.gov/airquality/cpp/tsd-cpp-demand-side-ee.pdf.

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3.1. Impact of Unit Retirements

The modeling results suggest that compliance with the CPP could result in the retirement of at least 4,000 MW of coal-fired capacity in the ERCOT region. In addition to these retirements, several units in the modeling results operate at low capacity factors during off-peak months, and would be potential candidates for suspended operations during those months (seasonal mothball). Though overall fewer coal units are at risk compared to the number of units under the CPP proposal, due to the differing level of stringency in the final rule, there continues to be a risk that the ERCOT Region could see multiple unit retirements within a short timeframe, which could result in implications for reliability.

The potential impacts to coal-fired generation increase when other environmental compliance requirements are considered. There are several environmental regulations for which owners of coal units will need to take actions to comply between now and 2022. With the implementation of the CPP to consider, resource owners may choose to retire units rather than install the required control technology retrofits to comply with these other rules. For more information about other environmental regulations affecting generation resources, see ERCOT's December 2014 report.

In this analysis, ERCOT included the CO_2 Price & Regional Haze scenario to assess the combined impacts of the two rules. The results of that scenario suggest that compliance with the CPP and the Regional Haze FIP could result in the retirement of at least 4,700 MW of coal-fired capacity. Model results indicate that many of the retirements will occur before the start of CPP compliance in 2022, due to the timing of the proposed Regional Haze FIP requirements. However, these results likely represent a lower bound on the number of potential coal unit retirements, in large part because the model is not requiring a competitive market rate of return for unit upgrades like investors would. Note that in the 2014 study, ERCOT considered 8,500 MW of coal-fired capacity to have some risk of retirement due to the proposed Regional Haze requirements.

If ERCOT does not receive adequate notification of these retirements, and if multiple unit retirements occur within a short timeframe, there could be implications for reliability. Coal resources provide essential reliability services necessary to maintain the reliability of the grid. The retirement of coal resources will require studies to determine if there are any resulting reliability issues, including whether there are localized voltage/reactive power control issues and the necessity of potential transmission upgrades, which is discussed in the following section.

3.2. Impact on Transmission

The modeling results indicate that the compliance requirements in the CPP could result in the retirement of at least 4,000 MW of coal-fired capacity. The retirement of legacy coal-fired generation could result in localized reliability issues and require transmission system upgrades. As part of ongoing work studying the potential impacts of environmental regulations, ERCOT recently conducted a reliability analysis that evaluated potential retirement scenarios resulting from compliance with the proposed Regional Haze FIP.[12] Though this study was focused specifically on scenarios associated with the Regional Haze requirements, the results are illustrative of the likely transmission reliability implications and associated costs of losing a substantial amount of legacy coal-fired generation over a relatively short period of time.

In the study, ERCOT retired affected units in phases – first assuming the retirement of units with scrubber retrofit requirements, and then adding to that the potential retirement of units with scrubber upgrade requirements. ERCOT evaluated the potential impacts separately for each region with affected

[12] Additional information on this study is available on ERCOT's Regional Planning Group (RPG) website at http://www.ercot.com/content/wcm/key_documents_lists/76860/Transmission_Impact_of_the_Regional_Haze_Environmental_Regulation_Oct_RPG.pdf.

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capacity (East/Coast, South/South Central, and North/North Central), using the 2015 Regional Transmission Plan (RTP) cases for the year 2020. New conventional and solar generation resources outside of the study region with a signed generator interconnection agreement (SGIA) were added to each scenario to balance the load, supply, and reserves.

The study showed that the retirement of coal-fired generation affected by the proposed Regional Haze FIP would have a significant impact on the reliability of the transmission system and would require substantial upgrades to transmission infrastructure. The study identified local transmission issues in all of the studied regions, as well as zonal transfer issues in the North/North Central region. In one scenario that assumed the retirement of 4,200 MW of coal-fired capacity, comparable to the amount expected to retire due to the CPP alone, model results indicated that the thermal capacities of 10 circuits (143 miles) of 345 kV transmission lines, 31 circuits (147 miles) of 138 kV transmission lines, 6 circuits (39 miles) of 69 kV transmission lines, and 11 transformers would be exceeded. Note that the transmission impacts of unit retirements are highly location specific. As a general estimate, new 69 kV and 138 kV lines cost on the order of one million dollars per mile and new 345 kV lines cost on the order of three million dollars per mile. Additionally, in the ERCOT Region, it takes at least five years for a new major transmission project to be planned, routed, approved, and constructed.

Growth in renewable generation would also likely have a significant impact on transmission requirements. In early 2014, the transmission upgrades needed to integrate the Texas Competitive Renewable Energy Zones (CREZ) were completed. These upgrades were intended to facilitate the integration of wind resources onto the ERCOT system and included more than 3,600 miles of new transmission lines, constructed at a cost of $6.9 billion dollars. The project took nearly a decade to complete. To date, more than 14 gigawatts of wind capacity have been successfully integrated onto the ERCOT grid. While the CREZ transmission upgrades provide some transmission capacity beyond current generation development, the modeling results indicate as much or more growth in renewable capacity over the next 15 years. Integrating these resources would likely require significant investments in new transmission and a substantial acquisition of new transmission line right of way, incremental to those that have already been completed as part of CREZ.

3.3. Impact of Renewables Integration

Integrating new wind and solar resources will increase the challenges of reliably operating the ERCOT grid. In 2014, 10.6% of the ERCOT region's annual generation came from wind resources. At its highest levels of instantaneous penetration, wind has provided enough energy to serve 40.58% of system load.[13] The modeling results predict further growth in both wind and solar resources, which together would constitute 27% of total generation by 2030 in the CO_2 Price and CO_2 Price & Regional Haze scenarios. However, in hourly operations, this level of renewables would result in intermittent generation serving more than 50% of load in over 400 hours of the year, and a peak instantaneous penetration of 67%. This is an increase in renewable generation compared to the results of ERCOT's 2014 study, due to the improving economics of these technologies, as reflected in the updated capital cost assumptions included in this analysis.

Further, these scenarios show significant growth in both wind and solar resources, compared to the 2014 study which predicted mostly solar capacity additions. Wind production in West Texas results in high renewable penetration during off-peak hours, when customer demand for electricity is lowest. The modeling results indicate lower net loads (defined as total customer demand minus generation from intermittent energy resources) compared to the 2014 study (14,611 MW in this analysis as compared to 17,611 MW in the 2014 study).[14] As a result, the anticipated challenges to grid reliability indicated by

[13] The current record in the ERCOT Region for wind penetration occurred on March 29, 2015 at 2:00 a.m.

[14] The current record in the ERCOT Region for net load is 14,809 MW, which occurred on March 24, 2014 at 2:25 a.m.

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these modeling results may be more severe. In addition, if a significant portion of future solar generation capacity is located on the distribution grid (e.g., rooftop solar and small scale utility solar connected at lower voltage levels), as opposed to the utility-scale, it could result in additional operational impacts.

The increased penetration of intermittent renewable generation, as projected by these results, will pose challenges to the reliable operation of all generation resources. In the periods when the output of renewable generation provides a large percentage of total energy, significant ramping capability and operational reserves will be required to maintain grid reliability. If there is not sufficient ramping capability and operational reserves during these periods, the need to maintain operational reliability could require the curtailment of renewable generation resources. The ability to curtail intermittent generation resources in real-time operations is a key backstop for maintaining the reliability of the system. Curtailment would reduce production from renewable resources, and could delay achievement of compliance with the CPP limits.

4. Conclusion

ERCOT's modeling of the CPP final rule suggests impacts of a different magnitude compared to the proposed rule. Though overall fewer coal units are at risk compared to the number of units under the CPP proposal, there continues to be a risk that the ERCOT Region could see multiple unit retirements within a short timeframe. When the impacts of the CPP are considered in combination with the requirements of EPA's proposed Regional Haze FIP, there are additional unit retirements, many of which occur even before the start of CPP compliance in 2022. If ERCOT does not receive adequate notification of these retirements, there could be periods of reduced system-wide reserve margins and localized transmission reliability issues due to the loss of generation resources in and around major urban centers. A recent reliability analysis of potential retirement scenarios resulting from compliance with the proposed Regional Haze FIP indicated that the retirement of 4,200 MW of coal-fired capacity would have a significant impact on the reliability of the transmission system.

As with ERCOT's analysis of the proposed rule, this study predicts a sizeable amount of renewable capacity additions, due both to the improving economics of these technologies as well as impacts of regulating CO_2 emissions. If there is not sufficient ramping capability and operational reserves during periods of high renewable penetration, the need to maintain operational reliability could require the curtailment of renewable generation resources. The ability to curtail intermittent generation resources in real-time operations is a key backstop for maintaining the reliability of the system. Curtailment would reduce production from renewable resources, and could delay achievement of compliance with the CPP limits.

The CPP will also result in increased energy costs for customers in the ERCOT region. Based on ERCOT's modeling analysis, energy costs for customers may increase by up to 16% by 2030 due to the CPP alone, without accounting for the associated costs of transmission upgrades, higher natural gas prices caused by increased gas demand, procurement of additional ancillary services, and other costs associated with the retirement or decreased operation of coal-fired capacity in ERCOT. Consideration of these factors would result in even higher energy costs for customers.

At this time, there is uncertainty regarding the implementation of the CPP in Texas. In the coming years, resource owners will need to make decisions about their generation units – taking into account the CPP as well as other environmental regulations – that could result in localized reliability issues and transmission constraints associated with a changing resource mix. As new information becomes available, ERCOT will continue to analyze the impacts of regulatory developments that may affect the ability to provide reliable electricity to customers in Texas.

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To: Stewart, Lori[Stewart.Lori@epa.gov]
From: Goffman, Joseph
Sent: Fri 10/9/2015 12:35:19 AM
Subject: OAR Major Actions through 2016 as of Oct7 jg
OAR Major Actions through 2016 as of Oct7 jg.docx

One change. Thanks.

To: Keith Belton[keith.belton@paretopolicysolutions.com]
Cc: Jordan, Deborah[Jordan.Deborah@epa.gov]
From: Goffman, Joseph
Sent: Mon 10/5/2015 7:44:54 PM
Subject: Re: question about ozone rule

Hi, Keith. Debbie, who is our Senior Adviser to Janet, can provide some info. Thanks

- Joseph Goffman
Sent from my iPhone

On Oct 5, 2015, at 11:22 AM, Keith Belton <keith.belton@paretopolicysolutions.com> wrote:

Joe:
I see that EPA has stated it plans to develop a white paper on background ozone, hold a workshop, and seek public comment. It is, however, unclear when this might occur. Can you share any info on timing? Or point me to the right person to ask?

Keith

Keith Belton
Pareto Policy Solutions, LLC
www.paretopolicysolutions.com
2-2-740-3368

To: McCabe, Janet[McCabe.Janet@epa.gov]
Cc: Fritz, Matthew[Fritz.Matthew@epa.gov]; Ragland, Micah[Ragland.Micah@epa.gov]; Enobakhare, Rosemary[Enobakhare.Rosemary@epa.gov]
From: Goffman, Joseph
Sent: Sat 9/26/2015 1:37:12 AM
Subject: Re: Green Group CEO Meeting Flag -- Oct. 12th

I am not sure where I will be that day since it is a federal holiday.

- Joseph Goffman
Sent from my iPhone

On Sep 25, 2015, at 9:10 PM, McCabe, Janet <McCabe.Janet@epa.gov> wrote:

yep--I agree too.

I will not be in DC on october 12, so wouldn't be able to attend. If it happens that day, Joe may be available to go. If it happens another day, then maybe even the Administrator could go.

From: Fritz, Matthew
Sent: Friday, September 25, 2015 7:08 PM
To: Goffman, Joseph
Cc: Ragland, Micah; McCabe, Janet; Enobakhare, Rosemary
Subject: Re: Green Group CEO Meeting Flag -- Oct. 12th

I care a great deal - but it somewhat worries me or, really, it should worry you

On Sep 25, 2015, at 7:05 PM, Goffman, Joseph <Goffman.Joseph@epa.gov> wrote:

Do you care that I agree?

From: Fritz, Matthew
Sent: Friday, September 25, 2015 7:00 PM
To: Ragland, Micah
Cc: Goffman, Joseph; McCabe, Janet; Enobakhare, Rosemary

Subject: Re: Green Group CEO Meeting Flag -- Oct. 12th

I do not plan on changing our plans for Miami - she has a good opportunity to talk WPS, refineries and ozone with HACU leadership; do something on climate since she is in Miami; and meet with Governor Scott on CPP.

On Sep 25, 2015, at 6:37 PM, Ragland, Micah <Ragland.Micah@epa.gov> wrote:

Yep, it is

From: Goffman, Joseph
Sent: Friday, September 25, 2015 6:37 PM
To: McCabe, Janet; Ragland, Micah
Cc: Fritz, Matthew; Enobakhare, Rosemary
Subject: RE: Green Group CEO Meeting Flag -- Oct. 12th

Isn't the 12th Columbus Day?

From: McCabe, Janet
Sent: Friday, September 25, 2015 6:35 PM
To: Ragland, Micah
Cc: Fritz, Matthew; Enobakhare, Rosemary; Goffman, Joseph
Subject: Re: Green Group CEO Meeting Flag -- Oct. 12th

We should check with Gina, as I think there's a good chxhance she would want to be able to attend this meeting

Sent from my iPhone

On Sep 25, 2015, at 6:31 PM, Ragland, Micah <Ragland.Micah@epa.gov> wrote:

Hey Matt & Janet – I just got off the phone with my counterpart at CEQ and she flagged for me that Brian Deese is trying to set-up a meeting with Green Group CEOs on Monday, October 12th to discuss activities leading up to the Paris talks. Below is a draft list of the people Deese is seeking to invite to the meeting. I think Utech is also planning to be at the meeting. October 12th is the day we are exploring having the Administrator at the HACU conference in Miami.

1. Krupp, EDF

2. Brune, Sierra

3. Suh, NRDC

4. O'Mara, NWF

5. Karpinski, LCV

6. Alt, Environment America

7. Steer, WRI

8. Kimmell, UCS

9. Welch, Corridor

10. Rakis, Climate Action Campaign

11. Van Noppen, Earthjustice

12. Tanden, CAP

13. Pica, FOE

14. Lubber, CERES (CEQ wants to invite her but they are waiting for sign-off from WH)

15. Roberts, WWF

To: Fritz, Matthew[Fritz.Matthew@epa.gov]; Ragland, Micah[Ragland.Micah@epa.gov]
Cc: McCabe, Janet[McCabe.Janet@epa.gov]; Enobakhare, Rosemary[Enobakhare.Rosemary@epa.gov]
From: Goffman, Joseph
Sent: Fri 9/25/2015 11:05:42 PM
Subject: RE: Green Group CEO Meeting Flag -- Oct. 12th

Do you care that I agree?

From: Fritz, Matthew
Sent: Friday, September 25, 2015 7:00 PM
To: Ragland, Micah
Cc: Goffman, Joseph; McCabe, Janet; Enobakhare, Rosemary
Subject: Re: Green Group CEO Meeting Flag -- Oct. 12th

I do not plan on changing our plans for Miami - she has a good opportunity to talk WPS, refineries and ozone with HACU leadership; do something on climate since she is in Miami; and meet with Governor Scott on CPP.

On Sep 25, 2015, at 6:37 PM, Ragland, Micah <Ragland.Micah@epa.gov> wrote:

Yep, it is

From: Goffman, Joseph
Sent: Friday, September 25, 2015 6:37 PM
To: McCabe, Janet; Ragland, Micah
Cc: Fritz, Matthew; Enobakhare, Rosemary
Subject: RE: Green Group CEO Meeting Flag -- Oct. 12th

Isn't the 12th Columbus Day?

From: McCabe, Janet
Sent: Friday, September 25, 2015 6:35 PM
To: Ragland, Micah
Cc: Fritz, Matthew; Enobakhare, Rosemary; Goffman, Joseph

Subject: Re: Green Group CEO Meeting Flag -- Oct. 12th

We should check with Gina, as I think there's a good chxhance she would want to be able to attend this meeting

Sent from my iPhone

On Sep 25, 2015, at 6:31 PM, Ragland, Micah <Ragland.Micah@epa.gov> wrote:

> Hey Matt & Janet – I just got off the phone with my counterpart at CEQ and she flagged for me that Brian Deese is trying to set-up a meeting with Green Group CEOs on Monday, October 12th to discuss activities leading up to the Paris talks. Below is a draft list of the people Deese is seeking to invite to the meeting. I think Utech is also planning to be at the meeting. October 12th is the day we are exploring having the Administrator at the HACU conference in Miami.

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15. Roberts, WWF

To: McCabe, Janet[McCabe.Janet@epa.gov]
From: Goffman, Joseph
Sent: Tue 9/22/2015 1:51:41 AM
Subject: FW: MATS_Motion to Govern_v4_McCabe draft declaration_9-21-2015_clean jg
MATS_Motion to Govern_v4_McCabe draft declaration_9-21-2015_clean jg.docx

Again, fyi. Perhaps they can turn around an updated draft before you get to the declaration. I note that a few of my concerns vis a vis the brief are allayed by some of the material here. Thanks.

From: Goffman, Joseph
Sent: Monday, September 21, 2015 9:50 PM
To: Ting, Kaytrue
Cc: Versace, Paul; Rodman, Sonja
Subject: MATS_Motion to Govern_v4_McCabe draft declaration_9-21-2015_clean jg

Apologies for not getting this to you sooner, especially since you already sent a version to Janet, but here are a small handful of fairly minor edits and suggestions for the draft declaration. Thanks.

To: Ting, Kaytrue[Ting.Kaytrue@epa.gov]
Cc: Versace, Paul[Versace.Paul@epa.gov]; Rodman, Sonja[Rodman.Sonja@epa.gov]
From: Goffman, Joseph
Sent: Tue 9/22/2015 1:50:28 AM
Subject: MATS_Motion to Govern_v4_McCabe draft declaration_9-21-2015_clean jg
MATS_Motion to Govern_v4_McCabe draft declaration_9-21-2015_clean jg.docx

Apologies for not getting this to you sooner, especially since you already sent a version to Janet, but here are a small handful of fairly minor edits and suggestions for the draft declaration. Thanks.

To: McCabe, Janet[McCabe.Janet@epa.gov]
From: Goffman, Joseph
Sent: Sat 9/19/2015 8:39:42 PM
Subject: Fwd: FOR YOUR REVIEW: MATS brief and declaration
ENV_DEFENSE-#739255-v1-MATS_motion_to_govern_9_17_15.DOCX
ATT00001.htm
MATS_Motion to Govern_v4_McCabe draft declaration_9-18-2015.docx
ATT00002.htm

Just getting to this now. I should have no trouble meeting Kaytrue's deadline but I would like you to have the option of looking at this sooner than Monday or Tuesday since the filing deadline is Thursday. Thanks.

PS hope you enjoy the opera.

- Joseph Goffman
Sent from my iPhone

Begin forwarded message:

From: "Ting, Kaytrue" <Ting.Kaytrue@epa.gov>
Date: September 18, 2015 at 4:24:23 PM EDT
To: "Goffman, Joseph" <Goffman.Joseph@epa.gov>, "Tsirigotis, Peter" <Tsirigotis.Peter@epa.gov>
Subject: FOR YOUR REVIEW: MATS brief and declaration

Joe and Peter,

Attached is the draft motion to govern and declaration. Note that the numbering in the motion may not correspond precisely to the declaration, as some changes were made last minute. Wanted to get these to you as soon as possible today.

Look forward to your comments. If you can, please send me your edits by midday Monday so that I can turn a draft for Janet and my front office.

Thanks and have a good weekend.

-Kaytrue

U.S. Environmental Protection Agency

Office of General Counsel

1200 Pennsylvania Avenue, NW

Washington, DC 20460

T: 202-564-6380

E: ting.kaytrue@epa.gov

To: Wolff, Brian[BWolff@eei.org]
Cc: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Goffman, Joseph
Sent: Sat 9/19/2015 8:33:26 PM
Subject: Re: Joe

Hi, Brian. Emily will help on the scheduling.

Thanks re dinner. Your question about my plans for Wednesday evening is one of of first impression as a court would put. At the moment I have no plans.

- Joseph Goffman
Sent from my iPhone

> On Sep 19, 2015, at 9:10 AM, Wolff, Brian <BWolff@eei.org> wrote:
>
>
> We are going to go to the WH next Friday on Ozone. Id like to bring Pat V Collawn and Greg Abel by EPA following that. Could you and Janet meet for 20 min around noon on 25th? I am trying to just get ahead of the final rule the following week and this would just be a courtesy and make their trip worthwhile.
>
> Thanks much.
>
> Also, ill be in NY next week for Climate week. Are we seeing you for dinner on Weds? Hope so.

To: Risley, David[Risley.David@epa.gov]; Dunham, Sarah[Dunham.Sarah@epa.gov]; Harvey, Reid[Harvey.Reid@epa.gov]
Cc: Friedman, Kristina[Friedman.Kristina@epa.gov]; Haeuber, Richard[Haeuber.Richard@epa.gov]
From: Goffman, Joseph
Sent: Fri 9/18/2015 7:22:24 PM
Subject: RE: Summary of CSAPR Update for 2008 Ozone NAAQS

Thanks.

From: Risley, David
Sent: Friday, September 18, 2015 1:46 PM
To: Goffman, Joseph; Dunham, Sarah; Harvey, Reid
Cc: Friedman, Kristina; Haeuber, Richard
Subject: Summary of CSAPR Update for 2008 Ozone NAAQS

Hi Joe,

Reid is having some computer troubles and asked me to send you the draft summary for the Administrator of the proposal to use CSAPR to address interstate ozone transport for the 2008 NAAQS. Please let us know if you have any questions or comments.

Best,

David

To: McCoy, Britney[McCoy.Britney@epa.gov]; Harvey, Reid[Harvey.Reid@epa.gov]
Cc: Friedman, Kristina[Friedman.Kristina@epa.gov]
From: Goffman, Joseph
Sent: Wed 9/16/2015 1:01:59 AM
Subject: FW: Transport jm 9-15-15.docx
Transport jm 9-15-15.docx

From: McCabe, Janet
Sent: Tuesday, September 15, 2015 9:01 PM
To: McCoy, Britney
Cc: Goffman, Joseph; Stewart, Lori
Subject: Transport jm 9-15-15.docx

Here are my few comments on the transport rule version I was sent over the weekend. Very few comments, mostly within the first 30 or so pages and then a typo or two elsewhere. Since my edits are hard to see on top of the other editing in the document, I put a comment bubble in the margin for each suggestion and highlighted it in yellow.

Thanks.

To: McCabe, Janet[McCabe.Janet@epa.gov]
From: Goffman, Joseph
Sent: Tue 9/15/2015 12:34:14 PM
Subject: Fwd: Big Project Cheat Sheet

- Joseph Goffman
Sent from my iPhone

Begin forwarded message:

From: "Goffman, Joseph" <Goffman.Joseph@epa.gov>
Date: September 14, 2015 at 7:06:08 PM EDT
To: "Page, Steve" <Page.Steve@epa.gov>, "Grundler, Christopher" <grundler.christopher@epa.gov>, "Flynn, Mike" <Flynn.Mike@epa.gov>, "Dunham, Sarah" <Dunham.Sarah@epa.gov>
Cc: "Stewart, Lori" <Stewart.Lori@epa.gov>, "Jordan, Deborah" <Jordan.Deborah@epa.gov>
Subject: Big Project Cheat Sheet

Coming out of a conversation with Gina over the weekend, Janet thought it would be a good idea to put together and share with Gina a one- or two-page "cheat sheet" that listed the "big projects"/deliverables we have in front of us in the coming months. In contrast to the weekly hot lists, which operate on a more immediate or incremental level, the cheat sheet would just name the deliverable and, if the item were not self-explanatory, include a one-sentence description, along with key milestones (like the signature date). We're talking here about things like: HDV FR, Ozone NAAQS FR, Oil and Gas NSPS FR and final CTGs, MATS Appropriate and Necessary Remand/Reconsideration, CPP-CEIP follow-on and Federal Plan FR, Transport Rule rulemaking; that kind of stuff.

Lori – Can I ask you please to work with the ODs, Debbie and me to assemble this? Perhaps we can take a couple of minutes at the Senior Staff meeting on Tuesday to discuss this as well.

Thanks.

Joseph Goffman

Associate Assistant Administrator for Climate

and Senior Counsel

Office of Air and Radiation

US EPA

Washington, DC.

To: Page, Steve[Page.Steve@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Flynn, Mike[Flynn.Mike@epa.gov]; Dunham, Sarah[Dunham.Sarah@epa.gov]
Cc: Stewart, Lori[Stewart.Lori@epa.gov]; Jordan, Deborah[Jordan.Deborah@epa.gov]
From: Goffman, Joseph
Sent: Mon 9/14/2015 11:06:09 PM
Subject: Big Project Cheat Sheet

Coming out of a conversation with Gina over the weekend, Janet thought it would be a good idea to put together and share with Gina a one- or two-page "cheat sheet" that listed the "big projects"/deliverables we have in front of us in the coming months. In contrast to the weekly hot lists, which operate on a more immediate or incremental level, the cheat sheet would just name the deliverable and, if the item were not self-explanatory, include a one-sentence description, along with key milestones (like the signature date). We're talking here about things like: HDV FR, Ozone NAAQS FR, Oil and Gas NSPS FR and final CTGs, MATS Appropriate and Necessary Remand/Reconsideration, CPP-CEIP follow-on and Federal Plan FR, Transport Rule rulemaking; that kind of stuff.

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Joseph Goffman

Associate Assistant Administrator for Climate

and Senior Counsel

Office of Air and Radiation

US EPA

Washington, DC.

From: Goffman, Joseph
Location: Administrator's Office
Importance: Normal
Subject: Accepted: Meeting Re: Planning for Ozone NAAQS Implementation
Start Date/Time: Thur 9/17/2015 7:00:00 PM
End Date/Time: Thur 9/17/2015 8:00:00 PM

From: Goffman, Joseph
Location: Administrator's Office
Importance: Normal
Subject: Tentative: Meeting Re: Planning for Ozone NAAQS Implementation
Start Date/Time: Thur 9/17/2015 5:15:00 PM
End Date/Time: Thur 9/17/2015 6:15:00 PM

To: Millett, John[Millett.John@epa.gov]; McCoy, Britney[McCoy.Britney@epa.gov]
From: Goffman, Joseph
Sent: Tue 9/8/2015 5:49:12 PM
Subject: Fwd: ECOS Slides
Koerber ECOS final1.pptx
ATT00001.htm

- Joseph Goffman
Sent from my iPhone

Begin forwarded message:

From: "Koerber, Mike" <Koerber.Mike@epa.gov>
Date: September 8, 2015 at 1:45:38 PM EDT
To: "McCabe, Janet" <McCabe.Janet@epa.gov>, "Goffman, Joseph" <Goffman.Joseph@epa.gov>
Cc: "Page, Steve" <Page.Steve@epa.gov>
Subject: ECOS Slides

At ECOS, I only used Slide 2, but verbally covered some of Slides 1 and 3.

To: Adm13McCarthy, Gina[Adm13McCarthy.Gina@epa.gov]; Meiburg, Stan[Meiburg.Stan@epa.gov]; Scaggs, Ben[Scaggs.Ben@epa.gov]; Fritz, Matthew[Fritz.Matthew@epa.gov]; Garbow, Avi[Garbow.Avi@epa.gov]; Vaught, Laura[Vaught.Laura@epa.gov]; Reynolds, Thomas[Reynolds.Thomas@epa.gov]; Bond, Brian[Bond.Brian@epa.gov]; Beauvais, Joel[Beauvais.Joel@epa.gov]; Pieh, Luseni[Pieh.Luseni@epa.gov]; Rupp, Mark[Rupp.Mark@epa.gov]
Cc: Stewart, Lori[Stewart.Lori@epa.gov]; Shaw, Betsy[Shaw.Betsy@epa.gov]; Niebling, William[Niebling.William@epa.gov]; Jordan, Deborah[Jordan.Deborah@epa.gov]; Millett, John[Millett.John@epa.gov]; Drinkard, Andrea[Drinkard.Andrea@epa.gov]; Dennis, Allison[Dennis.Allison@epa.gov]; Knapp, Kristien[Knapp.Kristien@epa.gov]; McCabe, Janet[McCabe.Janet@epa.gov]
From: Goffman, Joseph
Sent: Fri 9/4/2015 9:52:56 PM
Subject: OAR Hot List 09-07-15 draft Sent on behalf of Janet McCabe
OAR Hot List 09-07-15 draft.docx

OAR Hot List

Week of September 7, 2015

Climate Action Plan: This week, Joe got back from vacation and jumped right into Climate Action Plan outreach mode. As active as this week was for Joe, OAQPS and OAP, next week really starts to ramp up, with a lot of meetings, speeches and travel on the horizon for us over the next couple months.

After you approved the inadvertent error corrections on Thursday, OP sent off the three power plant rules to the *Federal Register* on Friday morning. We expect publication in mid to late–October.

At Environmental Council of States (ECOS), while Michigan stole the show by indicating that they were moving forward on their CPP plan, there were many encouraging sidebar conversations with several states who also indicated more quietly that they were moving forward as well. The conference also provided a good opportunity to coordinate on future discussions, not just with ECOS, but with the Association of Air Pollution Control Agencies (AAPCA) and the National Association of Clean Air Agencies (NACAA) as well. Joe met with the Business Council for Sustainable Energy's (BCSE) board on clean energy's role and opportunities for their members in achieving early reductions in the CPP and ways for them to engage with us going forward, especially regarding the state toolbox. Joe's meeting with Bill Bumper's organization, the Coalition for Innovative Climate Solutions (CICS), was certainly instructive, if not completely constructive, as they have many members who've been skeptical throughout the CPP development process. There is value in continued dialogue, however.

Discussions with the Texas Industry Project covered CPP and Oil and Gas, but most questions dealt with Clean Air Act Title I (air quality planning and standards) issues, so it was great to have Debbie there to field those. The Advanced Energy Management Association Board of Directors – a group of demand response and demand-side management firms came in for a

technical Q and A session that was very constructive and can-do. Joe also had a good meeting with the Blue-Green Alliance on the Oil and Gas proposals, as they look for ways to constructively engage. Finally, Joe, OAP and OAQPS participated in a successful and straightforward webinar briefing that CERES coordinated for their investor and company networks. Joe and Cindy Newburg also participated in a call with State and EOP reps to prepare for the USG's negotiating position for the upcoming Montreal Protocol Meeting of the Parties.

Next week, highlights include Joe's keynote on the CPP for the Air & Waste Management Association's conference in Chicago. Then Joe and I are both in Colorado Wednesday and Thursday for meetings with EEI's board and members and a CPP workshop for western states held by Gov. Ritter's Center for the New Energy Economy. Friday we meet with the Labor Unions. I will also provide opening remarks at a large SNAP stakeholders meeting on HFCs.

Primary Aluminum Final Rule: We have a September 10 consent decree deadline for the final its risk and technology review for the Primary Aluminum Production industry, so that will come your way for signature on Thursday. The final rule will establish emission standards for particulate matter, polycyclic organic matter, carbonyl sulfide, mercury, polychlorinated biphenyls, and dioxin furans from various emissions points.

Secondary Aluminum Inadvertent Errors Memo: Also coming your way next week is a memo, for your concurrence, to correct a few errors in the final Secondary Aluminum RTR rule. This will include restoring inadvertently omitted language and aligning a few things in the reg text with the preamble.

Coming Soon: We have three rules at OMB that are required under consent decree to be signed soon. These include the final Brick and Clay NESHAP MACT, the final Refinery NESHAP RTR, and of course, the Ozone NAAQS final rule. The Refinery rule has a consent decree target of September 30, but we're hoping to get that cleared and signed earlier so it won't be right up against the Ozone rule on October 1.

OAR Hot List
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From: Anderson, Denise
Location: DCRoomARN3530CFTB/DC-Ariel-Rios-AO + Call In# Conference Code Code Conference Code
Importance: Normal
Subject: ECOS Meeting Pre-Brief
Start Date/Time: Thur 4/7/2016 8:00:00 PM
End Date/Time: Thur 4/7/2016 8:45:00 PM
Annotated Agenda_ECOS 2016 Spring Mtg_4-06-16.docx

Call In # **Conference Code**

Point of Contact for the Meeting:
Mark Rupp 202-564-6074, staff Ct:
Andrea Barbery, 202-564-1397
SCt: Denise Anderson, 202-564-1782

Purpose: Mark Rupp, OCIR, will run through the agenda for the ECOS Spring Meeting (April 10-13) for senior leaders' situational awareness. This meeting will also serve as an opportunity for ECOS meeting attendees to coordinate on messaging and ask questions about content and logistics of the meeting.

Role of the Administrator: The Administrator will be featured in two sessions on Wed., Apr. 13: from 8:00 - 9:15 a.m., she will participate in a moderated Q&A session with ECOS President Martha Rudolph, and from 9:30 - 10:30 a.m., YOU and she will speak at a closed (state-EPA only) session on working together through crisis.

Role of Deputy Administrator: YOU will attend the entire ECOS Spring meeting, with speaking roles in the 9:30 - 10:30 a.m. closed session on Wed., Apr. 13, as well as the Federal Facilities Forum later on the afternoon of Wed., Apr. 13, and E-Enterprise Session on Wed - Thurs (13th - 14th).

Background: ECOS holds 3 key meetings every year: a Spring Meeting, a State Environmental Protection (STEP) Meeting in the summer, and a Fall meeting. In recent years, new leadership at EPA and ECOS has fostered a strong partnership between federal and state environmental leaders. These meetings are well-attended by state environmental commissioners and EPA leadership, as well as federal agency partners, industry, academia, and others. The 2016 Spring Meeting will focus on Public Health, with the Administrator slated to participate in a two sessions on Wednesday, April 13. Over 200 people are registered, including over 30 EPA senior leaders and staff.

Last possible date for the meeting: Friday, April 8 (meeting begins Sunday, Apr. 10)

Is the meeting urgent and if so why?: The meeting is not urgent but because so many AAs and RAs attend, it is helpful for all EPA participants to be on the same page with respect to meeting objectives, messages, etc.

Requested Time Length: 30 min

EPA Staff (Required):
- Teresa Marks
- Janet McCabe
- Andy Battin
- Mark Rupp

- Mike Osinski
- Andrea Barbery
- Cynthia Giles
- David Hindin
- Kay Holt
- Avi Garbow
- Mathy Stanislaus
- Nitin Natarajan
- Barry Breen
- Jackie Harwood
- Sandra Connors
- Tom Burke
- Lisa Matthews
- Elizabeth Corona
- Joel Beauvais
- Curt Spalding
- Shawn Garvin
- Heather McTeer Toney
- Anne Heard
- Cheryl Newton
- Sam Coleman
- Mark Hague
- Joan Card
- Shaun McGrath
- Michelle Pirzadeh

EPA Staff (Optional):

- Chris Knopes
- Allison Dennis
- Stacey Sublett
- Ragan Tate
- Nick Hilosky
- Kelley Smith
- Karen Gude
- Kendra Tyler
- Linda Miller
- Shea Jones Johnson

The Environmental Council of the States
2016 Spring Meeting: *Pathways to Partnerships: Advancing Environmental Protection*

Sunday, April 10 – Wednesday, April 13, 2016
Music City Center
Nashville, Tennessee

Followed by Meeting of the E-Enterprise for the Environment Leadership Council
Wednesday, April 13 – Thursday, April 14, 2016

Notes:
(1) Twitter users are encouraged to use #ECOSpringMtg16 to tweet about the meeting.
(2) Dress for the meetings is business casual.
(3) All meeting space is located on the main level of the Music City Center
(4) Draft resolutions will be posted near the registration desk.
(5) All meetings are open to all registrants, including press, except where indicated.

Sunday, April 10th – OPEN TO ALL ATTENDEES

[5:30 – 8:30 p.m.] After-Hours Tour, Buffet Dinner, and Musical Entertainment
Country Music Hall of Fame and Museum (222 5th Ave. South)
The Country Music Hall of Fame and Museum adjoins the Omni Nashville Hotel lobby. From the Omni, pass the concierge desk to the Hall of Fame lobby where guests will be directed to the museum elevators. No tickets or identification are needed. Guests may tour the museum until 7:30 p.m. and visit the souvenir shops until 6:00 p.m. or return to the shops during the meeting. In the first floor Conservatory, a cash bar opens at 6:00 p.m., buffet dinner is served at 6:30 p.m., and a seated musical performance begins at 7:30 p.m.

Monday, April 11th – OPEN TO ALL ATTENDEES UNTIL 4:00 P.M.

[7:30 – 8:45 a.m.] Continental Breakfast
103 A-B

[7:30 – 8:45 a.m.] The ECOS Shale Gas Caucus
103 C
After focusing initially on air and methane issues, the SGC now adds water to its portfolio. The caucus kicks off this work with a discussion of "What Commissioners Need to Know about Alternative Management Strategies for Water Produced from Oil and Gas Wells." A variety of state partners will participate. Continental breakfast may be taken into the session.

- Martha Rudolph of Colorado, ECOS President and SGC Co-Chair
- David Glatt of North Dakota, SGC Co-Chair
- Teresa Marks, AO
- Marni Lenahan, Energy Industry Analyst, U.S. Department of Energy
- Mike Smith, Executive Director, Interstate Oil and Gas Compact Commission
- Scott Anderson, Senior Policy Director, U.S. Climate and Energy Program, Environmental Defense Fund

ED_000738_00004943-00001

- Roy Hartstein, Vice President, Strategic Solutions, Southwestern Energy Company

[9:00 – 10:30 a.m.] Opening Plenary Session
104 A-D

- Call to Order – Martha Rudolph of Colorado, ECOS President
- Host State Welcome – Nashville Mayor Megan Barry, introduced by Bob Martineau of Tennessee, ECOS Past President
- Self-introduction of ECOS Officers and Members
- Announcements and Agenda Preview – Martha Rudolph of Colorado
- Keynote Address on the Environment-Public Health Nexus by Bryn Barnard, author of *Outbreak! Plagues That Changed History*, introduced by Martha Rudolph of Colorado
- Preview of ECOS' New Website – Alexandra Dunn, ECOS Executive Director

[10:30 – 11:00 a.m.] Fresh Air Break, with Refreshments and Book Signing by Author Bryn Barnard
104 A-D Foyer

[11:00 a.m. – 12:15 p.m.] The Nexus between Environment and Public Health
104 A-D

This dynamic discussion will focus on techniques and approaches for enhancing partnerships between environmental regulators and public health professionals. Examples will be shared to show how decision-making and outcomes can be improved through these collaborations. The session will include the signing of a Memorandum of Agreement on Public and Environmental Health Initiatives by EPA, ECOS, and ASTHO.

- Martha Rudolph of Colorado, ECOS President
- Dr. Edward Ehlinger, Commissioner of Health, Minnesota Department of Health, and President, Association of State and Territorial Health Officials (ASTHO)
- Dr. Tom Burke, ORD
- Richard Opper, Director, Montana Department of Public Health and Human Services, and former ECOS President

[12:15 – 1:30 p.m.] Keynote Lunch: Risk Communication and Response
103 A-B

Invited to sit at the head table during the lunch: Dr. Tom Burke

- Dr. Randall Hyer, Co-founder, CrisisCommunication.net, Deputy Director, Center for Risk Communication, and co-author of the World Health Organization handbook *Effective Media Communication during Public Health Emergencies*

[1:30 – 2:30 p.m.] Partnerships to Advance Air Quality: Focus on Ozone and Regional Haze
104 A-D

Under EPA's recent tightening of the NAAQS for ozone, state recommendations on nonattainment area designations are due in October. The Agency also plans to finalize a rule by the end of the year updating its regional haze program and already is taking local action in many states. This roundtable will center on strategies states are pursuing to address the new ozone NAAQS and regional haze requirements.

- Bryan Shaw of Texas, Air Committee Chair
- Janet McCabe, OAR

[2:30 – 3:15 p.m.] Featured Address: State-Army Corps of Engineers Relations
104 A-D

- Major General Donald E. (Ed) Jackson Jr., Deputy Commanding General for Civil and Emergency Operations, U.S. Army Corps of Engineers

[3:15 – 3:30 p.m.] 2018 ECOS Spring Meeting Host State Selection
104 A-D
Members will vote on a location for the 2018 ECOS Spring Meeting.

[3:30 – 4:00 p.m.] Fresh Air Break, with Refreshments
104 A-D Foyer

[4:00 – 5:00 p.m.] CLOSED SESSION: Resolutions, Bylaws Amendment, and Strategic Plan Voting
104 A-D
Open to ECOS members and their staff and ECOS staff. (No EPA Participants).

[5:00 – 5:30 p.m.] CLOSED SESSION: ECOS Executive Committee
104 A-D
Open to ECOS members and their staff and ECOS staff. (No EPA Participants).

Evening open for individually arranged dinners and Alumni Association dinner.

Tuesday, April 12th – OPEN TO ALL ATTENDEES

[6:15 – 8:30 a.m.] Optional Walking Tour
Radnor Lake State Natural Area (http://tnstateparks.com/parks/about/radnor-lake)
Led by Bob Martineau of Tennessee. See signup sheet and additional details on the bulletin board in the registration area. Transportation will be provided by the Tennessee Department of Environment & Conservation.

[7:30 – 9:00 a.m.] Continental Breakfast
103 A-B

[7:30 – 9:00 a.m.] CLOSED SESSION: Environmental Research Institute of the States Board Meeting
105 A
Open to states and invited guests. A separate continental breakfast will be served in the session.

- David Paylor of Virginia, ERIS President
- Dr. Tom Burke, ORD
- Jennifer Orme-Zavaleta, ORD/NERL
- Lisa Matthews, ORD

[7:30 – 9:00 a.m.] CLOSED SESSION: ECOS Data Management Workgroup
103 C
Open to states and invited guests. (No EPA Participants)
[9:00 – 10:15 a.m.] Restoring Urban Waters to Bring Economic and Environmental Vitality Downtown

104 A-D
This roundtable will feature partnerships working to restore urban waterways in cities around the country and will present transferable experiences for protecting human health and the environment.

- Sara Pauley of Missouri, Water Committee Chair
- Martin Suuberg, Commissioner, Massachusetts Department of Environmental Protection
- Joel Beauvais, OW
- Mekayle Houghton, Executive Director, Cumberland River Compact

[10:15 – 10:45 a.m.] Fresh Air Break, with Refreshments
104 A-D Foyer

[10:15 – 10:45 a.m.] Side-meeting of ECOS leaders and OW
105 A
EPA to discuss drinking water issues with ECOS leaders.

- Joel Beauvais, OW
- Mark Rupp, OCIR
- Heather McTeer Toney & Anne Heard, Lead Region 4
- Sara Parker Pauley of Missouri, Water Committee Chair
- David Paylor of Virginia, Water Committee Vice Chair
- Martha Rudolph of Colorado, ECOS President (invited)
- John Stine of Minnesota, ECOS Vice President
- Todd Parfitt of Wyoming, ECOS Secretary-Treasurer
- Bob Martineau of Tennessee, ECOS Past President (invited)
- Alex Dunn, ECOS Executive Director

[10:45 a.m. – 12:00 p.m.] The Recovered Material Role in Sustainable Materials Management: Corporate Roundtable
104 A-D
Representatives of industries at various stages of maturity – coal ash recycling, waste-to-energy, and forest products manufacturing – will spotlight strides in curbing waste streams and promoting air quality and renewable energy and discuss how states can partner in these initiatives. State and EPA experiences will be featured during a Q&A period.

- Todd Parfitt of Wyoming, Waste Committee Chair
- Thomas Adams, Executive Director, American Coal Ash Association
- Paul Gilman, Ph.D., Senior Vice President and Chief Sustainability Officer, Covanta
- Paul Noe, Vice President for Public Policy, American Forest & Paper Association
- Scott Thompson, Executive Director, Oklahoma Department of Environmental Quality, and Waste Committee Vice Chair
- Mathy Stanislaus, OLEM

[12:00 – 1:15 p.m.] Lunch with Regional Discussions
103 A-B
State attendees should be seated at designated tables with their U.S. EPA Regional Administrators or Deputy Regional Administrators. All others may be seated at non-reserved tables.

- RAs and DRAs (no R2 table)
- Mark Rupp, OCIR (for R9 table)

[1:15 – 2:30 p.m.] How Lean is Your Machine?
104 A-D
This roundtable will present results of ECOS' national inventory of state lean activities and offer case studies of transformative efforts at state environmental agencies. EPA will share lean work occurring across the Agency, often in partnership with states.

- John Mitchell of Kansas, Innovation and Productivity Committee Chair
- Misael Cabrera, Director, Arizona Department of Environmental Quality
- Cathy Stepp, Secretary, Wisconsin Department of Natural Resources
- Sandra Connors, OP/OSEM

[2:30 – 3:30 p.m.] Beyond Bean Counting: Measuring the Impact of Environmental Enforcement
104 A-D
This roundtable will explore how federal and state agencies are measuring the environmental, public health, and worker safety results of enforcement actions. While number of actions brought, or penalty dollars collected, can serve as indicators of results, enforcement officials are employing new and more refined approaches to communicate why actions were brought and to quantify how the environment, the public, and even violating entities will be in better positions post enforcement action. The roundtable also will show how private environmental governance approaches are supplementing state and federal enforcement activities.

- Ryan Flynn of New Mexico, Compliance Committee Chair
- John Cruden, Assistant Attorney General, Environment and Natural Resources Division, DOJ
- Cynthia Giles, OECA
- Michael Vandenbergh, David Daniels Allen Distinguished Chair of Energy, Environment and Land Use Program, Vanderbilt University School of Law

[3:30 – 4:00 p.m.] Fresh Air Break, with Refreshments
104 A-D Foyer

[4:00 – 5:00 p.m.] The Clean Power Plan: What's Next
104 A-D
After the U.S. Supreme Court stay of Clean Power Plan implementation and as the D.C. Circuit reviews its legality, EPA and some states are moving ahead with the carbon reduction concepts, programs, and complementary activities. Other states are focusing efforts on the existing workload of core air quality protection work. The session will focus on the status of state and federal carbon-oriented actions and "what's next" across the nation, providing ample opportunity for ECOS member and attendee participation.

- Martha Rudolph of Colorado, ECOS President
- Avi Garbow, OGC
- Todd Parfitt, Director, Wyoming Department of Environmental Quality, and ECOS Secretary-Treasurer

[7:30 p.m.] Optional "We're All for the Hall" Benefit Concert featuring Keith Urban, Vince Gill, and Others
Bridgestone Arena – 501 Broadway, Nashville, Tennessee
Attendees will walk to the arena. Pre-purchased ECOS tickets will be available for pickup at the registration desk on April 12. Tickets are still available here.

Wednesday, April 13th – OPEN TO ALL ATTENDEES UNTIL 9:30 A.M.

[8:00 – 9:15 a.m.] Breakfast, with Remarks by the Honorable Bill Haslam, Governor of Tennessee, followed by Progress and Plans for the State-Federal Partnership, featuring the Honorable Gina McCarthy, U.S. EPA Administrator, and ECOS President Martha Rudolph of Colorado
103 A-B
This dialogue will highlight EPA and state priorities for the coming months, explore the rich potential of the state-federal partnership, and invite audience participation. Invited to sit at the head table during the lunch: Administrator McCarthy, Stan Meiburg, Heather McTeer Toney, and Mark Rupp.

- The Honorable Bill Haslam, Governor of Tennessee
- Gina McCarthy, Administrator, U.S. EPA
- Martha Rudolph of Colorado, ECOS President
- Alexandra Dunn, ECOS Executive Director and General Counsel (moderator)

[9:15 – 9:30 a.m.] Fresh Air Break, without Refreshments
104 A-D Foyer

[9:30 – 10:30 a.m.] CLOSED SESSION: State-U.S. EPA Roundtable
104 A-D
Discussion will focus on working cooperatively in response to crises. Open to states, U.S. EPA, federal agencies, and state association staff.

Seated on stage:

- Gina McCarthy, Administrator, U.S. EPA
- Stan Meiburg, Acting Deputy Administrator, U.S. EPA
- Martha Rudolph of Colorado, ECOS President
- John Stine of Minnesota, ECOS Vice President
- Todd Parfitt of Wyoming, ECOS Secretary-Treasurer
- Bob Martineau of Tennessee, ECOS Past President

Seated at tables with ECOS Members:

- Regional Administrators/Deputy Regional Administrators
- Nitin Natarajan, OLEM
- Dr. Tom Burke, ORD
- Mark Rupp, OCIR

[10:30 – 10:45 a.m.] Fresh Air Break, with Refreshments
104 A-D Foyer

[10:45 a.m. – 12:45 p.m.] CLOSED SESSION: States-Only Cutting-Edge Breakouts
103 A-B
This session will provide an opportunity for ECOS members to spend time at three topically oriented tables: methane, grants, and federal facilities (10:45 – 11:20 a.m.); nuclear decommissioning, state agency budgets, and crisis response (11:25 – 12:00 p.m.); and toxics, management innovations and lean, and Partnership Action Plans (12:10 – 12:45 p.m.). Open to states and state association staff (No EPA Participants).

[1:00 – 3:15 p.m.] CLOSED SESSION: ECOS Federal Facilities Forum

105 A
This session is open to states, federal agencies, and invited guests.

- Shari Meghreblian of Tennessee, Federal Facilities Forum Chair
- Stan Meiburg, Acting Deputy Administrator, U.S. EPA
- Ann Heard, R4
- Sam Coleman, R6
- Michelle Pirzadeh, R10
- Barry Breen, OLEM
- Charlotte Bertrand, Greg Gervais, OLEM/FFRRO
- Mark Whitney, Principal Deputy Assistant Secretary for Environmental Management, DOE
- Karen Baker, Chief, Environmental Division, U.S. Army Corps of Engineers

[1:00 – 3:00 p.m.] CLOSED SESSION: Natural Resources Forum
104 A-D
This always-popular forum will include discussion of productive structures to coordinate environmental and natural resource issues. It will spotlight three case studies from ECOS members of large projects where the integration of these issues was front and center – situations involving mining, construction of recreational facilities, and species protection. The forum also will explore strategies for improving agency coordination and communication with stakeholders. Open to states and invited guests (No EPA Participants).

[2:15 – 7:00 p.m.] CLOSED SESSION: E-Enterprise for the Environment Leadership Council
103 C
Open to states, territories, tribes, and EPA.

THURSDAY, APRIL 14

[8:00 a.m. – 2:15 p.m.] CLOSED SESSION: E-Enterprise for the Environment Leadership Council Continued
103 C
Open to states, territories, tribes, and EPA

Upcoming ECOS Meetings

July 21, 2016: State Environmental Protection (STEP) Meeting: The Water/Energy/Air Nexus (Washington, DC)

July 22, 2016: ECOS-EPA Leadership Meeting (Washington, DC)

September 25-27, 2016: ECOS 2016 Fall Meeting (Wheeling, West Virginia)

April 6-8, 2017: ECOS 2017 Spring Meeting (Washington, DC)

TBD: ECOS 2017 Fall Meeting (Jackson Hole, Wyoming)

ED_000738_00004943-00007

From: Atkinson, Emily
Location: The Watergate Hotel, 2650 Virginia Ave NW, Washington, DC 20037
Importance: Normal
Subject: Keynote at EPRI's ENV-Vision Conference (Confirmed)
Categories: Green Category
Start Date/Time: Tue 5/10/2016 12:10:00 PM
End Date/Time: Tue 5/10/2016 1:50:00 PM
FW: [External] RE: Invitation to be a Keynote Speaker at EPRI's ENV-Vision Conference
ENV-Vision Conference Agenda_finaldraft.pdf
FW: EPRI ENV-vision Conference - May 10 Keynote Panelist
ENV-Vision Conference Preliminary Agenda_V2.pdf
Janet McCabe Event Form AAA.DOCX

ENV·VISION

Environmental Vision – An International Electricity Sector Conference

May 10 – 11, 2016
The Watergate Hotel, Washington, DC

About the Conference

Purpose: A premier conference to exchange research results on current and emerging issues in the electricity sector, and to develop a shared vision to address the most critical environmental and sustainability challenges through engagement of electric industry leaders, regulators, NGOs, academics, and other stakeholders.

Background: Environmental issues facing the electricity sector are changing as rapidly as the dynamic global economy and evolving regulatory policy. There is an urgent need to anticipate future environmental challenges, identify major science and technology gaps, and design a research approach to enable sustainable and cost-effective solutions to those challenges. The first ENV-Vision Conference was held in 2015 to comprehensively focus on existing and emerging environmental challenges in the electricity sector. There were about 240 attendees. The meeting brought together leaders, managers, and researchers from a broad spectrum of stakeholder groups to promote discussions on electricity sector environmental research and information needs. This second edition of the conference will build upon the success of the first edition and continue to enable high level discussion on current and future environmental challenges facing the electricity sector, identify knowledge gaps and to define research needed to solve those challenges.

General Information

About the Electric Power Research Institute The Electric Power Research Institute, Inc. (EPRI, www.epri. com) conducts research and development relating to the generation, delivery, and use of electricity for the benefit of the public. An independent, nonprofit organization, EPRI brings together its scientists and engineers as well as experts from academia and industry to help address challenges in electricity, including reliability, efficiency, affordability, health, safety, and the environment. EPRI also provides technology, policy, and economic analyses to drive long-range research and development planning, and supports research in emerging technologies. EPRI's members represent more than 90 percent of the electricity generated and delivered in the United States, and international participation extends to more than 30 countries. EPRI's principal offices and laboratories are located in Palo Alto, Calif.; Charlotte, N.C.; Knoxville, Tenn.; and Lenox, Mass.

Conference Information

Venue

The Watergate Hotel
2650 Virginia Ave NW, Washington, DC 20037
202-827-1600

Location
Near the airport, The Watergate Hotel is located in Washington's Georgetown - Foggy Bottom neighborhood and close to Kennedy Center, Department of State, and Blair House.

Getting There
The closest major airports to the Watergate Hotel are:
Washington, DC (DCA) - Ronald Reagan Washington National) 3.6 mi
Washington, DC (IAD) - Washington Dulles International) 22.4 mi

Conference Committee

Conference Chair: Naresh Kumar, *Electric Power Research Institute*
Conference Co-Chair: David Hunter, *Electric Power Research Institute*

Steering Committee

Air Quality
Bryan Hubbell, *U.S. Environmental Protection Agency*
Daniel Jacob, *Harvard University*
Eladio Knipping, *Electric Power Research Institute*
Naresh Kumar, *Electric Power Research Institute*
Rohit Mathur, *U.S. Environmental Protection Agency*
Annette Rohr, *Electric Power Research Institute*

Energy and Climate Analysis – Decarbonization and Resiliency
Manuel Baritaud, *International Energy Agency*
Francisco de la Chesnaye, *Electric Power Research Institute*
Judy Greenwald, *U.S. Department of Energy*
Tom Wilson, *Electric Power Research Institute*

Sustainability
Rich Bozek, *Edison Electric Institute*
Jessica Fox, *Electric Power Research Institute*
Sandra Nessing, *American Electric Power*
Morgan Scott, *Electric Power Research Institute*
Natural Resource Defense Council

Emerging and Cross Cutting Issues
Linda Gaines, *Argonne National Laboratory*
Garvin Heath, *National Renewable Energy Laboratory*
Vasu Kilaru, *U.S. Environmental Protection Agency*
Stephanie Shaw, *Electric Power Research Institute*

Energy-Water Nexus
Sam Bockenhauer, *U.S. Department of Energy*
Bob Goldstein, *Electric Power Research Institute*
David Hunter, *Electric Power Research Institute*
Paul Jacobson, *Electric Power Research Institute*
Jeni Keisman, *U.S. Geological Survey*
Kerry McCalman, *U.S. Bureau of Reclamation*
David Mohler, *U.S. Department of Energy*
Kent Zammit, *Electric Power Research Institute*

TUESDAY, MAY 10, 2016

7:00 am	**BREAKFAST**
8:00 am	**Introduction and Welcome** Naresh Kumar and Anda Ray, EPRI
8:10 am	**Keynote Plenary Panel Session: Meeting Future Environmental Challenges in a Transitioning Energy Sector** Moderator: Anda Ray, Electric Power Research Institute
8:10 am	☐ Mike Howard, Chief Executive Officer, Electric Power Research Institute ☐ Gina McCarthy, Administrator, U.S. Environmental Protection Agency (Invited) ☐ Christina Figueres, the Outgoing President of the UNFCCC (Invited) ☐ Lyn Orr, Undersecretary of Science and Energy, U.S. Department of Energy ☐ Open Q&A for first four keynote speakers
9:50 am	**BREAK**
10:20 am	**Keynote Plenary Panel Session (Continued)** ☐ Pat Kampling, Chief Executive Officer, Alliant Energy ☐ Robert Bonnie, Undersecretary for Natural Resources and Environment, U.S. Department of Agriculture ☐ Andrew Steer, Chief Executive Officer, World Resources Institute ☐ David Victor, Professor, University of California, San Diego ☐ Open Q&A
12:00 – 1:00 pm	**LUNCH**
1:00 – 3:00 pm	**Air Quality** **Health Effects of Ozone – I** **Chairs: Bryan Hubbell and Annette Rohr**
	1:00 – 1:25 pm — Key Science Elements of the 2015 Ozone Standards *Scott Jenkins, U.S. Environmental Protection Agency*
	1:25 – 1:50 pm — Short-Term Health Effects of Ozone *Ron Wyzga, EPRI*
	1:50 – 2:15 pm — Health Effects of Ozone: Epidemiology and Chamber Studies *Richard Smith, University of North Carolina*
	2:15 – 2:40 pm — Translational and Computational Approaches to Understand Ozone-Induced Health Effects *Ed Schelegle, University of California – Davis*
	2:40 – 3:05 pm — Cardiovascular Effects in Humans Exposed to Ozone *Robert Devlin, U.S. Environmental Protection Agency*
	Emerging and Cross-cutting Issues **Environmental Considerations of Grid Scale Battery Storage** **Chairs: Linda Gaines and Arnout ter Schure**
	1:00 – 1:25 pm — Life Cycle Analysis of Lithium-ion Batteries and End-of-life Issues *Linda Gaines, Argonne National Lab*
	1:25 – 1:50 pm — Green Energy Principles for Grid Energy Storage *Jeremiah Johnson, University of Michigan*
	1:50 – 2:15 pm — The Recycler's Perspective on Lithium-ion Batteries *Joseph Acker, Retrieve*
	2:15 – 2:40 pm — Second Uses for Lithium-ion Batteries *Dirk Spiers, Spiers New Technologies*
	2:40 – 3:05 pm — Evaluating the Energetic and Carbon Performance of Bulk Battery Storage as a Flexible Power Grid Resource *Charles Barnhardt, Western Washington University*
	Energy and Climate Analysis – Clean Power Plan **The Impact of the Clean Power Plan – Modeling for Strategic Insights** **Chair: Tom Wilson**
	1:00 – 1:15 pm — Introduction *Tom Wilson, EPRI*
	1:15 – 1:40 pm — State-level Perspectives on the Clean Power Plan *Vic Niemeyer, EPRI*

	1:40 – 2:40 pm	State Perspectives – 20 minutes each - *Betsy Higgins, Oglethorpe Power Corporation* - *Skiles Boyd, DTE Energy* - *Scott Weaver, American Electric Power*
	2:40 – 3:00 pm	Open Q&A
	Sustainability **Sustainable Electricity? Sharing Perspectives** **Chair: Jessica Fox** Participants should plan to attend the full track. This track will facilitate discussion to: 1. Share perspectives on what "Sustainable Electricity" means, 2. Create a vision for 2050, and 3. Brainstorm research/scientific/tool gaps	
	1:00 – 1:30 pm	Jessica Fox, Welcome and Session Objectives
	1:30 – 2:00 pm	WRI Energy Research (Invited)
	2:00 – 2:30 pm	Clean Energy, Community, and Business Vitality *Lisa Clyde, CPS Energy*
	2:30 – 3:00 pm	An Environmental Lawyer on Sustainable Electricity *Brad Klein, Environmental Law and Policy Center*
3:00 – 3:30 pm	**BREAK**	
3:30 – 5:00 pm	**Air Quality** **Background Ozone – I** **Chairs: Daniel Jacob and Greg Yarwood**	
	3:30 – 4:00 pm	Issues Associated with Background Ozone in Implementation of the 2015 Ozone NAAQS *Pat Dolwick, U.S. Environmental Protection Agency*
	4:00 – 4:30 pm	Structure, Capabilities, and Accomplishments of the Tropospheric Ozone Lidar Network for Background Ozone Determination *Mike Newchurch, University of Alabama, Huntsville*
	4:30 – 5:00 pm	Stratospheric influence on Surface Ozone in the Southwestern U.S. *Andrew Langford, National Oceanic and Atmospheric Administration*
	Emerging and Cross cutting Issues **Next Generation Compliance & Novel Monitoring Techniques** **Chairs: Vasu Kilaru and Stephanie Shaw**	
	3:30 – 4:00 pm	EPA's Next Generation Compliance *George Wyeth, U.S. Environmental Protection Agency*
	4:00 – 4:30 pm	EPA's Air Sensors Research Program *Vasu Kilaru, U.S. Environmental Protection Agency*
	4:30 – 5:00 pm	Interoperable Water Monitoring Networks *Dwayne Young, U.S. Environmental Protection Agency*
	Energy and Climate Analysis – Clean Power Plan **The Impact of the Clean Power Plan – Modeling for Strategic Insights** **Chair: Tom Wilson**	
	3:30 – 3:50 pm	Approaches to Address Potential CO2 Emissions Leakage to New Sources *Karen Palmer, Resources for the Future*
	3:50 – 4:10 pm	State-level Delivered Electrcity Rates with Different CPP Implementations *Scott Bloomberg and Anne Smith, NERA Consulting*
	4:10 – 4:30 pm	Securing Economic and Clean Energy Benefits for all States: A ReEDS Analysis *Alison Bailie, Union of Concerned Scientists*
	4:30 – 5:00 pm	Open Q&A
	Sustainability **Sustainable Electricity? Sharing Perspectives** **Chair: Jessica Fox**	
	3:30 – 4:00 pm	Roundtables: What Does Sustainable Electricity Look Like?
	4:00 – 4:30 pm	Roundtable Report Out I: Perspectives From Power Companies and Research Organizations
	4:30 – 5:00 pm	Roundtable Report Out II: Perspectives From Environmental Groups and Agencies
5:30 – 7:00 pm	**RECEPTION**	

WEDNESDAY, MAY 11, 2016

7:00 am		**BREAKFAST**
8:00-10:00 am		
		Air Quality **Background Ozone – II** **Session Chairs: Daniel Jacob and Greg Yarwood**
	8:00 – 8:30 am	Variability & Uncertainty in Background Ozone: Relevance to Present & Future Ozone NAAQS *Arlene Fiore, Columbia University*
	8:30 – 9:00 am	Past and Future Trends in Background Ozone *Greg Yarwood, Ramboll Environ*
	9:00 – 9:30 am	Merging of the streams: Integration of Modeling and Observations to Understand Background Ozone *Dan Jaffe, University of Washington*
	9:30 – 10:00 am	Improving Ozone Modeling in the Southeast US: How it Affects Background Ozone Estimates *Daniel Jacob, Harvard University*
		Energy and Climate Analysis – Clean Power Plan **Clean Power Plan Compliance and Trading** **Chair: Tom Wilson**
	8:00 – 8:10 pm	Recap of Day 1 *Tom Wilson, EPRI*
	8:10 – 8:40 am	Perspectives on Trade *David Young, EPRI*
	8:40 – 9:20 am	Perspectives on Compliance and Trading – 20 minutes each - Issues Facing Utilities and Regulators in Preparing CPP SIPs in the Upper Midwest *Mike Cashin, Minnesota Power* - Implications of Clean Power Plan on Utilities with Multi-State Asset Portfolios *Sebastian Mankowski, NERA Consulting*
	9:20 – 10:00 am	Closing Discussion
		Energy-Water Nexus **Panel Discussion: Water Resource Risk and Mitigation** **Chair: Jeni Keisman**
	8:00 – 10:00 am	White House Water Priorities *Kelly Kryc, White House Office of Science and Technology Policy* Changing Water Patterns and Availability *Jerad Bales, U.S. Geological Survey* Water Resource Risk to the Electricity Sector *Diana Bauer, U.S. Department of Energy* Integrating water in Electric Transmission Planning *Vince Tidwell, Sandia National Laboratory* Groundwater Challenges in the Electric Power Sector *Ken Ladwig, EPRI*
		Sustainability **Identifying Research and Scientific Gaps to Sustainable Electricity** **Chair: Jessica Fox**
	8:00 – 8:30 am	Reflections on Day 1: How Far Apart Are We from a Shared Understanding? *Jessica Fox, EPRI*
	8:30 – 9:00 am	Advancing Metrics, Measures, and Benchmarking Sustainability Performance *Morgan Scott, EPRI*
	9:00 – 9:30 am	How to Advance Environmental Stewardship, Align with Societal Issues and Improve the Economic Fabric of a Region, While Also Remaining Focused on the Bottom Line *M. Lee Matthews, Tennessee Valley Authority*
	9:30 – 10:00 am	Water Resource Sustainability Metrics and Tools for the Energy Sector *Laura Weintraub, Limnotech*
10:00-10:30 am		**BREAK**

10:30 -12:00 pm	**Air Quality** **Air Quality Modeling for Ozone – I** **Chairs: Russell Dickerson and Eladio Knipping**	
	10:30 – 11:00 am	Modeling Analysis of Multi-decadal Trends in Ozone and Precursor Species across the Northern Hemisphere and the United States *Rohit Mathur, U.S. Environmental Protection Agency*
	11:00 – 11:30 am	Western U.S. Regional Ozone Modeling *Tom Moore, Western States Air Resources Council (WESTAR)*
	11:30 – 12:00 pm	Addressing Texas' Unique Ozone Challenges Through Modeling and Research *James Smith, Texas Commission on Environmental Quality (TCEQ)*
	Energy and Climate Analysis – Decarbonization **Chair: Francisco de al Chesnaye**	
	10:30 – 11:00 am	How to Reinvent Electricity Markets After COP 21? *Manuel Baritaud, International Energy Agency*
	11:00 – 11:30 am	EPRI Analysis of COP21 and Long-term Scenarios *Steve Rose, EPRI*
	11:30 – 12:00 pm	International Emissions Analysis *Alan Fawcett, U.S. Environmental Protection Agency*
	Energy-Water Nexus **Panel Discussion: Hydropower in a changing world: balancing competing needs for drought, energy storage, low-carbon power, and diminishing capacity** **Chair: Paul Jacobson**	
	10:30 – 12:00 pm	Optimization among various energy-water uses *Kerry McCalman, U.S. Bureau of Reclamation* DOE Office of Wind and Water Power perspectrive on Hydropower and the Energy-Water Nexus *Hoyt Battey, Wind and Water Power Technologies Office, U.S. Department of Energy* National Laboratory Perspective *Brennan Smith, Oakridge National Laboratory*
	Sustainability **Identifying Research and Scientific Gaps to Sustainable Electricity** **Chair: Jessica Fox**	
	10:30 – 11:00 am	Environmental priorities for Sustainable Electricity, Natural Resource Defense Council
	11:00 – 11:30 am	Group Brainstorm: Research, Science, and Tools Needed
	11:30 – 12:00 pm	Summary, The Next Decade, and Collaborative Center of Sustainability Science
12:00 – 1:00 pm	**LUNCH**	
1:00 – 3:00 pm	**Air Quality** **Exposure Modeling** **Chairs: Bryan Hubbell and Annette Rohr**	
	1:00 – 1:30 pm	Approaches to Modeling Personal Exposures to Ozone *Lisa Baxter, U.S. Environmental Protection Agency*
	1:30 – 2:00 pm	Assessing Air Quality Fields Developed Using Alternative Methods for Exposure and Epidemiologic Studies *Ted Russell, Georgia Institute of Technology*
	2:00 – 2:30 pm	Recent Perspectives on Ozone Exposure Assessment for Use in Epidemiological Studies *Helen Suh, Northeastern University*
	2:30 – 3:00 pm	Estimated Lung Function Decrements in the HREA for Ozone are Primarily Driven by Model Assumptions, not Ozone Exposure *Garret Glasgow, NERA Consulting*
	Emerging and Cross-cutting Issues **Environmental Impacts of Renewables** **Chairs: Garvin Heath and Stephanie Shaw**	
	1:00 – 1:25 pm	End-of-life Issues and Projections for Solar Photovoltaic (PV) Panels *Garvin Heath, National Renewable Energy Laboratory*
	1:25 – 1:50 pm	Impacts of Solar Installations on Land Use and Species *Rebecca Hernandez, University of California, Davis*
	1:50 – 2:15 pm	Lifecycle Climate Impacts and Economic Performance of Commercial-Scale Solar PV Systems: A Study at Nevada's DRI *Vivian Liu, Desert Research Institute*

	2:15 – 2:40 pm	Emerging Environmental Issues in Large-Scale PV and Recycling *Parihkit Sinha, FirstSolar*
	2:40 – 3:05 pm	Life Cycle Analysis of Co-Formed Coal/Hydrochar Briquettes Produced by a Twin-Screw Extrusion (TSE) Process *S. Kent Hoekman, Desert Research Institute*
		Energy and Climate Analysis – Decarbonization **Chair: Francisco de al Chesnaye**
	1:00 – 1:30 pm	EPRI Analysis of Economy-wide Mitigation & Electrification *John Bistline, EPRI*
	1:30 – 2:00 pm	Cost Effective, Incremental Approach to Carbon Mitigation May Increase the Cost of Deep Decarbonization *Jared Moore, Meridian Energy Policy*
	2:00 – 2:30 pm	Economic Impact and Energy Market Consequences of Economy-wide GHG Reduction Goals for the U.S. *Sugandha D. Tuladhar, NERA Consulting*
	2:30 – 3:00 pm	Open Q&A
		Energy-Water Nexus **Energy-Water Nexus Case Studies** **Chair: Kent Zammit**
	1:00 – 3:00 pm	Improving water management and conservation in the electric power sector *Richard Breckenridge, EPRI* Managing Water in the Desert Southwest *Bob Lotts, Arizona Public Service* Treatment and Reuse of Produced Water from CO2 Injection *Aboyjit Bohwn, EPRI* Water Saving Technologies and Strategies for Sectors Other than Electric Power *Scott Sheeder, Systech Water Resources, Inc.* The Western Reservoir Evaporation Network (WREN): Quantifying the Impacts of Climate on Evaporative Water Loss and Reservoir Capacity *Peter Blanken, et al, University of Colorado-Boulder*
3:00 – 3:30 pm		**BREAK**
3:30 – 5:00 pm		**Air Quality** **Air Quality Modeling for Ozone – II** **Chairs: Eladio Knipping and Rohit Mathur**
	3:30 – 4:00 pm	Modeling Ozone in the Eastern U.S.: Using Observations to Guide CAMx and CMAQ *Russell Dickerson, University of Maryland*
	4:00 – 4:30 pm	Photochemical Modeling in the Midwest: Challenges and Policy Implications *Rob Kaleel, Lake Michigan Air Directors Consortium (LADCO)*
	4:30 – 5:00 pm	Experience with the SCICHEM Model for Applications Involving Single Source Ozone Evaluations *Mark Garrison, Environmental Resources Management (ERM)*
		Emerging and Cross-cutting Issues **Transmission and Distribution Environmental Considerations** **Chair: John Goodrich-Mahoney**
	3:30 – 3:50 pm	Challenges of Implementing an Electric Utility ROW Wildlife Habitat Program *Timothy Lohner, American Electric Power*
	3:50 – 4:10 pm	Predicting Bird and Bat Collisions with Wind Turbines using Models of Habitat, Demography, and Behavior *Nicholas Friedenberg, Applied Biomathematics*
	4:10 – 4:30 pm	Benefits of High Resolution Digital Aerial Photography Compared to LiDAR for Transmission Line Vegetation Management Assessments *Christian Newman, APEM, Inc*
	4:30 – 4:50 pm	Using an Unmanned Aerial Vehicle to Install Wire Markers to Mitigate Bird Collisions *Richard Harness, EDM International*
	4:50 – 5:10 pm	Optimizing Conservation Plans With Quantitative Tools *Nicholas Friedenberg, Applied Biomathematics*
		Energy and Climate Analysis **Climate Risk and Resiliency and the Electric Power Sector** **Chair: Geoff Blanford**
	3:30 – 3:45 pm	EPRI Perspective and Initial Research on Climate Resiliency *Delavane Diaz, EPRI*

	3:45 – 4:05 pm	Enhancing Climate Resilience of the Electricity Sector *Craig Zamuda, U.S. Department of Energy*
	4:05 – 4:25 pm	Estimating Multi-sector Climate Risk in the U.S.: An Update on the EPA's Climate Change Impacts and Risks Analysis (CIRA) Project *Jeremy Martinich, U.S. Environmental Protection Agency*
	4:25 – 4:45 pm	Economic Risks of Climate Change *Robert Kopp, Rutgers University*
	4:45 – 5:00 pm	Closing Discussion and Q&A
	Energy-Water Nexus **Panel Discussion: Policy and Regulatory Changes and Their Potential Impact on the Energy-water Nexus** **Chair: David Hunter**	
	3:30 – 5:00 pm	U.S. Environmental Protection Agency Update *Joel Beauvais, U.S. Environmental Protection Agency* U.S. Department of Energy Update *David Mohler, U.S. Department of Energy* State Perspective *Ben Grumbles, Secretary of the Environment, Maryland* Industry Perspective *Rich Bozek, Edison Electric Institute*
5:00 pm	**ADJOURN**	

From: Atkinson, Emily
Location: 1615 H Street NW
Importance: Normal
Subject: US Chamber Speech (Confirmed)
Categories: Green Category
Start Date/Time: Fri 4/8/2016 1:00:00 PM
End Date/Time: Fri 4/8/2016 2:00:00 PM
McCabe Speaking Form.docx
Panel Speakers.doc
RE: U.S. Chamber Meeting - April 8
RE: U.S. Chamber Meeting - April 8
Spring 2016 Committee Meeting Agenda.pdf

Event Information Form

This form has been designed to assist in planning participation in events and activities.
This is not a confirmation of AAA Janet McCabe's attendance.

Basic Background

Name of Event	Energy, Clean Air & Natural Resources Committee Meeting
Sponsoring Organization	U.S. Chamber of Commerce
Date of Event	May 8, 2016
Time of Event	8:30 – 11:30 a.m.
Expected time of remarks or participation by AAA McCabe	9:00 – 9:50 a.m.
Location (please include city/town and street address)	1615 H Street NW, Washington, D.C. 20062
Directions to the event (if appropriate, please also include relevant information about parking, the specific building, and best entrance to use)	Please enter through the front entrance at 1615 H Street NW. (Note: Photo IDs are required for entry.)
Where to meet POC	Front lobby

Event Description and Role of the AAA

Brief description or outline of the event	This is the spring meeting of the U.S. Chamber's Energy, Clean Air & Natural Resources Committee meeting. The committee meets semi-annually.
Brochure, invitation and/or other event material(s)	I will send that information separately by email.
Agenda and order of speakers and biography/information of other speakers	I will send that information separately by email.
Name of person introducing AAA McCabe	Kathy Beckett, Chairman of Energy, Clean Air & Natural Resources Committee
Basic information about the role of the AAA official at the event. (For example, will they serve as a keynote speaker? Participate on a panel? Take part in a press conference? Tour a facility?)	AAA McCabe will be the keynote speaker for the committee meeting.
If the AAA official is a featured speaker, which topic(s) should they address and how long?	Based upon my communications with AAA McCabe's staff, she has requested 25-30 minutes for remarks and 15-20 minutes for Q&A. Those times work for us, but if the AAA would like more time, we are happy to accommodate that request.
What rules would the audience like to hear about?	Clean Power Plan, Ozone NAAQS, Methane regulations for oil & gas sector, regional haze, Utility MACT, Cross-State Air Pollution Rule, RTRs, SSM, Accidental Release Prevention Risk Management Program
Will there be time for Q&A? If so, who will be moderating?	Yes, Kathy Beckett (see above) will moderate.

Do you have a sense of the types of questions that may be asked?	I think the committee members will want to hear about the status and implementation of certain rules, i.e. CPP, ozone; outreach for proposed rulemakings, i.e. methane regulations; and plans for other rulemakings through the end of this Administration.
Recommendations on the use of visuals/PowerPoint. Should the AAA official plan on using a PowerPoint Presentation?	We have PowerPoint capabilities if AAA McCabe would like to use it. If you could let us know that ahead of time, we would appreciate it; and, if we could get a copy of her slides a couple of days before the meeting to test them, that would be helpful. You can specify whether the slides can be shared with the meeting participants later or if you do not want them distributed.
What is the physical layout of the room (e.g. size, and format of the interaction; podium, seated in armchair dialogue, or at a table, etc.)	We will have a podium and front table with 4-5 chairs at the front of the room with round tables facing the podium for the audience. AAA McCabe can be seated at the table during her introduction and then give the keynote from the podium.

About the Audience

Please tell us about the make-up of the audience for the event:	The committee is comprised of representatives from companies, trade associations, and local/state chambers of commerce, representing a broad array of businesses and industry, including oil & gas, utilities, renewables, agriculture, manufacturing, chemical, technology, financial services, and construction.
Expected number in attendance at the event	50-75
Will it be largely members of your organization?	Yes
Will others be in attendance? If so, who will be at the event? (General public, Businesspeople, Educators, Families, Students – what grade level, Children – how old)	No
Others? (Please describe)	N/A
Is the event open to press?	No

Contact Information

Your name:	Mary Martin
Telephone Number:	202.463.5986
Mailing Address:	1615 H Street NW Washington, D.C. 20062
E-Mail Address:	mmartin@uschamber.com
Cell Phone Number:	Personal Privacy
Fax Number:	202.463.5521
Best way to reach you at the event?	Email or text on cell phone

EPA Contact Person
Emily Atkinson, Administrative Assistant to Janet McCabe: 202-564-7404
Allison Dennis, Public Affairs Specialist: 202-564-1985

To: Dennis, Allison[Dennis.Allison@epa.gov]; Dewey, Amy[Dewey.Amy@epa.gov]
Cc: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Martin, Mary
Sent: Tue 3/29/2016 2:12:39 PM
Subject: RE: U.S. Chamber Meeting - April 8
Panel Speakers.doc

Hi Allison:

I hope you are doing well and enjoying what is starting to feel like true spring weather. Regarding the Chamber meeting next Friday (April 8), I just wanted to make sure that we are all set in terms of AAA McCabe's keynote. I have attached a copy of the bios for the other speakers at the meeting – representatives from OMB and CEQ will be giving a presentation on the new permit streamlining laws that were passed as part of the FAST Act last year. Also, I will get you a copy of the agenda by tomorrow – we have AAA McCabe speaking from 9:00 – 9:55 a.m. (including Q&A).

Finally, will you be accompanying AAA McCabe to the meeting next week?

Thanks,

Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

U.S. Chamber of Commerce

1615 H Street, N.W. | Washington, D.C. 20062

T: 202.463.5986 | F: 202.463.5521 | M: 703.608.2994

mmartin@uschamber.com

From: Martin, Mary
Sent: Tuesday, March 22, 2016 2:44 PM
To: 'Dennis, Allison'; 'Dewey, Amy'

Cc: 'Atkinson, Emily'
Subject: RE: U.S. Chamber Meeting - April 8

Allison: I noticed one typo from the form that I sent you last week – I listed the date as "May 8" instead of "April 8." Apologies for the error; attached is the corrected form. Thanks, Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

U.S. Chamber of Commerce

1615 H Street, N.W. | Washington, D.C. 20062

T: 202.463.5986 | F: 202.463.5521 | M: 703.608.2994

mmartin@uschamber.com

From: Martin, Mary
Sent: Friday, March 18, 2016 6:01 PM
To: 'Dennis, Allison'; Dewey, Amy
Cc: Atkinson, Emily
Subject: RE: U.S. Chamber Meeting - April 8

Hi Allison: Attached is the completed speaking form for AAA McCabe's keynote speech at the Chamber on April 8. Please let me know if you have any follow-up questions and/or need additional information. Thanks again and have a nice weekend, Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

U.S. Chamber of Commerce

1615 H Street, N.W. | Washington, D.C. 20062

T: 202.463.5986 | F: 202.463.5521 | M: 703.608.2994

mmartin@uschamber.com

From: Dennis, Allison [mailto:Dennis.Allison@epa.gov]
Sent: Monday, March 14, 2016 10:09 AM
To: Martin, Mary; Dewey, Amy
Cc: Atkinson, Emily
Subject: RE: U.S. Chamber Meeting - April 8

Hi Mary,

One ask from us: At your earliest convenience, can you please complete and return the attached event form? It helps us prepare. Thanks! /Allison

From: Martin, Mary [mailto:mmartin@USChamber.com]
Sent: Friday, March 11, 2016 3:40 PM
To: Dennis, Allison <Dennis.Allison@epa.gov>; Dewey, Amy <Dewey.Amy@epa.gov>
Cc: Atkinson, Emily <Atkinson.Emily@epa.gov>
Subject: RE: U.S. Chamber Meeting - April 8

Allison: That sounds good – I will put her on the agenda for 9:00 and allot 45-50 minutes for her speech and Q&A. As soon as we have the agenda finalized, I will send you a copy. One more logistic matter – do you have a bio that you use for the Assistant Administrator? If the one on the website works, we can use that one; but if you have a particular one that you like to use, please send it to us. Finally, if you need any additional information, please do not hesitate to reach out. Thanks and have a great weekend, Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

U.S. Chamber of Commerce

1615 H Street, N.W. | Washington, D.C. 20062

T: 202.463.5986 | F: 202.463.5521 | M: 703.608.2994

mmartin@uschamber.com

From: Dennis, Allison [mailto:Dennis.Allison@epa.gov]
Sent: Friday, March 11, 2016 9:06 AM
To: Martin, Mary; Dewey, Amy
Cc: Atkinson, Emily
Subject: RE: U.S. Chamber Meeting - April 8

How about we aim for something in the range 25-30 min of remarks followed by 15-20 min of Q&A (for a total of 45 minutes)?

From: Martin, Mary [mailto:mmartin@USChamber.com]
Sent: Thursday, March 10, 2016 4:33 PM
To: Dennis, Allison <Dennis.Allison@epa.gov>; Dewey, Amy <Dewey.Amy@epa.gov>
Cc: Atkinson, Emily <Atkinson.Emily@epa.gov>
Subject: RE: U.S. Chamber Meeting - April 8

Hi Allison:

Absolutely no apologies required. I'm so glad that we are going to be able to make this work. The 9:00 – 10:00 a.m. hour sounds great. How long were you thinking for her presentation, and how long would she want to take for questions? (Again, we're flexible.) Also, we will put her name on the next invitation that goes out, as the keynote speaker.

Thanks again!

Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

U.S. Chamber of Commerce

1615 H Street, N.W. | Washington, D.C. 20062

T: 202.463.5986 | F: 202.463.5521 | M: 703.608.2994

mmartin@uschamber.com

From: Dennis, Allison [mailto:Dennis.Allison@epa.gov]
Sent: Thursday, March 10, 2016 3:56 PM
To: Martin, Mary; Dewey, Amy
Cc: Atkinson, Emily
Subject: RE: U.S. Chamber Meeting - April 8

Hi Mary,

My apologies for the delayed response.

You asked:

1) would it be ok to list her as the keynote speaker on the next invitation that goes out to my committee members (probably tomorrow or Thursday)? **Response: Yes!**

2) (2) is there a particular window of time that works best for her between 9:00 – 11:30 a.m. on April 8? I have not set the agenda yet so there is flexibility, but I would like to get the specific times firmed up this week, if possible. **Response: Morning is best…will sometime between 9 – 10 work?**

Thanks! /Allison

From: Martin, Mary [mailto:mmartin@USChamber.com]
Sent: Tuesday, March 08, 2016 4:00 PM
To: Dewey, Amy <Dewey.Amy@epa.gov>; Dennis, Allison <Dennis.Allison@epa.gov>
Cc: Atkinson, Emily <Atkinson.Emily@epa.gov>

Subject: RE: U.S. Chamber Meeting - April 8
Importance: High

Hi Amy, Allison and Emily:

Hope you are doing well and enjoying the nice weather! Attached is the speaking invitation for Assistant Administrator McCabe for the April 8 U.S. Chamber meeting. We are very excited about the prospect of having the Assistant Administrator speak at the meeting. I have a couple of preliminary questions – (1) would it be ok to list her as the keynote speaker on the next invitation that goes out to my committee members (probably tomorrow or Thursday)? and (2) is there a particular window of time that works best for her between 9:00 – 11:30 a.m. on April 8? I have not set the agenda yet so there is flexibility, but I would like to get the specific times firmed up this week, if possible.

Please let me know what other information you need from us. Thank you in advance for your time, responsiveness and efforts on this matter.

Best,

Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

U.S. Chamber of Commerce

1615 H Street, N.W. | Washington, D.C. 20062

T: 202.463.5986 | F: 202.463.5521 | M: 703.608.2994

mmartin@uschamber.com

From: Dewey, Amy [mailto:Dewey.Amy@epa.gov]
Sent: Monday, February 29, 2016 6:03 PM

To: Dennis, Allison
Cc: Atkinson, Emily; Martin, Mary
Subject: Re: U.S. Chamber Meeting - April 8

Allison, Mary Martin is sending us an official invitation letter with details but please feel free to contact her directly I have cc'd her on this email. I am out of the office tomorrow and will be back on Wed. Amy

Sent from my iPhone

On Feb 29, 2016, at 2:58 PM, Dennis, Allison <Dennis.Allison@epa.gov> wrote:

> Thanks Emily!
>
> Amy- should I work through you to get more details on this event (to help with Janet's prep) or work directly with Mary? Happy to do whatever you prefer! /Allison

Sent: Thursday, February 25, 2016 12:06 PM
To: Dewey, Amy <Dewey.Amy@epa.gov>
Subject: U.S. Chamber Meeting - April 8

Hi Amy:

Hope you are doing well. The U.S. Chamber's Energy, Clean Air & Natural Resources Committee that I oversee is having its semiannual meeting on **Friday, April 8** in the **morning** here at the Chamber (**1615 H Street NW**). I am writing to see about the possibility of having Assistant Administrator McCabe speak at the meeting, if she has interest and availability. Given the policy issues addressed by this Chamber committee, it would be helpful to hear from the Assistant Administrator about the Agency's activities on climate (including the Clean Power Plan), methane regulations, ozone implementation, and any other air-related issues, including the Agency's priorities for the remainder of the year.

Regarding the time of the meeting, we are scheduled to begin at 9:00 a.m. on April 8 (Friday). I'm still putting the agenda together so I have flexibility in terms of the specific time – between **9:00 a.m. and 11:00 a.m.** would work. We have had DOE and OMB representatives speak to this Committee in the last few years; however, it has been awhile since we have had EPA participate, so it would be helpful and interesting to have Assistant Administrator McCabe speak.

If you need additional information, please let me know. Also, if there is interest and availability,

I will follow up with a more formal invitation.

Thanks so much,

Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

U.S. Chamber of Commerce

1615 H Street, N.W. | Washington, D.C. 20062

T: 202.463.5986 | F: 202.463.5521 | M: 703.608.2994

mmartin@uschamber.com

From: Atkinson, Emily
Location: Columbia Marriott, 1200 Hampton Street, Columbia, SC 29201
Importance: Normal
Subject: AAPCA Spring Meeting (Confirmed)
Categories: Green Category
Start Date/Time: Fri 4/29/2016 1:15:00 PM
End Date/Time: Fri 4/29/2016 3:00:00 PM
RE: SAVE THE DATE: AAPCA's 2016 Spring Meeting
RE: Speaking Invitation for AAPCA's 2016 Spring Meeting
RE: Speaking Invitation for AAPCA's 2016 Spring Meeting
AAA McCabe Invite 3-25-16.pdf

AAPCA ASSOCIATION OF AIR POLLUTION CONTROL AGENCIES

March 25, 2016

Ms. Janet McCabe
Acting Assistant Administrator, Office of Air and Radiation (OAR)
U.S. Environmental Protection Agency (EPA)
William Jefferson Clinton Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Dear Ms. McCabe,

On behalf of the Association of Air Pollution Control Agencies (AAPCA), I would like to invite you to attend and speak at AAPCA's 2016 Spring Meeting in Columbia, South Carolina from April 28 - 29. As you may know, AAPCA is a consensus-driven organization representing state and local air agencies on technical Clean Air Act (CAA) issues. We are expecting robust member participation at the 2016 Spring Meeting and looking forward to holding the meeting in a location convenient for EPA and OAQPS staff to attend as well. More information on the meeting, which will be held at the Columbia Marriott, is available on AAPCA's website.

If you are available, AAPCA is interested in having you present on the morning of Friday, April 29, but we would welcome your participation throughout the meeting. The meeting is closed to the press and the program on April 29 is limited to EPA, state, and local agency personnel and their multi-jurisdictional organizations. We are happy to provide additional details on content and logistics. Our members have expressed an interest in discussing a few particular topics on April 29: SO_2 implementation; designations for the 2015 ozone NAAQS; transport issues; and balancing resource-intensive demands of traditional CAA responsibilities with legal uncertainties surrounding the Clean Power Plan.

We understand your schedule is very busy and we appreciate your consideration. I have included a link in my email to some of the other meeting logistics and hotel information, and am happy to answer any other questions you may have.

Our membership looks forward to working with you, and, if it works in your schedule, seeing you in Columbia in late April.

Sincerely,

Clinton J. Woods
Executive Director
AAPCA

From: Atkinson, Emily
Location: WJC-N 5400 + Video with RTP + Conference Code Participant Code: Conference Code
Conference Code
Importance: Normal
Subject: Meet with INGAA re: NSPS (Confirmed)
Categories: Blue Category
Start Date/Time: Wed 3/9/2016 3:00:00 PM
End Date/Time: Wed 3/9/2016 4:00:00 PM
INGAA Comments NSPS OOOOa Dec 4 20153FINALVersion.pdf
FW: INGAA request for meeting (interstate pipeline industry) NSPS (Docket ID No. EPA-HQ-OAR-2010-0505)
Confirmed 3/9 at 10am: March 9 and INGAA (confirmed)
Outside visitors for Janet McCabe Wednesday, March 9, 2016

To: McCabe, Janet; Goffman, Joe; Gunning, Paul; Dunham, Sarah; Tsirigotis, Peter; Page, Steve; Koerber, Mike; Moore, Bruce; Waltzer, Suzanne
Outside Attendees (in person):

- Diane Leopold, Dominion
- Mike McMahon, Boardwalk
- Pete Sheffield, Spectra Energy
- Chad Edwards, TransCanada CANADIAN CITIZEN
- Tom Hutchins, Kinder Morgan Don Santa, President & CEO, INGAA
- Theresa Pugh, VP, INGAA

Interstate Natural Gas Association of America

December 4, 2015

Via www.regulations.gov and email
U.S. Environmental Protection Agency
Attention Docket ID Number EPA–HQ–OAR–2010–0505
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Re: Docket ID No. EPA-HQ-OAR-2010-0505 – "Oil and Natural Gas Sector: Emission Standards for New and Modified Sources," dated September 18, 2015 (80 FR 56593)

Dear Docket Clerk:

The Interstate Natural Gas Association of America (INGAA), a trade association of the interstate natural gas pipeline industry, respectfully submits these comments in response to the Environmental Protection Agency's (EPA) proposed rule, "Oil and Natural Gas Sector: Emission Standards for New and Modified Sources" (Proposed Rule). The Proposed Rule would amend 40 C.F.R., Part 60, Subpart OOOO, the New Source Performance Standard (NSPS) for oil and gas operations, and proposes a new rule, Subpart OOOOa, for affected units that are modified, constructed, or reconstructed after the September 18, 2015 proposal date.

INGAA appreciates your consideration of these comments. Please contact me at 202-216-5955 or tpugh@ingaa.org if you have any questions.

Thank you.

Sincerely,

Theresa Pugh

Theresa Pugh
Vice President, Environment, Health and Construction

cc: Bruce Moore, U.S. EPA (via email)
David Cozzie, U.S. EPA (via email)
Paul Gunning, U.S. EPA (via email)
Jim Laity, Office of Management and Budget (OMB)

COMMENTS OF THE INTERSTATE NATURAL GAS ASSOCIATION OF AMERICA ON THE PROPOSED RULE, "OIL AND NATURAL GAS SECTOR: EMISSION STANDARDS FOR NEW AND MODIFIED SOURCES"
Code of Federal Regulations Title 40, Part 60, Subpart OOOOa

80 Federal Register 56593, September 18, 2015

December 4, 2015

INTRODUCTION

The Interstate Natural Gas Association of America (INGAA) respectfully submits these comments in response to the "Oil and Natural Gas Sector: Emission Standards for New and Modified Sources" proposal (Proposed Rule).[1] INGAA's members represent the vast majority of the interstate natural gas transmission pipeline companies in the United States, operating approximately 200,000 miles of pipelines, and serving as an indispensable link between natural gas producers and consumers. INGAA and its members have a long history of working collaboratively with a variety of stakeholders on greenhouse gas (GHG) issues, including on methane.

The U.S. interstate natural gas pipeline network relies on more than 1,400 natural gas compressor stations to maintain the continuous flow of natural gas between supply areas and consumers.[2] INGAA's members alone operate approximately 1,000 compressor stations in the U.S. Compressor stations typically are placed 40-70 miles apart along the pipeline system to maintain flow by re-pressurizing the gas. Depending on the time of year, location, and customer demand to utilize their transportation contracts, these stations may operate day and night, year-round, to push re-pressurized gas through the pipelines. Each interstate natural gas compressor station, on average, houses between two and ten compressor units. Larger compressor stations may have as many as 10-16 compressor units with an overall horsepower rating per station from 50,000 to 80,000 horsepower and a throughput capacity exceeding three billion cubic feet of natural gas per day.[3] Each compressor station has thousands of pieces of equipment and component parts.

These interstate compressor facilities, if "modified" or "reconstructed," would be subject to the "Oil and Natural Gas Sector: Emission Standards for New and Modified Sources" proposal. In addition certain "new" compressor facilities would be subject to the rule. Therefore, INGAA members have a direct interest in the Proposed Rule.

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[1] "Oil and Natural Gas Sector: Emission Standards for New and Modified Sources," 80 Fed. Reg. 56593 (Sept. 18, 2015).

[2] http://www.eia.gov/pub/oil_gas/natural_gas/analysis_publications/ngpipeline/index.html
"Compressor stations are 'pumping' facilities that advance the flow of natural gas. They … are designed to operate on a nonstop basis. The average station is capable of moving about 700 million cubic feet (MMcf) of natural gas per day, while the largest can move as much as 4.6 billion cubic feet (Bcf) per day." Energy Information Administration, Office of Oil and Gas, "Natural Gas Compressor Stations on the Interstate Pipeline Network: Developments Since 1996," November 2007. This data is understated since it relies on EIA data through 2007/2008 with selected updates.

[3] EIA, "About U.S. Natural Gas Pipelines, Transporting Natural Gas."

ED_000738_00004987-00003

I. EXECUTIVE SUMMARY

The Interstate Natural Gas Association of America (INGAA) is the national trade association representing the Transmission and Storage (T&S) sector. The T&S sector has more than 1,400 natural gas compressor stations across 200,000 miles of pipelines in the United States.

INGAA and its members have a long history of working with a variety of stakeholders on greenhouse gas (GHG) issues, including methane. Nonetheless, INGAA has serious concerns with the rule proposed by the Environmental Protection Agency (EPA). The Proposed Rule would offer little, if any, environmental benefit compared with the more reasonable alternatives offered by INGAA. If finalized as proposed, the rule would impose significant costs and create the real risk of both increased methane emissions due to unnecessary blowdowns and disruptions of service to natural gas consumers.

For the T&S sector, the Proposed Rule would set standards of performance that would apply to any new, modified or reconstructed compressor, pneumatic control or pneumatic pump used at a compressor station. For these types of equipment, the proposed standards would take the form of certain work practice and operational requirements.

In addition, the Proposed Rule would set standards of performance for fugitive methane emissions at new, modified and reconstructed compressor stations. For these purposes, the Proposed Rule defines "modification" as any addition of a compressor or compression capacity at a compressor station. As such, EPA appears to presume (incorrectly) that any such change would increase fugitive emissions at a station. (This is not always the case.) Furthermore, EPA appears to assume (incorrectly) that such a change would increase fugitive methane emissions at the *entire* compressor station because the Proposed Rule makes the entire station the "affected facility" to which the standard of performance for fugitive emissions applies.

The proposed standard of performance for controlling fugitive methane emissions at a new, modified or reconstructed compressor station is an extensive leak detection and repair (LDAR) regime. The LDAR regime involves an initial survey of "fugitive emissions components," which is an expansively defined category of equipment. After the initial survey, an operator must survey semi-annually. The LDAR regime, however, also has a self-ratcheting dynamic. If a survey detects fugitive emissions from just three percent or more of the fugitive emission components during two consecutive semi-annual surveys, the survey frequency increases to quarterly.

The Proposed Rule requires an operator of a compressor station that identifies a leak through such a monitoring survey to repair the leak in 15 days, with the possibility for an extension only under limited circumstances. The failure in the Proposed Rule to provide a reasonable delay of repair provision will lead to adverse consequences, including the possible impairment of transportation service to pipeline customers during high-demand periods and increased methane emissions due to otherwise unnecessary blowdowns conducted to enable leak repairs.

ED_000738_00004987-00004

INGAA's principal concerns with the Proposed Rule, and its proposed alternatives to remedy these concerns, are as follows:

EPA's definition of "modification" must be narrowed and clarified. INGAA points out that some physical or operational changes do not increase fugitive emissions. EPA's proposed definition for the T&S sector is entirely too broad and will, if not corrected, apply to an entire compressor station without any environmental justification. This expansion of the scope of the rule will greatly increase the cost of compliance and the likelihood of adverse consequences.

The proposed rule is flawed because it does not focus on the larger methane leaks, which EPA often calls "gross emitters." INGAA, along with others, has pointed out that a small number of sources account for greater than 80 percent of the volume of methane leaks attributable to the T&S sector. This is substantiated by EPA's Greenhouse Reporting Program data and the 2014 Natural Gas STAR program analysis. EPA should allow pipelines to focus on the greatest sources of leaks.

The proposed survey frequency combined with the proposed requirement to fix leaks within 15 days (and only a nominal opportunity for delay of repair) is neither justified nor feasible. As noted above, the intense focus on addressing fugitive emissions from smaller sources will lead to a misallocation of resources that will discourage T&S operators from addressing larger methane emissions at existing sources that are outside the scope of the Proposed Rule.

The proposal that the frequency of required leak surveys be determined by an arbitrary survey of the number of component parts that leak, rather than any measure of the volume of methane emissions, is arbitrary and capricious and inconsistent with other EPA New Source Performance Standard (NSPS) programs. Many new and modified compressor stations will have thousands of component parts. The possible consequence of this arbitrary metric, along with the low threshold for what constitutes a leak, could be that many new and modified compressor stations will trigger the quarterly survey requirement and repair mandate.

One of the most significant flaws in the Proposed Rule is EPA's failure to provide reasonable delay of repair provisions consistent with other EPA programs (such as the program for the Synthetic Organic Chemicals Manufacturing Industry). These other programs quite reasonably take into account repair feasibility, availability of parts, qualified personnel and other factors.

EPA's delay of repair provisions also fails to permit delays when the immediate repair will result in more methane emissions than would occur if the repair were delayed until the next unit shutdown. For example, EPA did not recognize that requiring leak repair within 15 days would necessitate blowdowns that otherwise would not occur, and that this could result in far greater emissions of methane than if more reasonable rules governed delay of repair. In many instances, it is likely that the methane emitted from a blowdown will greatly exceed the volume of methane emissions avoided by fixing a leak within 15 days.

INGAA urges EPA to allow a work practice standard such as INGAA's Directed Inspection and Maintenance Program (DI&M) that is more reasonable than the LDAR regime specified in the proposed rule. INGAA's DI&M addresses leak identification and repairs based upon more

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feasible repair criteria that account for station operations, customer demands, and availability of equipment and trained personnel while focusing on the largest sources of emissions. INGAA's DI&M program also would include verifiable documentation of repairs.

Furthermore, EPA did not take into account the existing leak repair program pursuant to Pipeline and Hazardous Materials Safety Administration (PHMSA) regulation. EPA should consult with PHMSA before proceeding in issuing a final rule.

INGAA believes EPA's cost-benefit analysis did not properly consider direct and indirect costs to the T&S sector for leak identification, station downtimes and repairs. EPA's cost estimates fail to identify the costs of service disruptions to pipeline customers caused by removing compressors from service to make repairs, and they do not include accurate costs for trained personnel to conduct the many activities under LDAR. In addition, EPA's Benefits Analysis relies upon a flawed Colorado study that exaggerates the expected reduction of emissions attributable to the LDAR program compared with that which would be achieved by other regulatory alternatives (including INGAA's DI&M Program).

EPA failed to make a separate legal Endangerment Finding for the T&S sector as a source category requiring this regulation. EPA should conduct a separate and explicit Endangerment Finding for the T&S sector under section 111(b)(1)(A) of the Clean Air Act (CAA) before proceeding with a final rule.

EPA failed to offer any justification for the proposed requirement of third-party auditors, which it does not now impose on other sectors subject to EPA regulation. INGAA opposes this proposed requirement.

INGAA requests that the final rule not take effect for 180 days following publication in order to allow sufficient time to train the personnel that will be needed to implement the rule.

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II. DETAILED COMMENTS

A. Key Elements of the Proposed Rule Affecting the Transmission and Storage Sector.

For the T&S sector, the Proposed Rule sets standards of performance that apply to any new, modified or reconstructed compressor, pneumatic control or pneumatic pump used at a compressor station.[4] For these types of equipment, the proposed standards take the form of certain work practice and operational requirements.[5]

In addition, the Proposed Rule sets standards of performance for fugitive methane emissions at new, modified, and reconstructed compressor stations.[6] For purposes of these fugitive emissions requirements, the Proposed Rule defines "modification" as any addition of a compressor or compression capacity at a compressor station.[7] As such, EPA appears to presume that any such change would increase fugitive emissions at a station. Furthermore, EPA appears to assume that such a change would increase fugitive methane emissions at the *entire* compressor station because the Proposed Rule makes the entire station the "affected facility" to which the standard of performance for fugitive emissions applies.

The proposed standard of performance for controlling fugitive methane emissions at a new, modified or reconstructed compressor station is an extensive leak detection and repair (LDAR) regime.[8] The LDAR regime involves an initial survey of the collection of "fugitive emissions components," which is an expansively defined category of equipment.[9] After the initial survey, surveys are required semi-annually. However, the LDAR regime also has a self-ratcheting dynamic. If a survey detects fugitive emissions from just three percent or more of the fugitive emission components during two consecutive semi-annual surveys, the survey frequency jumps to quarterly.[10] Such a regime would require an operator to engage in a continuous leak identification and repair cycle, focusing significant company time and resources to identify minor and hard to locate leaks that do not emit appreciable volumes of methane. The commitment of resources required to meet this obligation to identify and repair all leaks, regardless of size, will limit an operator's ability to undertake voluntary leak detection and mitigation programs, such as the Methane Challenge to reduce methane emissions from existing sources.

The Proposed Rule requires an operator of a compressor station that identifies a leak through such a monitoring survey to repair the leak in 15 days, with the possibility for an extension only under limited circumstances.[11] Failure to provide a reasonable delay of repair provision will lead to adverse consequences, including the possible impairment of transportation service to

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[4] 80 Fed. Reg. at 56663 (proposed 40 C.F.R. § 60.5635a(b), (c), (d)).
[5] 80 Fed. Reg. at 56665 (proposed 40 C.F.R. §§ 60.5380a, 60.5385a, 60.5390a, and 60.5393a).
[6] 80 Fed. Reg. at 56664 (proposed 40 C.F.R. § 60.5635a(j)).
[7] *Id.*
[8] 80 Fed. Reg. at 56667-69 (proposed 40 C.F.R. § 60.5397a).
[9] 80 Fed. Reg. at 56695 (proposed 40 C.F.R. § 60.5430a(definition of "fugitive emissions component")).
[10] 80 Fed. Reg. at 56668 (proposed 40 C.F.R. § 60.5937a(g)).
[11] 80 Fed. Reg. at 56667 (proposed 40 C.F.R. § 60.5937a(i)).

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pipeline customers during high demand periods and an increase of unnecessary blowdowns, which would result in methane emissions in order to conduct the repair.

B. EPA Should Amend the Definition of "Modification" to Exclude Changes that do not Result in Emissions and Should Amend the Definition of Fugitive Methane at "Affected Facility" to cover only those Parts of a Compressor Station Actually Affected by a Modification.

With respect to the control of fugitive methane emissions, EPA proposes to define "modification" such that any addition of a new compressor or compression capacity triggers the fugitive emission control requirements at the compressor station "affected facility." Furthermore, EPA proposes to define the "affected facility" in this context as the entire compressor station. Both of these approaches are overbroad and exceed EPA's statutory authority. EPA's expansive definition of what entails a "modification" at an existing compressor station could affect many thousands of parts and components at existing compressor stations. Therefore, the impact of the Proposed Rule is significantly more expansive for the T&S sector than EPA acknowledges.

i. EPA may not presume that all additions of compression are "modifications" because not all additions of compressors *increase* fugitive emissions at a compressor station.

EPA proposes, for purposes of the fugitive emissions methane standard for compressor stations, that a "modification" to a station occurs any time that: (1) a new compressor is constructed at an existing compressor station; or (2) a physical change is made to an existing compressor at a compressor station that increases the compression capacity of compressor station.[12] This definition incorporates the concept of a physical change to a part of the station but omits an explicit demonstration that these changes result in an *increase* in emissions.

However, CAA § 111 defines "modification" in terms of both a change *and* a resulting emissions increase. Specifically, it defines the "modification" of a source as a physical or operational change that "increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted."[13] In addition, EPA's own general regulations interpreting section 111 define "modification" to occur only when there is a physical or operational change and an increase in the source's emissions rate.[14]

Therefore, EPA's definition of "modification" for purposes of the proposed fugitive emission standards is not consistent with the Agency's statutory authority as the Agency has not provided

[12] 80 Fed. Reg. at 56663-64 (proposed 40 C.F.R. §60.5365a(j)).
[13] CAA § 111(b)(4).
[14] EPA's modification rule is codified in 40 C.F.R. Part 60, which applies to all categories of NSPS sources. It states that a "physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies shall be considered a modification." See 40 C.F.R. § 60.14(a).

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a reasoned basis for *presuming* that *any* addition of compression at a compressor station *necessarily* increases fugitive emissions at the station.[15]

In fact, there are many instances in which the addition of a compressor or compression capacity at a compressor station does not result in an increase in fugitive emissions (or the rate of such emissions) at the station. For example, the addition of a new compressor at an existing facility may replace other units, and a single, larger unit may replace multiple smaller units. In these instances, emissions may actually *decrease* from newer equipment or from fewer components that have the potential to leak. Similarly, horsepower replacement or upgrades do not necessarily cause increased fugitive emissions.

For these reasons, we urge EPA to more narrowly and precisely define "modification" in the context of fugitive emissions at a compressor station so it covers only those additions of compressors or compression capacity *that increase the rate* of fugitive emissions of the station.[16] To this end, INGAA supports the American Gas Association's recommendations for changes to the regulatory definition of "modification."

ii. EPA should affirm the NSPS exemptions for routine maintenance, repair and replacement.

We request that EPA affirm that the exemptions in the general NSPS regulations remain available for fugitive emission components at compressor stations, including the exemption for physical or operational changes that constitute routine maintenance, repair and replacement.[17] These exemptions are important to provide certainty to operators of compressor stations that undertake such activities as the like-kind replacement of an old compressor with a new compressor. Such activities should not trigger "modifications" under the OOOOa Rule.

iii. EPA's definition of the fugitive methane "affected facility" unreasonably presumes that any addition of compression increases fugitive emissions throughout the entirety of a compressor station.

To be sure, there are cases in which the addition of compression at a compressor station can increase fugitive methane emissions. However, as explained below, the Proposed Rule unreasonably presumes that in all such cases the potential for fugitive methane emissions increases throughout the entire compressor station. EPA has appropriately solicited comment on the validity of this presumption.

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[15] Section 60.14 of the general NSPS regulations provides that "special provisions" in a subpart applicable to a particular source category may supersede any conflicting provisions in EPA's general NSPS regulations. Nevertheless, even such a "special provision" may not conflict with EPA's *statutory* authority under section 111. In other words, EPA might have authority to promulgate an interpretation of "modification" for purposes of the Proposed Rule that conflicts with the definition of that term in the general NSPS regulations, but it lacks authority to promulgate an interpretation of "modification" that conflicts with the definition of that term in CAA § 111(b)(4).

[16] In some instances, it might be more expedient for an operator to assume that a change has increased the emission rate at a station, and therefore implement the requirements of the regulation. However, this assumption should be an option for the operator, not a regulatory presumption.

[17] 40 C.F.R. § 60.14(e)(1).

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EPA has proposed to define, for purposes of the fugitive methane emissions standard, the "affected facility" as the "collection of fugitive emissions components" at a compressor station.[18] EPA further proposes to define "fugitive emission component" as "any component that has the potential to emit fugitive emissions of methane… at a compressor site."[19]

The implication of these proposed definitions is that any addition of compression to any part of a compressor station is not only presumed to increase fugitive methane emissions (as discussed above), but moreover is presumed to increase these emission *throughout the entire station* – thereby triggering the requirement to apply the work practice standard for fugitive emissions at every one of the thousands of "fugitive emission components" in the station.

In the preamble, EPA acknowledges that "for some modified compressor stations, the added compressor may only be connected to a subset of the fugitive emissions sources on the site" – and therefore solicits comment on whether the abatement requirements should only apply to the subset of components actually affected.[20]

There are cases in which the addition of a compressor at a compressor station will increase throughput at only part of the station rather than the whole station—which means that the potential for an increase in fugitive emissions is confined just to the affected part. For example, a new compressor could be installed adjacent to existing compressors where the new compressor piping is connected directly into the existing compressor piping manifolds. A fugitive emissions increase would result from addition of valves and other components associated with the new compressor, but it would not increase the fugitive emissions from the existing compression manifold piping. Another example could be the addition of a new compressor in a new building at an existing compressor station. A fugitive emissions increase would result from the installation of the piping and components for the new compressor building into the existing station piping or mainline pipeline. However, fugitive emissions from the existing compressors and associated piping and components would not be increased.

For these reasons, INGAA urges EPA to define "affected facility" as the portion of a compressor station at which fugitive methane emissions increase as the result of a "modification." This change is necessary to ensure that the operator of a compressor station need only apply the fugitive emission abatement requirements at the portion of a station actually affected by the addition of a compressor or compression capacity.[21]

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[18] 80 Fed. Reg. at 56663-64 (proposed 40 C.F.R. § 60.5365a(j)).
[19] 80 Fed. Reg. at 56695 (proposed 40 C.F.R. § 60.5430a (definition of "fugitive emissions component")).
[20] 80 Fed. Reg. at 56643.
[21] To be sure, as EPA observes, some operators may find it "advantageous . . . from an operational perspective to monitor all the components at a compressor station since the monitoring equipment is already onsite." 80 Fed. Reg. at 56643. However, such station-wide monitoring should be an *option* for the operator of an affected facility, not a requirement.

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C. EPA's Standards of Performance for Affected Facilities in the Segment Should Focus on Gross Emitters.

i. EPA erred by focusing on the percentage of leaking components and equipment pieces at compressor stations rather than the volume of leaks.

EPA requests comment on whether the fugitive emissions standard for compressor station "affected facilities" should focus on larger leaks, which EPA refers to as gross emitters.[22] There is scientific evidence to support focusing on gross emitters, and INGAA agrees that the standard should focus on large leaks from gross emitters.

There is scientific evidence that the vast majority of leaks, over 80 percent, in the T&S sector come from a small number of sources called "gross emitters." The Environmental Defense Fund (EDF), industry and Colorado State University (CSU) published a collaborative study documenting that a small number of leaks, termed in that study as "super emitters," account for a large percentage of emissions from leaks. These leaks are also called either "gross emitters" or "long tail emitters." The CSU study concludes that "the highest emitting 10 percent of sites (including two super emitters) contributed 50 percent of the aggregate methane emissions, while the lowest emitting 50 percent of sites contributed less than 10 percent of the aggregate emissions."[23] In addition, EPA's Natural Gas STAR program, among other analyses, has demonstrated that a relatively small percentage of leaks contribute to the vast majority of emissions for natural gas operations, e.g., 80 to 90 percent of methane emissions from equipment leaks are from 20 percent of the leaks at compressor stations. Moreover, as discussed below, EPA's Subpart W monitoring data also supports the conclusion that a small category of equipment account for a majority of the fugitive emissions from a compressor station.

INGAA supports EPA's goal of reducing methane emissions from the T&S sector. EPA can meet its goal by permitting natural gas pipeline operators to focus on "gross emitters." INGAA strongly supports a programmatic approach that focuses on reducing emissions from sources with higher risk of producing larger leaks. In the case of the T&S sector, these sources are reciprocating compressor rod packing, centrifugal compressor seals, compressor blowdown valves, compressor isolation valves and storage tank dump valves. This is substantiated by EPA's Subpart W data.

EPA cannot overlook the scientific studies and data that support focusing on the largest or "gross" emitters. A focus on those specific components or equipment with the greatest chance of leaking and the most significant leaks will provide benefits similar to a comprehensive leak detection program – with significantly reduced costs and burden on the operators and less risk of disruption of natural gas service to pipeline shippers and ultimately consumers.

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[22] 80 Fed. Reg. at 56642.

[23] Subramanian, R, et al., "Methane Emissions from Natural Gas Compressor Stations in the Transmission and Storage Sector: Measurements and Comparisons with the EPA Greenhouse Gas Reporting Program Protocol", Environ. Sci. Technol., 49,3252-3261, DOI:10.1021/es5060258 (2015): http://pubs.acs.org/doi/pdf/10.10121/es5060258

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The Proposed Rule includes a performance-based survey schedule that inappropriately depends on the percentage of compressor station component parts or equipment pieces that are leaking, rather than the volume of methane emissions from such leaks. In addition to conducting the survey, this approach requires a component count and tracking over time to assess the percentage of leaking components.

EPA defines "fugitive emissions component" as including, but not limited to, valves, connectors, pressure relief devices, open-ended lines, access doors, flanges, closed-vent systems, thief hatches or other openings on a storage vessel, agitator seals, distance pieces, crankcase vents, blowdown vents, pump seals or diaphragms, compressors, separators, pressure vessels, dehydrators, heaters, instruments and meters.[24] This can be more than 1,000 components per new compressor station. This definition is not consistent with the traditional list of fugitive or modified components found in the proposed rule for processing plant "equipment" and will cause confusion within the oil and gas sector and LDAR contractors. The definition will also result in many more components than traditionally identified in LDAR programs, which will increase survey time and cost for transmission compressor stations.

Under EPA's Proposed Rule, an operator must survey the fugitive components at a compressor station and determine the percent of components that are leaking. An operator then must conduct quarterly surveys if more than three percent of the compressor station's component equipment fails to pass a leak inspection survey two consecutive times.[25] Regardless of survey frequency, the Proposed Rule would require an operator to repair any leaks within 15 days.

Under this proposal, an operator would spend significant time searching to identify the source of very small leaks that individually result in a minimal volume of released methane. For example, EPA's proposed use of Optical Gas Imaging (OGI) equipment in the proposed rule could require an operator to detect and repair a small volume (often described as a wisp) from a compressor station piece of equipment that is equivalent to a small, 60 grams per hour release. The 60 grams per hour is less than three standard cubic feet per hour (SCFH). This level of leak rate detection in the Proposed Rule is equivalent to a "no leak" threshold for measurement procedures included in EPA's Subpart W reporting program.[26] The approach would waste valuable resources addressing small leaks rather than allowing the focus to be identifying and eliminating the gross emitters.

Operators should be permitted to delay the repair of leaks emitting *de minimis* amounts of methane and those that are difficult to locate and costly to fix. This will allow operators to set priorities for repair of large or significant leaks, resulting in more meaningful emissions reductions.

EPA has not justified why the one percent of equipment threshold for triggering a NSPS work practice standard is reasoned decision-making. Nor has EPA demonstrated why a particular number of equipment leaks, i.e., one percent, without regard to the volume released by the

[24] https://www.federalregister.gov/articles/2015/09/18/2015-21023/oil-and-natural-gas-sector-emission-standards-for-new-and-modified-sources#h-74
[25] 80 Fed. Reg. at 56668 (proposed 40 C.F.R. § 60.5397a(h)).
[26] 40 C.F.R. §§ 98.233(k)(1)(iv) and 98.234(a)(5).

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leaking equipment, is justified or how the benefits of the rule outweigh its cost. These thresholds are all the more arbitrary in light of EPA's own data supporting the conclusion that the vast majority of emissions can be addressed by focusing on the limited number of gross emitters.

As EPA notes in the Regulatory Impact Analysis (RIA), methane is not a health pollutant. Consequently, EPA has discretion in setting reasonable repair response times. The number of compressor station leaks not repaired over a one-month to two-year time interval will not affect climate change because of the relative *de minimis* nature of those methane emissions in contrast to methane in the global atmosphere. Therefore, reasonable delay-of-repair provisions that would mitigate many of the adverse consequences that are likely to result from the rule are appropriate.[27]

ii. EPA should accept INGAA's Directed Inspection and Maintenance Program since it provides a robust alternative to the proposed leak monitoring and repair program.

The vast majority of leaks from the T&S sector can be addressed by INGAA's DI&M program.[28] As recognized by EPA's Natural Gas STAR Lessons Learned document,[29] DI&M is an effective programmatic approach that focuses on large leaks. Further, EPA's GHG reporting program will provide the verification that methane leaks are being identified and repaired under DI&M.

The INGAA DI&M program provides the structure, program elements and procedures for development of a company-specific DI&M program that focuses on key leak sources within a facility that pose a higher probability of being "gross emitters" or "super emitters." These sources require measurement under EPA's Subpart W reporting program. They include reciprocating compressor rod packing, centrifugal compressor wet seal degassing vents, compressor blowdown valves, compressor isolation valves and scrubber dump valves.[30] The INGAA DI&M program also includes centrifugal compressor dry seals for completeness.

INGAA's DI&M program also includes adaptive management to refine facilities based on data collected, tracking of leaks, and repair of leaks, among others. Each of these components addresses programmatic requirements for a leak mitigation program analogous to program criteria included by EPA in the Proposed Rule. Specifically, INGAA's DI&M program provides for an annual survey (consistent with Subpart W) into the DI&M program. The program would

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[27] "While we expect that the avoided emissions will result in improvements in ambient air quality and reductions in health effects associated with exposure to hazardous air pollutants (HAP), ozone, and particulate matter, we have determined that quantification of those benefits cannot be accomplished for this rule." Regulatory Impact Analysis of the Proposed Emission Standards for New and Modified Sources in the Oil and Natural Gas Sector, EPA-452-/R-15-002, August, 2015.

[28] INGAA's DI&M paper was provided to EPA in early 2015 and referenced as footnote 17 on page 17 of EPA's Natural Gas STAR Methane Challenge program. It is provided in Appendix C.

[29] "Directed Inspection and Maintenance at Compressor Stations." U.S. EPA Natural Gas STAR, Lessons Learned (see http://epa.gov/gasstar/documents/ll_dimcompstat.pdf), EPA430-B-03-008 (October 2003).

[30] There are six source types that must report for transmission compressor stations. Four of the six are leak sources- reciprocating compressors, centrifugal compressors, tanks and "other" leaks. Compressors and tanks require annual vent measurements. Other leaks require an annual leak detection survey. The other two sources- pneumatic controllers and blowdown- are vented emissions associated with station operations.

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involve condition-based maintenance for rod packings and wet seals and annual leak surveys for the key compressor station components that have the greatest potential for emissions.

INGAA's DI&M program is supported by emissions data from the transmission segment reports submitted to EPA under Subpart W of the GHG Reporting Program (GHGRP).[31] Figure 1 illustrates data from EPA's website for the first three years of Subpart W reporting.[32] The vast majority of compressor station emissions are from reciprocating compressors, centrifugal compressors and tanks (*i.e.* scrubber dump valves) rather than component leaks. Two Subpart W emission sources—pneumatic devices and blowdowns—are not fugitive emissions. Compressor and storage tank emissions are associated with a select and limited number of components, while the proposed separately tabulated "leaks" category is the cumulative emissions from screening thousands of additional components throughout a facility. This "leaks" source category comprises a relatively small percentage of total leak emissions.

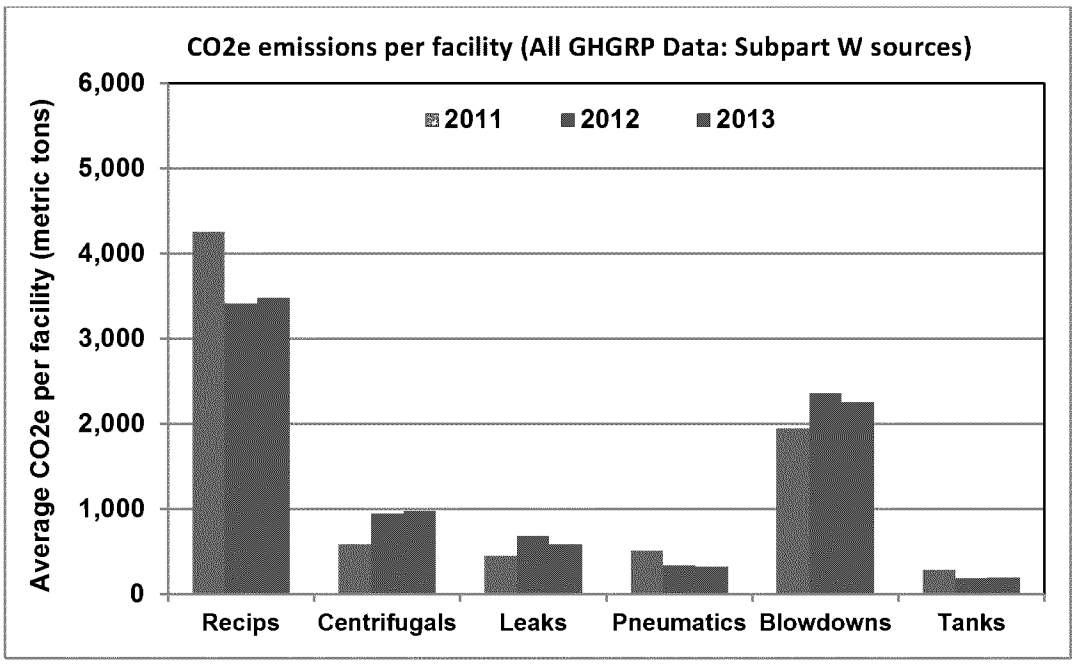

Figure 1. Transmission segment emissions by Subpart W source type (EPA data).

The INGAA DI&M program does not include this other equipment "leaks" category, since it requires surveying hundreds of additional components that account for only a relatively small portion of the total emissions from the four types of leak sources included in Subpart W.

INGAA's DI&M program is a preferred method since it is effective at reducing methane emissions by identifying and repairing leaks at compressor stations. It is a less burdensome, less

[31] 40 C.F.R. Part 98, Subpart W.

[32] Since the number of facilities increased from year to year, the emissions are presented on a per-facility basis. There are six source types that report for the transmission segment, and four of the six emission sources are associated with equipment leaks: reciprocating compressors, centrifugal compressors, (other) equipment leaks, and storage tanks (i.e., emissions are from leaking dump valves).

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disruptive and less costly way of meeting EPA's objective of reducing methane emissions by identifying and repairing leaks at compressor stations, while considering the magnitude of leaks and practical matters that affect repair schedules. It can achieve similar reductions at lower costs by avoiding surveying thousands of pieces of components that it has been documented account for only a relatively small amount of the total emissions, and by avoiding repairs that are not cost effective to address (i.e., small leaks with high repair costs or practical operational matters affecting the repair schedule). INGAA's DI&M program would implement an annual inspection, maintenance and repair program, in which repairs were made consistent with safety and common sense timing. The affected facilities would identify and repair leaks based upon the severity of the leak in a manner that minimizes compressor station downtime.

INGAA recommends that EPA adopt INGAA's DI&M program, which focuses on identifying and repairing the largest leaks, rather than focusing on all leaks, including insignificant leaks.

iii. INGAA's DI&M program is more consistent with EPA's statutory requirements for establishing a work practice standard than LDAR.

In the case of fugitive methane emission components at compressor stations, EPA is acting under §111(h) of the Clean Air Act (CAA),[33] which provides authority to EPA to promulgate a particular work practice standard only if that standard reflects "the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated)." section 111(h) also authorizes EPA to permit the use of an "alternative means of emission limitation" if EPA finds that it will achieve a reduction in emissions "at least equivalent to the reduction" achieved by the designated work practice.[34]

As explained in detail above, INGAA's DI&M program is a cost-effective and abundantly demonstrated technique that achieves substantial emission reductions in fugitive methane emissions at compressor stations. The LDAR program in the Proposed Rule, by contrast, imposes substantially higher costs and higher risks to "energy requirements" – with no meaningful gain in emissions mitigation. Therefore, if EPA appropriately fulfills its statutory obligation to "take into consideration" costs and impacts on energy requirements, it should eliminate LDAR in favor of DI&M. At a minimum, DI&M should be permitted as an "alternative means of emission limitation."

For these reasons, INGAA urges EPA either to: (1) determine that DI&M, not LDAR, is the work practice standard for fugitive methane emissions at compressor stations; or (2) permit the use of DI&M as an "alternative means of emission limitation" pursuant to CAA §111(h)(3).

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[33] CAA § 111(h) provides that, if in the judgment of the Administrator, it is not feasible to prescribe or enforce a standard of performance for a source category, he may instead promulgate a "design, equipment, work practice, or operational standard, or combination thereof" that meets the "best technological system of continuous emission reduction" test. For purposes of these comments, references to "work practice standard" also encompass design, equipment, or operational standards, or a combination thereof.

[34] CAA § 111(h)(3).

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iv. EPA has not justified why a departure from annual leak detection surveys, consistent with Part 98, Subpart W reporting, is inadequate.

INGAA recommends that fugitive emissions program surveys be required annually, which is consistent with EPA's survey schedule for sources subject to Subpart W of the GHGRP. There is no indication that a more aggressive schedule provides any meaningful environmental benefit in regard to GHG impacts. Over time, EPA's GHGRP data will show whether associated emissions are reasonably stable or declining. In addition, the component count tracking adds an unnecessary burden that should be eliminated. If EPA retains the performance-based schedules in the final rule, INGAA recommends flexibility allowing operators to forgo component count tracking and implementation of the more rigorous reporting schedule.

D. EPA Should Not Require All Repairs within 15 Days or Should Provide for a Delay of Repair Given Potential Disruptions of Service Associated with Its Proposal.

EPA proposes to require that an operator repair or replace the source of leak emissions as soon as practicable, but no later than 15 calendar days after detection of the fugitive emissions.[35] The proposed rule requires that leaks, no matter how small, must be repaired within 15 days. The Proposed Rule provides a delay-of-repair provision, at proposed 40 C.F.R. § 60.5397a(j)(1), that is much more limited than the leak detection and repair programs prescribed by other EPA regulations. Specifically, EPA's proposed delay of repair provision states:

> Each identified source of fugitive emissions shall be repaired or replaced as soon as practicable, but no later than 15 calendar days after detection of the fugitive emissions. If the repair or replacement is technically infeasible or unsafe to repair during operation of the unit, the repair or replacement must be completed during the next scheduled shutdown or within 6 months, whichever is earlier.[36]

Therefore, EPA would require an operator to repair all leaks within 15 days unless the repair is "technically infeasible or unsafe to repair during operation of the unit." If one of these two conditions were met, EPA would require the operator to make all repairs within six months. EPA's proposal, however, does not provide operators with adequate relief for other justified delays of repair.

As described more fully below, EPA should provide for a more expansive delay-of-repair provision consistent with INGAA's DI&M program, which is modeled after other existing EPA regulations and state programs. EPA also should delete the proposed six-month limitation on the delay-of-repair provision in its Final Rule.

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[35] 80 Fed. Reg. at 56668 (proposed 40 C.F.R. § 60.5397a(j)(1)).
[36] *Id.*

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i. EPA failed to explain why its leak repair requirements in its proposed rule do not provide for delay of repair consistent with its other programs.

In the Proposed Rule, EPA selected a 15-day repair period with insufficient delay-of-repair conditions for leak emissions. This is not consistent with the leak detection and repair programs prescribed by other EPA regulations such as Part 60, Subpart VV and Subpart VVa,[37] "Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for which Construction, Reconstruction, or Modification Commenced After January 5, 1981, and on or Before November 7, 2006." In addition, EPA's proposed delay-of-repair provision for leak emissions is inconsistent with the delay-of-repair provisions proposed by EPA in this rulemaking for closed-vent systems and storage vessels.[38]

Both Part 60, Subpart VV and VVa provide more reasonable criteria for delay of repair and more reasonable repair timelines. EPA has not explained why the delay-of-repair provision for identification and repair of methane emissions should be stricter than the provisions in other EPA regulations.

For example, Part 60, Subpart VVa at 40 C.F.R. § 60.482-9 provides that:

- "Delay of repair of equipment for which leaks have been detected will be allowed if repair within 15 days is technically infeasible without a process unit shutdown. Repair of this equipment shall occur before the end of the next process unit shutdown. Monitoring to verify repair must occur within 15 days after startup of the process unit." 40 C.F.R. § 60.482-9(a);
- Delay of repair for valves will be allowed if "The owner or operator demonstrates that emissions of purged material resulting from immediate repair are greater than the fugitive emissions likely to result from delay of repair." 40 C.F.R. § 60.482-9 (c)(1); and
- "Delay of repair beyond a process unit shutdown will be allowed for a valve, if valve assembly replacement is necessary during the process unit shutdown, valve assembly supplies have been depleted, and valve assembly supplies had been sufficiently stocked before the supplies were depleted. Delay of repair beyond the next process unit shutdown will not be allowed unless the next process unit shutdown occurs sooner than 6 months after the first process unit shutdown." 40 C.F.R. § 60.482-9 (e).

Part 60, Subpart VV provides identical delay of repair provisions.[39]

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[37] 40 C.F.R. Part 60, Subpart VV and VVa, "Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry." *See e.g.,* 40 C.F.R. § 60.482-9a for delay of repair provisions.
[38] 80 Fed. Reg. at 56684-5 (proposed 40 C.F.R. § § 60.5416a(b)(10) and (c)(5).
[39] 40 C.F.R. § 60.482-9.

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Therefore, unlike the delay-of-repair provision in this Proposed Rule, these other Part 60 provisions permit an operator to:

- Delay a repair beyond six months if the repair requires a shutdown and the next shutdown period will occur in more than six months (rather than a maximum delay of six months);
- Delay a repair if the operator demonstrates that purged (i.e., blowdown) emissions resulting from immediate repair exceed the fugitive emissions likely to result from the delay; and
- Delay a repair beyond the next shutdown if there are issues associated with the availability of valves or valve assemblies.

In addition, EPA does not explain why its delay-of-repair provision for fugitive emissions at a compressor station is more stringent than the proposed delay=of=repair provisions for the treatment of closed-vent systems. In proposed 40 C.F.R. § 60.5416a(b)(10),[40] EPA provides that:

> Delay of repair of a closed vent system or cover for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, or if you determine that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. You must complete repair of such equipment by the end of the next shutdown.

Further, state regulatory programs also provide more reasonable criteria for delay of repair. For example, Colorado's LDAR rule for oil and gas operations includes delay-of -repair provisions. The Colorado rule provides that:

- If parts are unavailable, the operator must order parts promptly and complete repair within 15 working days of parts receipt (or the next shutdown after the part is received if repair requires shutdown); and
- If delay is attributable to other good cause, complete repair within 15 working days after the cause of delay ceases to exist.

The Colorado regulation does not provide an explicitly defined or list of "good cause" criteria. Yet, "good cause" delay could include, based on practical experience, the need for a specialized technical skillset to complete the repair when scheduling requires more than 15 days, warranty issues that require more than 15 days to address parts replacement, and safety or accessibility issues that warrant waiting for a shutdown based on operator judgment.

The delay-of-repair provision in INGAA's DI&M program is modeled after delay-of-repair provisions in Part 60, Subpart VV and Subpart VVa and Colorado's regulatory program. Therefore, INGAA advocates that EPA revise proposed 40 C.F.R. § 60.539a(j)(1) to adopt the following delay-of-repair provisions from INGAA's DI&M program:

[40] 80 Fed. Reg. at 56684 (proposed 40 C.F.R. § 60.5416a(b)(10)).

EPA should permit an operator to delay repairs beyond the 15-day deadline, if an operator can satisfy and document one of the following conditions:

1. Repair Requires Unit /Station Shutdown – If the repair of any component is technically infeasible without a process unit shut down or if the source cannot be repaired during operation of the source.
2. Equipment Isolated From Process – If the repair is unnecessary because the equipment is isolated from the process (i.e., the component/equipment is taken out of gas service, and repair is completed before a return to service).
3. Valves Where Purged Gas Would Exceed Leaking Gas – If immediate repair of the equipment would result in vented emissions (from equipment purge) greater than the emissions resulting from delay.
4. Valves Where Leakage Would Be Controlled – If leaked gas is collected and destroyed, recovered in a control device, or used for some other beneficial purpose.
5. Repair Is Unsafe, Inaccessible, or Difficult to Monitor – If a repair cannot be made due to safety issues.
6. Equipment Must Be Ordered for Repair – If additional time is needed to procure equipment or components necessary to complete the repair, the repair timing will be based on equipment delivery dates that may depend upon manufacturer stock and shipment schedules.[41]
7. Specialized Skill Set Must Be Scheduled – If the repair requires a specialized technical skillset, the repair timing will be based on personnel scheduling.

EPA has not explained why this proposed rule requires a 15-day leak repair period with a limited six-month delay of repair condition only when the repair "technically infeasible or unsafe to repair during operation of the unit," when its other regulatory programs permit delay of repair in other, more numerous circumstances. INGAA believes that this provision is arbitrary and should be modified, as described above.

At a minimum, EPA should revise proposed 40 C.F.R. § 60.5397a (j)(1) to adopt the same delay-of-repair provisions in Part 60, Subpart VVa or, if not, explain its departure.

In all cases, the operator would address repairs as soon as practical. For example:

- If a repair requires a shutdown or if a repair is delayed due to emissions from purged gas exceeding the emissions that result from the leak, the operator would complete the repair the next time the unit or process is shut down and/or purged;
- For parts such as large valves with extended delivery times, the operator would complete the repair within 15 days of delivery or upon the next shutdown after delivery if a unit or process shutdown is required to complete the repair; and
- For repairs that require a specialized skill set, the operator would complete the repair planning within 15 days, and schedule and complete the repair as soon as feasible.

[41] Once an operator has the part, an operator will conduct the repair in 15 days if the repair does not require a shutdown. If the repair requires a shutdown, the operator will conduct the repair at next process unit shutdown.

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ii. The 15-day repair requirement is unreasonable since most compressor station replacement parts are not available in 15 days.

EPA's proposal to require repairs within 15 days, without reasonable delay-of-repair provisions, is unworkable. T&S pipeline companies operate dozens of different models of reciprocating and centrifugal compressors with different vintages and manufactured by different vendors. Availability of replacement parts could be challenging especially for existing facilities that become subject to EPA's proposed modification provisions. Each compressor station, regardless of vintage, type or model, has thousands of components and equipment parts.[42] Operators do not warehouse all of the many replacement component parts – including a variety of valves, flanges and the many other components listed in the Proposed Rule. It is impractical to maintain such a large spare parts inventory. Due to the wide variety of compression equipment and compressor station piping, manufacturers do not stock all possible replacement equipment. Other than the most essential parts, ordering and obtaining those replacement parts from the manufacturer or other vendor becomes the critical path for completing repairs. This usually takes significantly longer than 15 days. Thus, delay of repair due to parts availability and delivery schedule is reasonable, and is a common delay of repair provisions in EPA and state LDAR programs.

Especially for existing compressor stations that trigger "modification," there often are waiting periods because replacement parts for older compressors cannot be acquired "off the shelf" and in many cases must be specifically manufactured on a special-order basis. For example, to replace a component, such as a crank shaft,[43] on a vintage reciprocating compressor would require the component to be removed from service and shipped to the manufacturer. The manufacturer then would make a mold of the component and re-cast a new piece. The process to remove, ship and re-cast a new component may take six months or longer. For additional examples, see Appendix D.

Moreover, EPA's six-month extension[44] – for repairs that require a pipeline operator to shut down a compressor station – does not apply to an operator that cannot receive replacement parts within 15 days. Even if EPA had proposed to include the unavailability of parts in its six-month extension, the six-month time period would be insufficient in all cases. The repair of an individual compressor unit or its associated piping components may limit the capacity of the compressor station even if the entire station does not shut down. Compressor stations normally have multiple compressor units. An individual compressor unit and its associated piping can be shut down to conduct a repair while the other compressor units at the station remain in operation. However, if the leak repair is within the overall compressor station piping, then a shutdown of the entire compressor station would be required. Both of these repair scenarios could potentially impact customer deliveries if EPA imposes a six-month time limit rather than relying on the next unit, process or station shutdown – whichever is necessary to complete a particular repair.

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[42] See EPA's Background Technical Support Document for the Proposed New Source Performance Standards, 40 C.F.R. Part 60, Subpart OOOOa, August 2015, Table 5-11, page 61.

[43] A crank shaft is a mechanical part able to perform a conversion between reciprocating motion and rotational motion.

[44] 80 Fed. Reg. at 56668 (proposed 40 C.F.R. § 60.5397a(j)(1)).

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Further, if all operators must adhere to the 15-day repair schedule, the interstate pipeline industry may not have a sufficient work force to comply with this timeline. Personnel capable of working on compressors and compressor station piping must meet the Pipeline and Hazardous Materials Safety Administration's (PHMSA) operator qualification requirements.[45] While companies currently have sufficient qualified personnel to conduct normal operations and repairs, the proposed Subpart OOOOa leak detection and repair requirements may significantly increase the number of qualified operators and maintenance personnel required to conduct leak surveys and repairs. Furthermore, the pipeline industry will be competing for qualified personnel to make necessary repairs at the same time it is implementing pipeline safety integrity management work pursuant to current and likely more rigorous upcoming regulations under the Pipeline Safety Act. The pipeline industry also is competing for personnel with the rest of the natural gas value chain – producers and local gas utilities – to comply with EPA's regulations and with the oil pipeline industry, which is performing its own pipeline safety work.

Therefore, EPA should modify its proposed rule to provide delay-of-repair provisions, as discussed above, consistent with INGAA's DI&M program.

iii. EPA failed to consider the adverse effects of the proposed rule.

EPA failed to consider the 15-day repair requirement's environmental and operational consequences, including the emissions that would occur to repair a leak and the service disruptions to customers while a piece of equipment is out of service for repair.

a. The proposed rule's 15-day repair requirement would result in unnecessary blowdowns and methane emissions releases.

EPA's proposal to require an operator to repair leaks within 15 days is unreasonable because, in many cases, it would necessitate releases of methane larger than what would have occurred without the rule. EPA's 15-day repair requirement will require operators, in many situations, to conduct a blowdown to vacate gas from the equipment or station piping before repairing or replacing leaking equipment or component(s) at a compressor station. One way to explain blowdowns is to use the water pipe inside a home as an example. A blowdown event at a pipeline connected to a compressor station would be similar to closing the main water valve to a home and then opening a faucet to allow all of the water to drain from the pipe before repairing a broken or cracked water pipe.

The amount of gas blowdown will vary, but, in many cases, it could be much greater than the methane emissions that would result from delaying the leak repair. If a significant blowdown event were required to complete a repair, it may be more environmentally beneficial to complete the repair at the next scheduled shutdown. EPA should allow operators flexibility to make reasonable judgments on whether to delay repair of a leak to minimize methane emissions.

For example, a leak can occur in a compressor unit's piping (valves, flanges, etc.) that would require the compressor unit to be shut down and the associated piping (from upstream isolation valve to downstream isolation valve) to be blown down resulting in greater emissions than what

[45] 49 C.F.R. Part 192, Subpart N.

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would be emitted by the leaking components if the repair were delayed. Furthermore, if the leaking component(s) were part of the overall compressor station piping, then the entire contents of the compressor station piping would need to be blown down to conduct the repair. Once again, greater emissions would result from the blowdown than what was being leaked.

If an operator could delay the leak repair, it would have a greater opportunity to minimize, or possibly eliminate, the amount of additional methane gas it would need to blowdown. Typically, this would result in an operator completing the repair the next time the unit or process is blown down for other operational reasons. For example, an operator could make repairs during a month or season that the compressor is not operating due to lower flow volumes on the pipeline. Another option could be for a pipeline customer to draw down gas from the pipeline slowly to reduce the volume of gas in the pipe at or near the compressor or for the customer to move the gas into storage.[46] However, these options are case specific and each situation would need to be evaluated for feasibility. A 15-day repair deadline would not provide the operator with the flexibility to work with its customers (often referred to as shippers) to minimize releases. INGAA also notes that the re-routing of methane gas is not always possible to avoid blowdown because many older compressor stations and their pipelines are not designed to re-route natural gas.

In addition, not all leaks are significant, particularly if the leaks release *de minimis* amounts of methane to the atmosphere. In fact, EPA recognizes that some level of methane release is acceptable to accommodate necessary equipment operations. It is well reasoned for an operator to delay repairing a *de minimis* leak if the volume of methane emitted in the process of repairing the leak exceeds the methane emissions likely to result from the delay. EPA should allow operators the discretion to decide whether more methane emissions would result from conducting a blowdown in order to make a repair within 15 days (versus the volume of methane emitted should the leak not be repaired). In such cases, operators would continue to monitor a leak and the need to make repairs, and most commonly repair the leak when the unit or process is next blown down for other operational purposes.

Specifically, EPA should revise its proposal to permit an operator to delay a repair if it demonstrates that emissions resulting from the immediate repair (e.g., blowdown) exceed the fugitive emissions likely from the delay. The repair would be scheduled to be completed during the next unit, process or station shutdown, depending on what level of shutdown and blow down is needed to address the repair.

b. The proposed rule could result in service disruptions to pipeline customers.

There is no question that a pipeline operator may need to shut down an entire compressor station or a compressor unit to perform larger repairs. If, for example, a pipeline operator must replace a valve that is used to isolate the compressor station from the mainline, it typically would take the compressor station out of service for six days once the pipeline had obtained the replacement part(s) from the manufacturer/vendor. By contrast, if a pipeline operator must replace a smaller, eight-inch valve connected only to a compressor unit, the pipeline operator would need to take

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the compressor station out of service for three to four days. These estimates, however, assume that all compressor station equipment parts are readily available from the manufacturer and can be timely shipped to the location, which, as discussed above, may not be the case. The compressor station would be out of service for the full timeframe required to order and obtain the part(s) and to conduct the repair or replacement, or risk being out of compliance with Subpart OOOOa in order to continue operations to meet critical demand. In many cases, this total timeframe could significantly exceed 15 days.

During the time the compressor station is out of service, the pipeline will need to reduce maximum capacity on it system. Depending on its customers' demand for gas, a pipeline operator may need to restrict transportation service through affected segments of its system while the compressor station is out of service.

If a pipeline identifies a leak in January, during peak natural gas usage, and must make repairs within 15 days, then, under EPA's proposed rule, that pipeline operator would risk service disruptions and thereby impair reliability in order to repair even the most *de minimis* leaks. A similar case could occur during high cooling day demand periods when electric generators use natural gas as a fuel. The arbitrary 15-day repair requirement limits the ability of the pipeline operator to make important operational decisions to maintain the delivery of natural gas to its customers.

Moreover, a transportation reduction on one pipeline could affect other pipelines in the transportation delivery path. Natural gas is often transported across several pipelines, from a producing region to the ultimate customers. If one pipeline in the path is experiencing service disruptions due to the inability to plan and prioritize repairs, there could be service disruptions affecting larger areas and more gas customers along the entire gas delivery chain. It is possible that these larger service disruptions could affect industrial customers, including factories that have two or three manufacturing processes or continuous manufacturing over a 24-hour basis (such as chemical and refining industries). Additionally, some service disruptions might affect electric power generation, which will, under the Clean Power Plan (CPP) and separate state regulations, increasingly be using natural gas over coal-fired generation from 2016-2030. Hospitals, data management centers and other industrial manufacturing customers require reliable natural gas delivery through the interstate pipeline industry just as the electric power sector will require reliable natural gas delivery.

EPA's failure to acknowledge likely service disruptions caused by its 15-day repair requirement, without adequate delay-of-repair provisions as described above, is not reasoned decision making and fails to recognize the true costs of this rule.

In establishing the Best System of Emission Reductions (BSER) under the CAA, EPA can take into account non-air and energy issues and other factors. There are obvious and important implications on energy infrastructure and availability that EPA has not considered. INGAA believes that EPA should consider the feasibility, cost-effectiveness, non-air issues, and other issues when considering delay-of-repair provisions that should be included in the rule.

E. EPA's Cost-Benefit Analysis Is Flawed and Incomplete.

EPA's technical support document (TSD) includes EPA's estimates of control costs and cost effectiveness, including costs for proposed LDAR requirements to control fugitive methane and VOC emissions from T&S compressor stations. INGAA believes that EPA overestimated uncontrolled model plant emissions and fugitive emissions reductions, and underestimated the costs for LDAR implementation. INGAA recommends a complete review and revision of the analysis, and asks that EPA consider more current emission estimates, including information available from the GHGRP.

i. EPA overestimated uncontrolled model plant emissions.

EPA's estimate of model plant methane and volatile organic compound (VOC) fugitive emissions are based on component counts and emission factors from the 1996 EPA/GRI study. Therefore, these emission factors are based on data collected only at pre-1996 T&S facilities and do not represent a new T&S facility. Further, the leak rates most likely over-estimate emissions from current existing facilities that have adopted leak monitoring practices over the past 20 years.

It is likely that EPA could improve emission estimates for existing model plants using leak data recently collected for Subpart W of the GHGRP. Initial review of that data indicates current emission estimates from existing facilities are lower than EPA's model plant (based on 20 year-old data). Emissions would be even lower for a "new" model plant compared to existing facilities.

ii. EPA underestimated the number of annually impacted T&S compressor stations.

EPA's projected number of transmission and storage stations and associated compressor units that would become subject to the Proposed Rule is significantly underestimated, which greatly undermines EPA's costs analysis. EPA estimated that the average number of new transmission compressor stations and new storage stations through 2020 to be six and fifteen, respectively. EPA estimated that those numbers would increase to 36 transmission and 90 storage stations by 2025. EPA's estimates were based on estimated number of facilities in the GHG Inventory for the years 1990 to 2012 and determining the rate of change in the number of these facilities over this period. INGAA's member companies operate approximately 1,000 transmission compressor stations of which only less than 300 are storage stations. Based on national transmission and storage compressor station totals, it is unrealistic to expect that the number of new storage stations would more than double the number of new and modified transmission stations annually. Moreover, the most common method for expanding pipeline system operations is to install one or more new compressor unit at an existing compressor station rather than installing new compressor stations. The installation costs to expand an existing compressor station are significantly less expensive than installing new compressor stations. EPA failed to include an estimate for the number of and associated implementation costs for existing facilities that would become subject to the Proposed Rule due to modifications at existing compressor stations.

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iii. EPA overestimated fugitive emissions reductions by citing a flawed Colorado study.

To estimate fugitive emission reductions as a function of LDAR monitoring frequency, EPA references a Colorado Air Quality Control Commission (CAQCC) Economic Impact Analysis. [47] There are two fundamental problems with EPA's reliance on the CAQCC analysis. First, sources relied upon by the CAQCC are undocumented. CAQCC references data having been obtained from EPA, but provides no documentation regarding the actual source of the data on which it relies. Second, while EPA references the CAQCC analysis as its support, it then without explanation a different and significantly more optimistic reduction factor for the increase in the emissions reduction achieved by increasing the frequency of the survey. Table 1 below compares the CAQCC analysis and the EPA reductions:

Table 1.

Colorado Air Quality Control Comission (CAQCC)		EPA Propoesed Rule	
Percent Reduction	Survey Frequency	Percent Reduction	Survey Frequency
40	annual	60	semi annual
60	quarterly	80	quarterly
80	monthly	-	-

INGAA strongly believes that survey frequency has a much smaller impact on performance than undocumented EPA source utilized by CAQCC. The credibility of EPA's estimate of how the frequency of surveys affects emissions reductions is seriously undermined by both the lack of well documented source data and the lack of explanation for the choice of even more optimistic estimates for how the frequency of surveys will affect emission reductions.

INGAA recommends that EPA should rely on a credible and well-documented study that assesses changes in LDAR effectiveness for different survey frequencies.

iv. EPA drastically underestimated LDAR implementation costs and INGAA finds them unrealistic.

EPA's approach to estimating LDAR costs included: (1) developing uncontrolled emissions estimates for a model transmission "plant" (i.e., compressor station) and a model storage plant; (2) developing nationwide uncontrolled emissions estimates based on the model plant emissions estimates and estimated numbers of new T&S compressor stations; (3) developing nationwide annual emissions control/reduction estimates for different LDAR monitoring frequencies (e.g., annual, semiannual, and quarterly); (4) developing annual control cost estimates for different LDAR monitoring frequencies; and (5) calculating estimated cost of control as dollars per ton of methane or VOC emissions reductions ($/ton).

[47] EPA's Technical Support Document at 70.

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INGAA asserts that EPA's LDAR implementation/compliance cost estimates are consistently well below practical estimates of actual costs. Select examples of this unrealistic calculation include:

- Labor cost for each of the monitoring plan elements, such as reading the rule, were estimated to be $57.80 per hour[48]. This rate is well below an average burdened cost for an Environmental Engineer or Manager. Assuming a conservative average annual salary for an environmental engineer of $100,000 plus a benefits rate of 50 percent ($150,000 total annual costs), the total hourly rate would be $72.11, not $57.80.

- EPA asserts that the reading of the rule and instructions is estimated to require one person four hours to complete. This estimate is an order of magnitude below the level of effort required to read and fully understand a new rule. Further, it is likely that more than one person at a company needs to understand the rule requirements. For example, EPA includes 2.5 people to develop a monitoring plan.

- EPA asserts that development of a fugitive emission monitoring plan was estimated to require 2.5 people a total of 60 hours to complete at a cost of $3,468. This EPA estimate fails to consider that each facility must develop a method to track every fugitive emissions component at the facility. This could include component counts for the facility, and permanent tagging of all components or attaching a unique tag to each leaking component to comply with the § 60.5397a(k)(6) recordkeeping requirement. In order to develop a monitoring plan including the "walk through path" for each compressor station, it is likely that personnel would need to travel to each station to develop a monitoring plan meeting the OOOOa level of detail requirements. The actual level of effort would be significantly (perhaps, an order of magnitude) greater than EPA's estimate.

- EPA assumes that the cost to conduct leak surveys for thousands of components at each compressor station using OGI cameras would be $2,300. Based on INGAA member companies experience with conducting Subpart W surveys using OGI cameras, the contractor costs ranged from $5,000 to $10,000 per compressor station.

- Notification of compliance status was estimated to take one person one hour to complete for T&S facilities. Preparation of this compliance status report requires collection and verification of all leak detection and repair data to determine compliance. The level of effort could be days, not a single hour.

- EPA's estimated cost of a Method 21 monitoring device for repair verification is $10,800. EPA's analysis appears to be based solely on the use of Method 21 measurement devices. However, the proposed OOOOa leak survey requirement is through use of OGI cameras. OGI cameras cost (typically in the range of $85,000 to

[48] Technical Support Document, page 69.

$95,000) significantly more than Method 21 portable analyzers. EPA did not include the cost of OGI cameras in its cost estimates. EPA's analysis also appears to assume this single Method 21 device will be used company-wide by numerous T&S stations and does not consider the practical aspects (and cost) of shipping a single Method 21 portable analyzer to verify every repair within a 15-day period, let alone shipping costs for OGI cameras that could also be used to confirm leak repairs. Practical implementation of leak repair verification requirements would require a Method 21 portable analyzer for most, if not all, T&S stations. Associated costs, such as portable analyzer calibration gases, are not considered.

- EPA estimates the cost to re-survey the repaired components using a Method 21 portable analyzer that could not be fixed during the initial survey based on $2.00 per component. EPA's estimate is not explained or supported, and it illustrates a lack of understanding of resurvey implementation. Assuming a labor rate of $30 per hour for maintenance repair, EPA assumes that each repaired component survey can be completely conducted in four minutes. A Method 21 survey requires the tester to locate the Method 21 portable analyzer, conduct calibration and zero checks, locate each repaired component (and possibly travel to the facility), measure and record the hydrocarbon concentration, return travel, and document and submit results. Even if multiple repaired components are covered during a single survey, four minutes per component is a significant under-estimation, and does not consider components that fail the resurvey and must be repaired (and resurveyed) multiple times.

- Section 5.4.2 of the TSD, "Cost Impacts" for "Fugitive Emissions Detection and Correction with OGI," assumes 1.18 percent of compressor station components leak. However, section 5.4.3 of the TSD, "Cost Impacts" for "Fugitive Emissions Detection and Correction with EPA Method 21," assumes a compressor station leak percentage of 7.49 at a leak definition of 10,000 ppm. If the OGI has a detection limit of 10,000 ppm as indicated in the TSD:

  > The OGI instrument that is used to conduct monitoring surveys must be capable of imaging gas that is half methane and half propane at a concentration of 10,000 ppm at a flow rate of $\geq$ 60 g/hr from a quarter inch diameter orifice. These criteria are based on the EPA's recent work with OGI systems indicating that fugitive emissions at a concentration of at least 10,000 ppm are generally detectible using OGI with proper monitoring and operating practices.[49]

- Then, the OGI and Method 21 leak percentages (at 10,000 ppm) would be expected to be similar. EPA does not explain why the two estimated leak percentages differ by a factor of six. Further, EPA estimates a leak percentage of 12.25 for a leak definition of 2,500 ppm and a leak percentage of 13.53 for a leak definition of 500 ppm. INGAA questions whether EPA believes that 13.5 percent of the components at a new T&S facility (one out of every seven) are actually leaking at a rate greater than the repaired component leak

[49] Technical Support Document, page 69.

concentration limit of 500 ppm. Clearly, EPA's cost-effectiveness analyses are confused and flawed, and should not be the basis for regulatory development.

- Table 2 presents data from the TSD that estimates annual methane emission reductions for different Method 21 portable analyzer monitoring frequencies and leak definitions for transmission stations. The data shows lower annual methane emission reductions for more frequent Method 21 portable analyzer monitoring, and are either flawed or should be fully explained. (See next page).

Table 2. Technical Support Document Model Plant Annual CH_4 Emissions Reductions based on Method 21 Monitoring at Transmission Stations

TSD Data Source	M21 Monitoring Frequency	Leak Definition (ppm)	Annual CH4 Reductions (tpy)
Table 5-22	Annual	10,000	51.1
Table 5-23	Semi-annual	10,000	44.9
Table 5-24	Quarterly	10,000	41.8
Table 5-22	Annual	2,500	58.6
Table 5-23	Semi-annual	2,500	57.4
Table 5-24	Quarterly	2,500	55.5
Table 5-22	Annual	500	61.1
Table 5-23	Semi-annual	500	60.5
Table 5-24	Quarterly	500	58.6

v. EPA failed to consider secondary impacts of the monitoring and repair of fugitive emissions leaks.

Section 5.4.2.4 of the TSD, "Secondary Impacts" states:

> No secondary gaseous pollutant emissions or wastewater are generated during the monitoring and repair of fugitive emissions components. There are some emissions that would be generated by the IR camera monitoring contractors with respect to driving to and from the site for the fugitive emissions survey however, these emissions cannot be quantified because there is no data related to the distance that would need to be traveled to the site. However, it is believed that the secondary impacts expected from the implementation of an OGI monitoring program would be minimal.

This statement fails to consider two very important issues. First, the repair of pressurized leaking components often requires depressurizing equipment and/or piping and the venting of gas. This is especially true for the Proposed Rule because EPA fails to include blowdown-related delay-of-repair discretion found in other LDAR regulations. The rule should consider the volume of gas that would be released to make a repair relative to the fugitive emissions when prescribing repair requirements. For example, the rule should allow delay of repair until the next shutdown if the volume of gas released to make the repair would exceed the estimated fugitive emissions. (See discussion at Section D.)

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Second, transmission stations are generally located about every 50 to 80 miles along a pipeline. This distance could be used to estimate the distance traveled to and from a site by IR camera monitoring contractors and the associated emissions. Since the proposed LDAR program includes OGI technology and repair of all leaks visualized, there will be scenarios where the leak repair will result in an inconsequential emission reduction and "secondary" emissions from transportation will eliminate the benefit.

EPA should revisit LDAR implementation cost analyses using more current data and well-documented assumptions. This improved analysis should include PHMSA's existing leak regulations. Further, EPA's cost analysis should consider all of the additional costs addressed in INGAA's comments. Component repair costs at compressor stations can range from $200,000-$2.3 million when considering construction costs. There could be an additional $2.5 million in customer impact costs if the station was unable to provide natural gas to their customers.

vi. EPA has overstated the benefits of the proposed rule by ignoring the number of blowdowns that will need to occur to fix a leak.

EPA's calculation of the anticipated benefits of the Proposed Rule fails to factor in the mechanics of fixing a leak.[50] Operators will have to conduct blowdowns in order to fix numerous leaks at any given compressor station along the pipeline system. EPA states that it anticipates the Proposed Rule will result in a savings of 180,000 tons of methane in calendar year 2020.[51] However, in order to fix leaks, pipeline operators have to blow down the station piping to conduct the necessary repair work. Prior to producing a net benefit calculation, EPA needs to factor in the additional releases of methane that will be required in order to address leak repairs.

INGAA offers four schematics in Appendix D that will help EPA understand the variation of impacts at a compressor station resulting from out of service events. Each schematic offers a different compressor station segment outage and the respective equipment involved. Further, the schematics offer explanations on time, costs and permitting requirements.

vii. EPA failed to consider the cost of service disruptions and cost of pipeline reimbursements for outages.

EPA failed to consider fully the costs associated with a pipeline operator's obligation to refund customers' monthly firm reservation (demand charge) credits during periods a pipeline must reduce service to conduct compressor repairs. When there is an interruption of service on a pipeline and the shipper cannot use the capacity, it reserved through the reservation charge. Pipelines are required to provide shippers credits against their reservation charges.[52]

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[50] EPA-HQ-OAR-2010-0505-5258 at 4-4.

[51] *Id.*

[52] Natural gas shippers pay two fees for firm transportation service on an interstate natural gas pipeline. One is the "reservation charge," based on the amount of pipeline capacity reserved by the shipper, regardless of how much of that capacity that shipper actually uses. The second is a "usage charge," based on the actual volume of gas that the shipper transports on the pipeline. When there is an interruption of service on a pipeline, and the firm shipper cannot use the capacity it reserved through the reservation charge, the Commission requires pipelines to provide shippers credits against their reservation charges. *See Natural Gas Supply Association et al.*, Order on Petition, 135 FERC 61,055 (2011).

Since EPA's Proposed Rule would require a pipeline operator to complete leak repairs within 15 days and shut down every six months, regardless of the time of year or gas load, a pipeline operator may be forced to reduce firm transportation service, reducing pipeline reliability during high demand periods, in order to conduct the repair within the arbitrary repair timeline. This reduction in service carries significant costs to the pipeline operator. In one case, an INGAA member needed to reimburse customers $2.5 million in associated demand charge credits for a six-day outage/reduction in firm transportation service.

There also are added costs to pipeline customers and ultimately consumers associated with the cost of the gas that is removed (or vacated) from the pipe and the cost of new gas that must be purchased to replace the blown down gas.

viii. EPA should not include a social cost of methane in its cost-benefits analysis.

INGAA endorses the comments provided by NERA's economic consulting's analysis[53] as to how EPA has estimated Social Cost of Methane. EPA has counted the global benefits to climate change mitigation through methane reduction while counting only the U.S. T&S sector costs. Further, EPA's estimates of net benefits lack appropriate peer review that is necessary for use in supporting regulatory policy.[54] INGAA urges EPA to take these matters into consideration when setting the final NSPS rule regarding cost-effective reductions. As proposed, INGAA does not believe that EPA's NSPS is cost-effective, and it feels that the Proposed Rule exaggerates the benefits while significantly minimizing the costs to the T&S sector.

ix. EPA did not predict the costs if "modification" is triggered on existing compressor or compressor stations.

While INGAA cannot predict the precise number of existing compressor stations that could trigger "modification," it believes that the cost range could vary between $100,000 and $1 million dollars per affected existing compressor station. EPA did not include cost estimates for existing sources that might trigger modifications.

F. EPA Failed to Make a Separate Endangerment Finding Necessary to Include T&S Segment as a Source Category.

Section 111(b)(1)(A) of the CAA requires EPA to make a new endangerment finding for each new source category in order to establish standards of performance for the new source(s).[55] INGAA does not believe that EPA can appropriately add the downstream T&S sectors as a source category without the requisite endangerment finding. That endangerment

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[53] "Technical Comments on the Social Cost of Methane as Used in the Regulatory Impact Analysis of the Proposed Emissions Standards for New and Modified Sources in the Oil and Natural Gas Sector;" Prepared for American Council for Capital Formation, Nov. 27, 2015. http://accf.org/wp-content/uploads/2015/12/NERA_TechnicalComments_ProposedMethaneRegs_FINAL.pdf

[54] EPA Regulatory Impact Analysis (RIA), Section IIV.

[55] *See* 42 U.S.C. § 7411(b)(1)(A).

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finding would also mean explaining why addressing all of the compressor station equipment leaks (including component parts totaling perhaps 1,000 per compressor station) is warranted. INGAA does not believe that EPA can make that finding based upon relative contributions from those component parts, equipment and those much smaller leaks.

INGAA expresses concerns regarding EPA's addition of the downstream T&S sector as a part of EPA's 1979 source category of "crude oil and natural gas production," without a substantiated endangerment finding. INGAA respectfully disagrees with EPA, and believes that the T&S sectors are not included in the "crude oil and natural gas production" category. Accordingly, INGAA requests that EPA conduct an endangerment finding for the T&S sectors pursuant to section 111(b)(1)(A) of the CAA, prior to promulgating any NSPS regulations regarding the same.[56]

In the Proposed NSPS OOOOa Rule, EPA summarizes the statutory and regulatory history supporting its proposal. In relevant part, EPA published a list of source categories in 1979, which included "crude oil and natural gas production" ("Priority List").[57] In this 1979 Priority List, EPA determined that "crude oil and natural gas production" was a source category which may reasonably be anticipated to endanger public health or welfare. EPA was then able to promulgate standards of performance for "crude oil and natural gas production" pursuant to section 111(b) of the CAA.[58] Thus, in 1985 and 2012, EPA promulgated NSPS KKK, LLL, and OOOO, respectively, addressing VOC emissions from leaking components at onshore natural gas processing plants; sulfur dioxide emissions from natural gas processing plants; and VOC standards for equipment leaks at onshore natural gas processing plants, as well as at several oil and natural gas-related operations not covered by subpart KKK, including gas well completions, centrifugal and reciprocating compressors, natural gas-operated pneumatic controllers, and storage vessels.[59]

In this rulemaking, EPA broadly interprets the 1979 Priority List to cover the entire natural gas industry.[60] To support this position, EPA states:

> For example, the priority list analysis indicated that the EPA evaluated emissions beyond the natural gas production segment to include emissions from natural gas processing plants. The analysis also showed that the EPA evaluated equipment, such as stationary pipeline compressor engines, that are used in various segments of the natural gas industry.[61]

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[56] This issue was raised by another energy sector entity in 2010. API comments submitted to Docket ID Number EPA–HQ–OAR–2010–0505 on Nov. 11, 2011.
[57] *See* 44 Fed. Reg. 49222 (Aug. 21, 1979).
[58] *See* 44 Fed. Reg. at 49223.
[59] *See* 50 Fed. Reg. at 26,122 (June 24, 1985); 50 Fed. Reg. 40,158 (Oct. 1, 1985); 77 Fed. Reg. 49,490 (Aug. 16, 2015). Later, in 2013 and 2014, EPA amended NSPS OOOO. 78 Fed. Reg. 58,416 (Sept. 23, 2013); 79 Fed. Reg. 79,018 (Dec. 31, 2014).
[60] *See* 80 Fed. Reg. at 56600.
[61] *Id.*

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EPA's stated rationale finds no support in the 1979 Priority List, the proposed rulemaking preceding the 1979 Priority List, the background document to the 1979 Priority List, or in any subsequent EPA rulemakings.

First, beyond listing "crude oil and natural gas production" as a source category, EPA did not discuss (in its mere five page publication) any segment "beyond the natural gas production segment," nor does the analysis show that "EPA evaluated equipment," such as stationary pipeline compressor engines.[62] In fact, neither the 1979 Priority List final rule, the 1979 Priority List proposed rule, nor the background document filed in support of the 1979 Priority List provide any explanation or support for EPA's interpretation.[63]

In addition, EPA's original listing intended to regulate two discrete categories of sources: first, large stationary sources (such as plants), and second, sources that typically emit at least 100 tons per year of a regulated pollutant.[64] The natural gas T&S sectors satisfy neither of these criteria, and could not reasonably have been considered a major-emitting plant at the time of the 1979 Priority Listing. Thus, it could not have been EPA's original intent in 1979 to include the T&S sectors in the category source "crude oil and natural gas production."

In fact, the background document filed in support of the 1979 Priority List buttresses this conclusion. In that document, EPA's only mention of the natural gas industry outside of the precise phrase "crude oil and natural gas production" occurs when it adds the word "plants" to the source listing, labeling the source category as "crude oil and natural gas production plants."[65] The inclusion of the word "plants" is a telling sign that EPA's original intent may have contemplated the regulation of natural gas processing plants—the closest thing to a major-emitting plant found in the natural gas sector.

Second, EPA's 1984 rulemaking does not support EPA's current position to include the T&S sector as a source listing. In fact, the 1984 rulemaking made clear that natural gas processing plants were the actual target of the "crude oil and natural gas production" source listing. The 1984 rule defined the source category, stating that "the crude oil and natural gas production industry encompasses the operations of exploring for crude oil and natural gas products, drilling for these products, removing them from beneath the earth's surface, and processing these products from oil and gas fields for distribution to petroleum refineries and gas pipelines."[66] EPA's definition focuses on extraction and production; it says nothing about T&S. Additionally, the T&S sectors contemplated in the current rule-making are well beyond the natural gas processing plant of the 1984 rulemaking. As EPA notes in the Proposed Rule emissions in the transmission and storage sectors have virtually no VOC and significantly less HAP content than those in the production and processing segments. Thus, EPA is erroneously treating the various, and very distinct, segments of the natural gas industry as one source category, directly contradicting its 1984 definition, which tailored the application of this source category.

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[62] 44 Fed. Reg. 49222 (Aug. 21, 1979).
[63] *See* 43 Fed. Reg. 38,872 (Aug. 31, 1978); M.R. Monarch, Revised Prioritized List of Source Categories for NSPS Promulgation, EPA-450 / 3-79-023, at 9 (March 1979).
[64] *See* 44 Fed. Reg. at 49224.
[65] M.R. Monarch, Revised Prioritized List of Source Categories for NSPS Promulgation, EPA-450 / 3-79-023, at 9 (March 1979).
[66] 49 Fed. Reg. 2636, 2637 (Jan. 20, 1984).

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Third, and because it is clear that the natural gas T&S sectors do not fall under the existing source category, EPA must provide an explicit endangerment finding to regulate this new source category. EPA's broad authority and discretion to list and establish NSPS for a source category is not so broad as to modify a source category without such a finding. EPA has the authority to regulate the natural gas T&S sectors only if it (1) defines the precise source categories of the transmission and storage sectors, and (2) determines that emissions from the T&S sectors may contribute to endangerment of health or the environment.[67] Absent these two express findings, EPA cannot arbitrarily expand a pre-existing source category to include new sources it never intended to include in the first place. EPA's attempt to provide "good reasons" to treat the various segments of the natural gas industry as one source category is insufficient. *See* 80 Fed. Reg. at 56,600. No matter how "good" the reason, such reasons must be cited in an endangerment finding.

Finally, EPA's alternative argument that it provides adequate support to satisfy an endangerment finding is insufficient under CAA section 111. Essentially, EPA is attempting to avoid its obligation to make an endangerment finding with respect to each individual segment of the natural gas industry, and to substantiate its proposed source performance standards. EPA's generalized argument in support of a new endangerment finding is insufficient under section 111(b).[68]

EPA's argument focuses broadly on potential environmental and health impacts caused by atmospheric concentrations of GHGs. Yet EPA fails to offer a detailed discussion of any potential specific impacts directly caused by the T&S sector. Second, EPA applies its endangerment finding broadly to the entire oil and gas industry as a whole, rather than specifically to the T&S sector (or other discrete industry sectors). While EPA provides some indication regarding the percent of contribution of methane to the total GHG atmospheric concentrations from the T&S sector, EPA's analysis does not sufficiently demonstrate that the T&S sector on its own warrants an endangerment finding under section 111(b) of the CAA– particularly given the low hazardous air pollutant emissions and almost no VOCs from the T&S sector. EPA cannot arbitrarily expand a pre-established source category in such a cursory manner.

INGAA believes that a T&S specific proposal is needed for EPA to expand its source category to include the natural gas T&S sectors. EPA's broad authority and discretion to list and establish NSPS for a source category is not so broad as to permit modification of a category list without an explicit endangerment finding. Because the natural gas T&S sector was not included in the original 1979 Priority Listing, and because background documentation and further analysis of that 1979 Priority Listing support the conclusion that EPA never intended to include the T&S sector, EPA is required to make a new endangerment finding before it can purport to regulate those sectors.

EPA attempts to argue that because EPA "evaluated equipment, such as stationary pipeline compressor engines that are used in various segments of the natural gas industry" it is reasonable

[67] 42 U.S.C. § 7411(b).
[68] 80 Fed. Reg. at 56601.

to assume that EPA made an endangerment finding that encompassed all of those segments. There is no evidence that EPA made such an evaluation, much less a specific endangerment finding.

However, even if we accept for the sake of argument that such an "evaluation" occurred, there is no reason to believe that the mere evaluation of compressors equates to an endangerment finding for compressors in all segments of the natural gas value chain. In 2012, EPA "evaluated" VOC emissions from compressors in the T&S segment, and explicitly found that their emissions were not high enough to merit regulation – but EPA found that regulation of compressors in the *processing* segment was merited.[69] Accordingly, EPA's practice has been to evaluate different segments of the natural gas value chain independently – as different source categories – and to make findings for some segments but not others, even where different segments use the same types of equipment.

Therefore, EPA's own practice in this area makes clear that it is unreasonable to assume that the simple evaluation of sources in a particular segment of the natural gas value chain equates to an endangerment finding for that segment. Accordingly, EPA has not evaluated endangerment for the T&S sector pursuant to section 111(b)(1)(A) of the CAA.

G. EPA Has Not Acknowledged or Taken into Consideration Existing PHMSA Regulations for the Timing of Leak Repairs.

In the preamble, EPA frequently refers to the need to leverage existing programs. However, EPA does not indicate in the Proposed Rule that the agency has conducted any review, comparison, or reconciliation with other regulatory programs. In particular, EPA does not recognize the existing regulations that cover leak repairs. PHMSA has the authority to regulate leak detection and repair for natural gas pipelines and facilities and exercises that authority through its existing regulations.

Specifically, PHMSA requires operators to conduct leakage surveys, patrol rights-of-way, repair hazardous leaks promptly, and report unintentional estimated gas loss of three million cubic feet or more.[70] PHMSA requires that operators repair all "hazardous"[71] leaks promptly. Pipeline and facility operators must also report to PHMSA the number, location, and cause of all leaks eliminated or repaired annually.[72] PHMSA defines a leak in the annual reporting forms as "…unintentional escapes of gas from the pipeline that are not reportable as Incidents under § 191.3. A non-hazardous release that can be eliminated by lubrication, adjustment, or tightening is not a leak. Operators should report the number of leaks repaired based on the best data they have available."[73]

Rather than issuing its own leak repair regulations requiring operators to repair all leaks within 15 days, EPA should work with PHMSA to support the existing regulations. As illustrated

[69] 77 Fed. Reg. 49490, 49523 (Aug. 16, 2012).
[70] *See* 49 C.F.R. §§ 192.706, 192.703(c), 192.705, and 191.3.
[71] Hazardous under PHMSA regulation has no correlation to a Hazardous Air Pollutant under the Clean Air Act.
[72] *See* PHMSA F. 7100.2-1 at *http://phmsa.dot.gov/pipeline/library/forms*.
[73] Instructions for PHMSA F. 7100.2-1 at 13.

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above, PHMSA recognizes that not all leaks are the same and operators need to acquire replacement parts and consider disruptions in service. EPA should consult with PHMSA and rely on the time frames for leak repairs set out in existing federal regulations. This type of collaborative effort meets the Administration's directive to agencies to coordinate on cross-cutting issues.[74]

H. EPA Fails to Justify Third-Party Verification Requirements for the T&S Sector, When EPA Does Not Require Such Verification for Other Sectors.

INGAA does not believe that EPA has provided any justification for mandating third-party verification for the T&S sector. Third-party verification is not a conventional part of the NSPS program where a third party must be hired to verify that the company met its regulatory obligations. INGAA points out that EPA has an ongoing enforcement and inspection program (in addition to the annual reporting under Subpart W) where any failure to have completed all requirements will be identified by EPA.

INGAA does not support third-party audit and verification programs. EPA, in the Proposed Rule, would require third-party audits for leak surveys and repairs (e.g., audit of OGI program), and third-party professional engineer verification of gas capture, closed vent and combustion device designs. The operator is responsible for compliance and third parties do not facilitate that process nor relieve the operator's obligations. In addition, it is unlikely that independent third parties are available that can adequately meet EPA's conflict of interest requirements and fulfill the roles desired by EPA, thus adding unnecessary burden for ineffective requirements.

Sector-specific training and experience would be lacking for "qualified professionals." For example, OGI is a relatively new technology for leak detection. Other than instrument vendors, operating company personnel and their hired third-party contractors (e.g., for Subpart W surveys) have the most experience with OGI technology for detecting leaks in natural gas operations. Since T&S facilities are the majority of facilities that require methane leak surveys under Subpart W, this expertise is unique. Third parties will not likely have the experience to conduct a meaningful audit. Third-party auditors are unlikely to have experience with gas transmission operations and are unlikely to have as much experience with OGI surveys as the operator's team. Thus, third parties cannot be expected to provide beneficial, insightful audit services or reasonable recommendations for an OGI program.

Similarly, transmission companies have in-house expertise and an established relationship with additional resources that address systems design. Third-party verification would likely be conducted by parties with far less experience regarding design considerations for natural gas operations.

In addition, the implications for third-party audits and verification are not clear. It is unclear if the operator would be obligated to implement "recommendations" from the audit that the operator did not support. Recommendations from auditors lacking gas transmission and OGI

[74] *See* FACT SHEET: Administration Takes Steps Forward on Climate Action Plan by Announcing Actions to Cut Methane Emissions (Jan. 14, 2015), available at https://www.whitehouse.gov/the-press-office/2015/01/14/fact-sheet-administration-takes-steps-forward-climate-action-plan-anno-1.

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experience could present significant issues for operators and possible conflicts with other operational, safety or regulatory requirements.

It is unclear where the audit resources would come from, because OGI certification is primarily conducted by instrument vendors. These companies should not perform an independent audit service due to an obvious conflict of interest. Given the lack of trained auditors with appropriate sector-specific and technology experience, and lack of clarity regarding the breadth of audits and the requirements for implementing audit recommendations, it is difficult to assess potential costs at this time.

Lastly, EPA did not even attempt to quantify the cost of third-party audits. However, there is a strong chance that costs would be high, benefit would not be realized, and the early stages of an audit program would more likely consist of operators educating and training the third-party auditors on T&S operations and OGI performance. For these reasons, third-party programs should not be required in Subpart OOOOa.

III. MISCELLANEOUS COMMENTS

A. Leak Detection Methods Other than OGI Should Be Allowed.

The Proposed Rule requires Optical Gas Imaging (OGI) for leak detection, and EPA solicits comment on whether additional methods should be allowed. INGAA strongly supports including flexibility for leak detection, and EPA Method 21 should be in included as an option for leak surveys. In the preamble, EPA concludes that OGI is more cost effective than Method 21, but many factors can influence survey costs – including the availability of trained operators and OGI instruments, which are orders of magnitude more costly than Method 21 instrumentation. The operator should have the discretion to use other established methods for leak surveys, such as Method 21. The final rule should include Method 21 and the ability to implement other future EPA-approved technologies that are proven as equivalent to OGI or Method 21. If not, this program will be inconsistent with every other leak mitigation program in the U.S., as well as the Subpart W leak survey methodology.

EPA's Proposed Rule contains a leak survey method requiring the more restrictive OGI technology. However, EPA's Subpart W requirement allows either OGI or Method 21. EPA should strive for consistency with existing programs to avoid similar, duplicative efforts. Since a primary objective of the GHG Reporting Program was to inform policy decisions, EPA should better utilize data and information available from Subpart W reporting and reconsider environmental benefits and the need for regulation.

B. The Leak Threshold for Method 21 Surveys Should Be 10,000 ppm.

EPA solicits comment on the appropriate leak definition concentration if Method 21 is included in the final rule. As noted in the preamble, current NSPS include thresholds ranging from 500 to 10,000 ppm. It is important to understand that these thresholds were established for VOC regulations, where the measured stream may include constituents other than hydrocarbons. When nonhydrocarbon species are within the stream, the measured concentration is diluted to

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lower values. For the natural gas sector, typically ninety percent or more of the stream is methane and nearly the entire stream is hydrocarbon. Thus, relative to a diluted VOC stream, a smaller leak of natural gas will record a higher hydrocarbon concentration. In addition, for T&S the Proposed Rule is primarily interested in reducing methane emissions – rather than VOCs or Hazardous Air Pollutants (HAPs). Very small leaks that may be detected with a low concentration threshold (e.g., 500 ppm) are not likely to provide meaningful reductions when GHG impacts are the primary environmental concern.

Since existing NSPS with lower concentrations thresholds are associated with VOC regulations and different process streams, a higher threshold is appropriate for a regulation addressing methane leaks. INGAA recommends a leak definition concentration of 10,000 ppm. This is consistent with the range of thresholds in current regulations, also consistent with the OGI performance objectives in § 60.5397a(c)(7)(i)(B), and consistent with the Subpart W leak definition.

C. Survey Requirements Should Not Include Definition of a Walking Path.

The Proposed Rule requires a site-specific monitoring plan that includes a defined walking path. This is an ambiguous and unnecessary requirement, and more burdensome than leak monitoring programs required in other NSPS. The operator and survey team are responsible to ensure that all affected components are surveyed, as established by programs in existing regulations. The proposed requirement to identify and adhere to a defined walking path is unnecessary and should be removed from the rule.

D. The Initial Survey Schedule Should Be Revised to Allow 180 days from Startup, which Is Consistent with Performance Test Schedules in Other NSPS that Affect Compressor Stations.

The Proposed Rule requires an initial survey within 30 days of startup, and EPA requests comment on that requirement. Startup of a facility generally encompasses a busy period for operators, and includes schedules for other regulatory requirements associated with facility operations. More consistency with other NSPS and a more reasonable schedule is warranted. For example, most new compressor stations include natural gas-fired compressor drivers – i.e., reciprocating engines or combustion turbines. These units are also subject to NSPS and NESHAP regulations, such as Part 60, Subpart JJJJ and Part 63, Subpart ZZZZ for reciprocating engines, and Part 60, Subpart KKKK for turbines. Those regulations allow a longer period to complete initial performance tests, and similar schedules are warranted for Subpart OOOOa. Similar schedules will also simplify managing compliance during the busy period following initial startup. Subpart JJJJ, Subpart KKKK, and Subpart ZZZZ allow 180 days or longer to complete the initial performance test. A similar schedule is warranted to complete the initial leak monitoring survey. INGAA recommends revising the schedule for the initial survey to within 180 days of startup.

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E. Reporting on Company Websites Should Not Be Required.

EPA requests comment requiring operators "to report *quantitative environmental results* on their corporate maintained Web sites." *[emphasis added]* The preamble also ponders the type of information and data that could be included in such reports. INGAA objects to this proposition.

The details and nuances of regulatory compliance are not commonly understood. EPA notes that on-line reporting could improve transparency, but that claim is not supported by analysis or fact. EPA should not underestimate the complexities of interpreting "quantitative environmental results." Web site reporting is more likely to raise questions due to misinterpretation than to improve public transparency and insight.

Significant additional effort would be required to develop standardized information for reporting and clearly define the meaning for the reported information. The nuances of Subpart OOOOa would not be understood by the vast majority of third parties that may review the website reports. For example, pneumatic controller counts, justification for applying a high-bleed pneumatic controller and time frames for rod packing replacement are all examples of compliance information for Subpart OOOOa affected facilities. Compliance requirements include work practices, equipment standards and control requirements depending upon the affected source. The terminology and regulatory criteria are beyond the comprehension of most individuals that are not well acclimated to the rule and would befuddle many online readers rather than improve transparency. Interpretation of reported quantitative results would likely cause confusion (and possibly unneeded consternation) because the reader would not understand the context of a complex regulation. Reporting on company websites is an ill-conceived idea and should not be required.

F. For Reciprocating Compressors, Condition-Based Maintenance Should Be Included as an Alternative to Prescribed Maintenance Intervals.

INGAA's comments have addressed rod packing elsewhere, but INGAA wishes to make some technical suggestions to address maintenance schedules. For reciprocating compressor rod packing, the Proposed Rule includes a prescribed maintenance schedule or control of the leakage by routing it to a process (such as the engine combustion air). An additional option- should be included- the use of condition-based maintenance practices. Condition based maintenance may extend the operation of functional rod packing, precludes premature and wasteful rod packing maintenance/replacement, and encourages the development of innovative rod packing technologies.

EPA has acknowledged that condition-based maintenance is a practical approach in its Natural Gas STAR lessons learned document, "Reducing Methane Emissions from Compressor Rod Packing System."[75] A draft California Air Resources Board (CARB) regulation[76] for oil and gas operations includes condition-based maintenance for reciprocating compressor rod packing, with

[75] http://www.epa.gov/gasstar/documents/ll_rodpack.pdf

[76] CARB Proposed Regulation Order, Subchapter 10, Article 3, "Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities." http://www.arb.ca.gov/cc/oil-gas/meetings/Draft_Regulatory_Language_4-22-15.pdf (April 22, 2015).

a leak threshold of >2 SCFM requiring maintenance. The INGAA DI&M Guidelines include condition-based maintenance for reciprocating compressor rod packing. Since EPA's Natural Gas STAR program has demonstrated this work practice, it should be included as an alternative to the Proposed Rule requirements.

Companies understand the value of rod packing monitoring and maintenance/replacement programs and have instituted these programs as part of safety and standard maintenance practices. The final rule should include condition-based maintenance practices such as those in INGAA's DI&M program. These include:

- Rod packing condition-based maintenance, with performance assessed by measuring the rod packing leak rate in accordance with applicable industry standard practices (e.g., as defined in Subpart W procedures);
- A leak rate exceeding 2 SCFM would require rod packing maintenance/replacement at the next unit shutdown:
    - A nine-month window is necessary to allow a critical unit to continue operating during a high-use season. Maintenance will occur sooner if the unit is shutdown; and
- Monitoring would occur annually, which is consistent with the CARB proposal. A leak rate less than 2 SCFM demonstrates acceptable rod packing leakage.

Reliability engineering has advanced from following antiquated, periodic (i.e., preventative) maintenance to more use of predictive or condition-based maintenance, because it has been demonstrated that condition-based maintenance improves operational reliability and performance. Subpart OOOOa should not limit state-of-the art approaches or advancements in technology and maintenance procedures. Condition-based maintenance should be added as a compliance option for reciprocating compressor rod packing.

G. For Existing Centrifugal Compressors with Wet Seals, EPA Should Clearly Indicate that Routine Maintenance and Repair Does Not Trigger Applicability.

For existing units, interpretation of modification and reconstruction provisions is not always straightforward. The history of determination requests for other NSPS in EPA's Applicability Determination Index demonstrates this fact. For centrifugal compressors, only units with wet seals are affected units. For new installations, turbines with dry seals are installed and these units are not subject to the Proposed Rule. Dry seals have been common for over ten years, but a number of existing wet seal units remain in operation. Thus, the Proposed Rule would most likely affect existing centrifugal compressors that are modified or reconstructed. INGAA is concerned with regulatory interpretations that could unnecessarily change the status of existing units. EPA should provide additional background regarding exemptions when routine maintenance or repair is conducted. Additional evaluation is also needed regarding the potential high costs and minimal benefits associated with retrofit "control" of an existing centrifugal compressor with wet seals.

It is important to understand that some situations (e.g., associated with reconstruction or modification determinations for existing units with wet seals) could introduce unreasonable regulatory costs. EPA needs to properly consider reasonable scenarios and associated outcomes. INGAA discussed this with EPA during development of the original Subpart OOOO rule in 2011 and 2012. Existing units with wet seals that become subject to Subpart OOOO could be faced with extraordinary costs. The final rule should clearly indicate that routine repair and maintenance, including long-established component replacement programs, do not trigger Subpart OOOOa applicability.

Compliance costs (and cost benefit) could be an important issue in select cases where "applicability" triggered for existing units results in measures such as installation of control systems, or more extreme measures such as replacing wet seals with dry seals or unit replacement. Retrofit feasibility and peripheral costs could result in inordinate costs such that replacement is the only viable option. Since wet seal emission rates can vary – and are similar to dry seals in some cases – this requirement could be triggered with little or no environmental benefit.

The associated benefit is an important issue. As discussed earlier, EPA has failed to consider emissions information being compiled from Subpart W reporting for centrifugal compressors. Industry stakeholders are reviewing that information, and it indicates centrifugal compressor *wet seal emissions are far lower than EPA's current estimated.* Closer scrutiny is warranted to leverage important insights that can be gained from Subpart W measurements.

INGAA recommends that EPA more clearly indicate that routine maintenance and repair of a centrifugal compressor with wet seals does not trigger applicability. INGAA also recommends that EPA complete a thorough analysis of GHG Reporting Program data, which includes measurement of wet seal emissions for Subpart W T&S facilities. INGAA believes that such a review is likely to indicate that EPA should reassess the perceived environmental benefits from mitigation of wet seal degassing vent emissions, and reconsider whether this equipment category should be included in the regulation.

H. Subpart W Emissions Information Should Be Considered When Determining Environmental Benefits and the Need for Regulation.

Since 2011, operators have been reporting emissions information to EPA under the GHGRP. This includes thousands of new measurements at T&S compressor stations associated with Subpart W annual surveys. When the GHGRP was adopted, a primary EPA objective was to use that information to inform future policy. In 2015, as GHG programs migrate from emission reporting to emissions reductions, the GHGRP data has not been used for its stated purpose. There is little indication that EPA has considered four years of Subpart W reporting, including many measurements, to inform this rulemaking.

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Industry stakeholders are engaged in a review process and initial results raise questions about the Proposed Rule. It appears that Subpart W data provides some compelling data, including these examples:

1. Emissions measurement data supports DI&M by reinforcing the understanding that a small minority of leaks are responsible for the majority of compressor station leak emissions;

2. Emissions measurement data indicates that emissions from centrifugal turbines with wet seal degassing vents are many times lower that EPA's current estimates; and

3. Pneumatic controller counts and emissions estimates indicate that pneumatic device emissions are lower for T&S than current EPA estimates, and a relatively minor contributor to T&S methane emissions.

The first item provides support for focusing on gross emitters by allowing DI&M. The other two items raise questions about environmental benefit estimates and whether regulation of those sources is warranted.

INGAA recommends that EPA engage in a more thorough and thoughtful process that considers Subpart W data, including T&S measurement data. INGAA welcomes additional discussion on this topic and related stakeholder projects that are reviewing and analyzing Subpart W data.

I. GHGRP Data Indicates T&S Emissions from Continuous Bleed Pneumatic Controllers Are Relatively Low. Thus, Pneumatic Controllers in T&S Should Not Be an Affected Source.

The GHGRP requires reporting of T&S emissions from pneumatic controllers based on an inventory of devices (by type) and associated emission factors. Review of GHGRP reported data and comparison to estimates (e.g., per facility) from EPA's annual inventory indicate that GHGRP pneumatic device emission estimates are several times lower than EPA's national inventory estimate for the T&S sector.

EPA should more closely review and consider the more current information from the GHGRP. GHGRP reporting indicates that pneumatic controller emissions are far lower than EPA's historical estimate. Thus, these emissions comprise a small percentage of total methane emissions from T&S sources. EPA should consider excluding pneumatic device regulations from the regulation for T&S compressor stations.

J. EPA Should Clarify that for T&S, Pneumatic Controllers Are Only an Affected Source at Compressor Stations.

As stated above, INGAA does not believe pneumatic controllers should be covered in the final rule. However, if EPA decides to include T&S pneumatic controllers as an affected source, the final rule should more clearly indicate that Subpart OOOOa only applies to devices located at compressor stations and not at locations along the pipeline (e.g., metering stations).

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From preamble discussion and support documents, it appears that EPA only intends to regulate pneumatic devices at compressor stations. However, the Proposed Rule does not clearly state this, and clarification is warranted. The Proposed Rule applicability section and definition could lead to the conclusion that pneumatic controller affected sources in T&S are not limited to pneumatics located at compressor stations.

In § 60.5365a(d)(1), the affected source is listed for pneumatics not located at gas processing plants, which includes T&S operations:

> (d)(1) Each pneumatic controller affected facility not located at a natural gas processing plant, which is a single continuous bleed natural gas-driven pneumatic controller operating at a natural gas bleed rate greater than 6 scfh.

And, "pneumatic controller" is defined in § 60.5430a:

> *Pneumatic controller* means an automated instrument used for maintaining a process condition such as liquid level, pressure, delta-pressure and temperature.

Neither of these citations limits applicability to the compressor station for T&S operations. Either or both of these subsections should be revised to indicate that for T&S, pneumatic controllers are only subject if located at a compressor station. If EPA intends broader applicability, then its support analysis is lacking, and additional analysis is required to accurately assess the costs and benefits from regulating pneumatics at other locations along a pipeline (e.g., at metering stations).

K. INGAA Recommends Removing Pneumatic Pumps as an Affected Source for T&S Facilities.

The Proposed Rule includes T&S pneumatic pumps as an affected source if there is a control device located on site. Control for this situation would require a vapor recovery system and some means to combust, catalytically oxidize, or re-use the stream. EPA requests comment and additional information on gas assist glycol dehydrator pumps and the associated emissions. Although INGAA does not have detailed information readily available, these pumps are not prevalent in T&S and when at a site (e.g., a storage facility with dehydration), vapor recovery or other control devices are usually not located at the site.

INGAA's interpretation is that this requirement would only apply if a pump is present, as well as the associated control (i.e., existing vapor recovery and control system is a prerequisite to applicability). For the T&S sector, cumulative emissions from glycol dehydrator pumps are very low, and compressor stations typically do not have an available control system. For some upstream operations, it is more likely that a control device will be co-located at the site due to other requirements associated with storage tank or other emissions. For transmission compressor stations, dehydrators are very uncommon and the need for a control device is unlikely (i.e., not required by other regulations). Storage facilities may include a dehydrator, but NSPS affected sources may not include a gas assist dehydrator pump. In addition, control devices are relatively

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uncommon because other regulations, such as the oil and gas NESHAP[77] (Part 63, Subpart HHH) only require control in certain circumstances (e.g., for a large dehydrator and dependent upon the dehydrator throughput and natural gas BTEX[78] content). For these reasons, INGAA recommends removing pneumatic pumps as an affected source for T&S facilities.

L. Recordkeeping.

Recordkeeping requirements should not be transformed into new reporting requirements, and leak survey requirements should not be expanded to include additional digital records.

EPA requests feedback on recordkeeping issues. For example, EPA proposes utilizing technology to facilitate sharing records directly with regulatory agencies. EPA also requests comment on expanding the use of technology such as digital pictures for leak surveys. INGAA does not support expanding reporting and recordkeeping. The Proposed Rule's reporting and recordkeeping requirements require the use of digital surveys showing latitude and longitude. OGI cameras typically do not have the functional capability to record latitude and longitude. This is not consistent with other LDAR programs and should be removed. If EPA considers adding requirements, stakeholders should be provided the opportunity to comment on the specific requirements.

The Proposed Rule includes separate requirements for recordkeeping and reporting, which is the standard format for NSPS and NESHAP regulations. INGAA does not support new methods for sharing records directly with agencies, as this blurs the line between recordkeeping and reporting obligations. Each has its place and context in regulations, and information that is directly shared with agencies should be clearly proposed and justified as a reporting requirement, so that stakeholders have an opportunity to comment.

EPA also requests comments on the viability and benefits of reporting and recordkeeping approaches that utilize technology such as digital pictures, and areas where such use might be expanded. The Proposed Rule includes defined recordkeeping and reporting requirements. It is likely that EPA will receive recommendations from other parties requesting such documentation and reporting (including to cover digital pictures associated with leak surveys). If EPA intends to amend recordkeeping and reporting requirements that differ from the Proposed Rule, EPA should provide another opportunity for comment on those new requirements.

M. EPA Requests Comment on Whether Ozone Health Impacts from Methane Should Be Considered. INGAA Does Not Support Including this Analysis since Methane Is Not Defined as a VOC.

EPA requests comments on whether ozone health impacts should be considered. Several documents are listed in the docket (e.g., related studies), but those documents are not readily available due to copyright or other issues. The implication is that methane is a reactive hydrocarbon that significantly contributes to ozone atmospheric chemistry – i.e., methane is a volatile organic compound. Federal regulations include a clear definition of the hydrocarbon

[77] National Emissions Standards for Hazardous Air Pollutants
[78] Benzene, Toluene, Ethylbenzene and Xylenes

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species that are considered VOCs[79]. Methane is not considered a VOC. Thus, EPA should not embark on environmental analysis that contradicts long-established EPA definitions. Ozone impacts should not be included in the cost-benefit analysis. (See INGAA's Social Cost of Methane).

N. EPA Should Incorporate by Reference INGAA's Prior Comments on EPA's Methane White Papers.

INGAA submitted comments in response to EPA's White Papers in 2014 and asks that those comments and the cost analyses be incorporated by reference.

IV. CONCLUSION

INGAA's comments suggest revisions to EPA's Proposed Rule that, if accepted, will provide the basis for a workable, cost-effective program to achieve meaningful reductions in methane emissions from new and modified T&S sector sources. INGAA would be pleased to meet with EPA or the Office of Management and Budget during the review period to answer any operational questions. Please contact Theresa Pugh, vice president of environment and construction policy, at tpugh@ingaa.org or 202-216-5955.

[79] 40 CFR § 51.100(s)

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APPENDICES

Appendix A
INGAA White Paper, "Directed Inspection and Maintenance for Reducing Leak Emissions from Natural Gas Transmission and Storage Compressor Stations: Greenhouse Gas Reporting Program Data Supporting a Focused Leak Mitigation Program," prepared by Innovative Environmental Solution, Inc. (Sept. 2015).

Appendix B
Relevant Pipeline and Hazardous Materials Safety Administration Regulations

Appendix C
INGAA DI&M Guidelines, "Directed Inspection and Maintenance Voluntary Program Elements and Procedures for Natural Gas Transmission and Storage Compressor Stations."

Appendix D
Diagrams/illustrations of Compressor Station Repair Processes and Timing Needed for Making Repairs Once Existing Sources Are Affected By Modification Language

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APPENDIX A

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Directed Inspection and Maintenance for Reducing Leak Emissions from Natural Gas Transmission and Storage Compressor Stations: Greenhouse Gas Reporting Program Data Supporting a Focused Leak Mitigation Program

Prepared for:

Interstate Natural Gas Association of America (INGAA)
20 F Street, N.W., Suite 450
Washington, D.C. 20001

Prepared by:
Innovative Environmental Solution, Inc.
Cary, IL

September 2015

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INTRODUCTION AND BACKGROUND

It has been shown that a relatively small percentage of leaks contribute the vast majority of leak emissions for natural gas operations. For example, 95% of methane emissions from equipment leaks are from 20% of the leaks at natural gas transmission compressor stations.[80] Directed Inspection and Maintenance (DI&M) is a leak mitigation practice that leverages this characteristic of compressor station leaks through procedures that focus repairs on larger leaks while limiting resources expended on inconsequential leaks. This White Paper provides background and technical support for implementing DI&M, as described in the INGAA DI&M Guidelines, to mitigate natural gas transmission compressor station equipment leaks.

The INGAA DI&M Guidelines provide the structure, program elements, and procedures for a company-specific DI&M program. The Guidelines focus on key leak sources within a facility that have a higher probability of being large leaks – referred to as "gross emitters" in recent EPA documents. The focused list of sources is based on previous studies, company experience, and available information, including data from the EPA Greenhouse Gas Reporting Program (GHGRP). The key leak sources are discussed further below, and GHGRP data collected for an industry research project are analyzed to demonstrate that the INGAA DI&M Guidelines focus on the appropriate leak sources.

INGAA members operate compressor stations that are required to report GHG emissions under the GHGRP. An ongoing project is being conducted by the Pipeline Research Council International (PRCI) to collect data submitted to EPA through its electronic greenhouse gas reporting tool (e-GGRT). The PRCI project is also collecting supplemental data that provides additional information on associated facility and equipment operations, and on vent measurements. Data from the PRCI project was analyzed to document that the sources included in the INGAA DI&M Guidelines represent the vast majority of equipment leak emissions from natural gas transmission compressor stations. Data and associated analysis is presented in this document.

INGAA GHG GUIDELINES – EQUIPMENT LEAK SOURCES AND RELATIONSHIP TO SUBPART W LEAK SOURCES

Leak sources included in the INGAA DI&M Guidelines are similar to emissions sources that require measurement in Subpart W of the GHGRP. The primary interest is compressor related leak sources, and the INGAA DI&M Guidelines go beyond the requirements of Subpart W by including leak sources and operating modes that are not included in GHGRP reporting. The sources included in the INGAA DI&M Guidelines are shown in Table 1.

[80] "Directed Inspection and Maintenance at Compressor Stations." U.S. EPA Natural Gas STAR, Lessons Learned (see http://epa.gov/gasstar/documents/ll_dimcompstat.pdf), EPA430-B-03-008 (October 2003).

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Table 1. Affected Equipment / Component List for DI&M Program.

<table>
<tr><td>• Reciprocating compressor blowdown valve leakage through blowdown vent in any mode as found:
1. Leakage during “Operating” mode
2. Leakage during “Standby Pressurized” mode</td><td rowspan="2">• Reciprocating rod packing leakage[A] in any mode as found:
1. Reciprocating rod packing emissions during “Operating” mode
2. Reciprocating rod packing emissions during “Standby Pressurized” mode</td></tr>
<tr><td>• Reciprocating compressor unit isolation valves (suction and discharge) leakage through the associated vent during “Not Operating, Depressurized” mode</td></tr>
<tr><td rowspan="2">• Centrifugal compressor blowdown valve leakage through the blowdown vent in any mode as found:
1. Leakage during “Operating” mode
2. Leakage during “Standby Pressurized” mode</td><td>• Centrifugal compressor unit isolation valves (suction and discharge) leakage through the associated vent during “Not Operating, Depressurized” mode.</td></tr>
<tr><td>• Centrifugal compressor wet or dry seal leakage through associated vent(s) in any mode as found (see modes listed above for rod packing).</td></tr>
<tr><td colspan="2">• Storage tank vents to atmosphere from scrubber dump valve leakage.</td></tr>
</table>

[A] Reciprocating compressor rod packing is designed to leak, even when new.[81] Repair decisions and timing that considers condition-based maintenance for rod packing will be defined in the DI&M Plan.

The primary focus is on compressor emissions from large valves and other known leak sources, such as reciprocating compressor rod packing and centrifugal compressor wet seal degassing vents. The list of sources includes combinations of the emission source and the compressor mode that are not included in GHGRP reporting, including: reciprocating compressor rod packing leakage in standby-pressurized mode; centrifugal compressor dry seals; and centrifugal compressor sources in standby-pressurized mode. As discussed below, GHGRP data indicates storage tank emissions from scrubber dump valve leakage is not a significant source, but because this is a source of interest included in Subpart W, storage tanks are included in the INGAA DI&M Guidelines.

The equipment leak sources *excluded* from the INGAA Guidelines are components such as connectors, valves, and open ended lines associated with yard piping or compressor house gas lines. As discussed in the next section, evaluation of detailed data from the PRCI project demonstrates that these emissions are generally a small portion of overall leak emissions.

[81] EPA Natural Gas STAR Lessons Learned document, “Reducing Methane Emissions From Compressor Rod Packing Systems.” October 2006. http://www.epa.gov/gasstar/documents/ll_rodpack.pdf

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PRCI GHG DATA COMPILATION PROJECT

Compressors stations that exceed the GHGRP annual emissions reporting threshold of 25,000 CO_2 equivalent (CO_2e) metric tons are subject to reporting under Subpart C (combustion emissions) and Subpart W (leaks, venting, blowdowns). Subpart W requires annual leak measurements for compressor-related sources and storage tanks. In addition, a leak survey that counts leaks by component types is required for other facility equipment. Since significant new data is being collected, PRCI is conducting an ongoing project to gather data from its members, and compile and analyze the data. This includes Subpart W data submitted to EPA and supplemental data on equipment, operations, and measurement methods. The project is analyzing the data to assess development of improved emission factors for compressors. The data can also be analyzed to provide technical support for ongoing dialogue related to GHG emission estimates and emission reduction opportunities.

The first year of Subpart W reporting was 2011, and data elements reported to EPA were broadened in January 2015. Since reporting was more limited in the initial three reporting years, the PRCI project supplemented the e-GGRT data with additional information. In addition to e-GGRT data, companies provided supplemental data on facility equipment, operations, and methods used for vent measurement. This supplemental data is needed to better understand the reported emissions and to support analysis such as emission factor development.

The PRCI data was collected from members and the dataset does not include all companies or facilities that report to EPA. However, the majority of facilities are included in the PRCI dataset: 70% of all EPA facilities are included for 2011 and over 60% are included for 2012. As discussed in the following section, the emission trends for each Subpart W source type are similar for the PRCI dataset and the entire EPA dataset.

The PRCI GHG dataset is being analyzed to assess whether updated emission factors can be developed for reciprocating compressors and centrifugal compressors. In addition, the data is available to support technical analysis on GHG issues such as source-specific emissions, emission trends, the distribution (by size) of measured leaks, the prevalence of "large" leaks, and measurement methods performance. At this time, the PRCI dataset includes 2011 and 2012 data. Final review is being completed for 2013 data, which will be added to the PRCI dataset. Data collection and compilation for the 2014 reporting year will occur in late 2015.

DATA ANALYSIS AND DISCUSSION

The figures presented in this document are based on PRCI 2011 and 2012 data, with one exception. Figure 2 includes the entire EPA dataset downloaded from EPA's website. Figure 1 presents PRCI data for 2011 and 2012 by Subpart W emissions source. Figure 2 shows all data from EPA for 2011, 2012, and 2013. Facility counts differ from year to year. Thus, to facilitate comparison, the emissions are presented as a facility average (i.e., total emissions for each source type divided by the total number of facilities for the respective datasets). Storage facility data is more limited (i.e., fewer facilities report and fewer emission sources are included in GHGRP reporting), so the data analysis focused on the transmission segment.

Data has been collected for 2011 – 2013 reporting years; PRCI data in this document is from 2011 and 2012. These data were reported based on a methane global warming potential (GWP)

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of 21, and this document does not correct the GWP to its current value (GWP = 25). The EPA website "all facility" data for 2011 – 2013 presented in Figure 2 is also based on a GWP of 21.

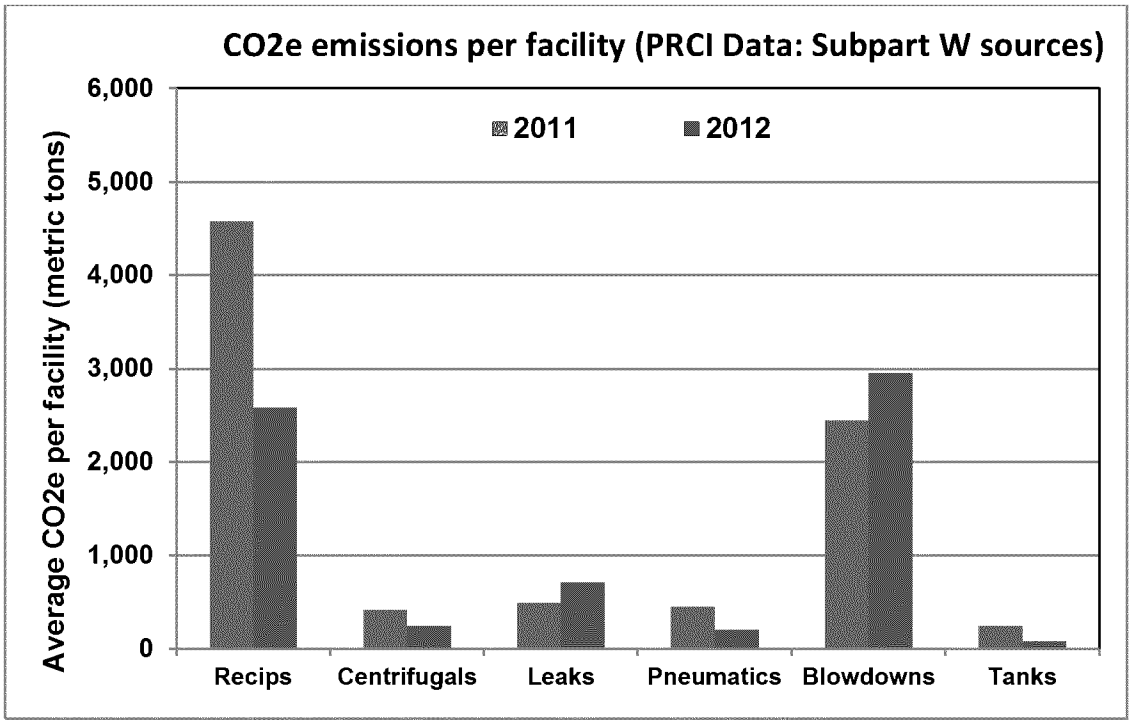

Figure 1. Emissions by Subpart W source type (PRCI data)

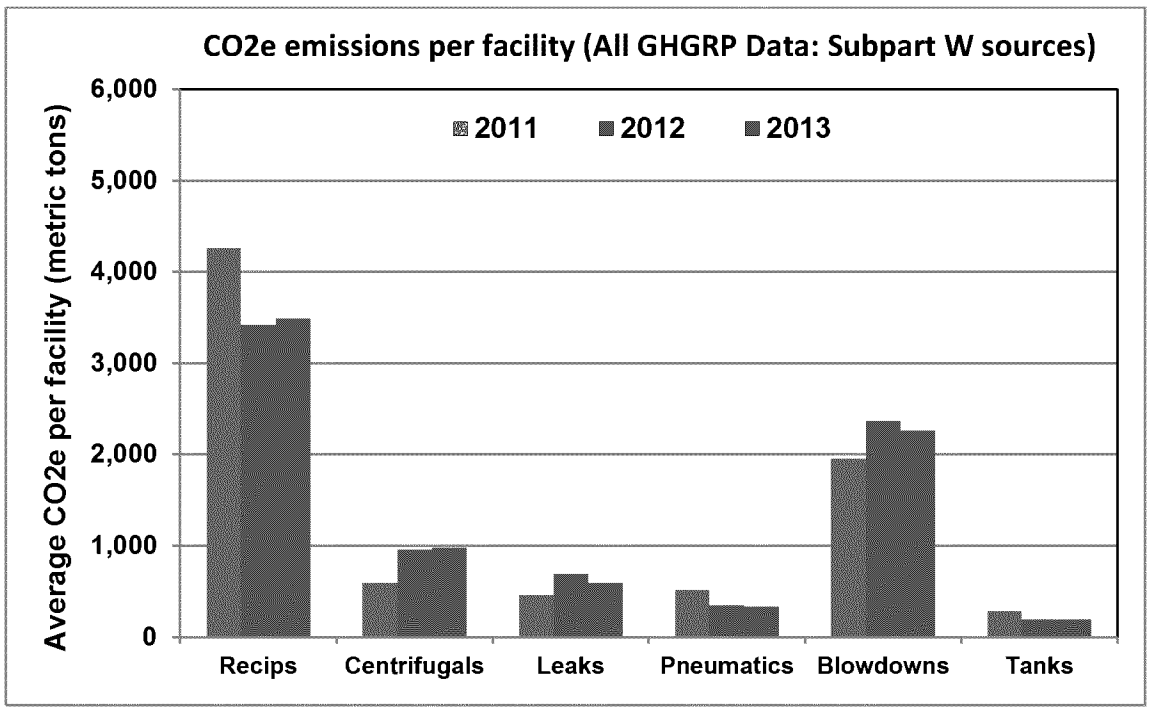

Figure 2. Emissions by Subpart W source type (All EPA data)

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The two figures show similar reported emission levels and similar trends. Several observations follow:

- Reciprocating compressor emissions and blowdown emissions are more than 70% of the total emissions.

- Reciprocating compressor emissions decreased in the second year of the program. A larger decrease occurred for facilities included in the PRCI dataset compared to the entire GHGRP dataset. There are several factors that likely contribute to the decrease after the first year: 2011 allowed the use of "best available monitoring methods" (BAMM) when the program was launched; some large leaks were likely repaired following discovery in 2011; and, measurement method used may have changed.

- The 2013 data from EPA shows that emissions were similar in the second and third reporting years and generally differ from reported emissions for the first year.

- Vented emissions from pneumatic devices decreased in the second year of the program. That emission estimate is based on device count by type (high bleed, low bleed, intermittent) and emission factors. It is likely that categorization by device type improved in 2012 – e.g., in the first year of the program conservative estimates based on best available information classified devices as high bleed that were subsequently confirmed as low bleed devices.

- There is a difference between the PRCI data and "all EPA" data for centrifugal compressor emissions. The PRCI project will likely examine this data more closely to determine whether the reason for the difference can be discerned. However, the difference does not impact the discussion and conclusions that follow in the document regarding sources included in the INGAA DI&M Guidelines.

For the six Subpart W sources, four are leak-related sources where the reduction option is a leak mitigation program (e.g., LDAR, DI&M). Blowdowns are a separate category of emissions and emission reduction opportunities are generally based on the feasibility of alternative operating practices for select types of events. Pneumatic device venting is reduced by using low bleed devices or compressed air systems.

The other four source types are the candidate compressor station emission sources for leak mitigation:

- Reciprocating compressor emissions from rod packing, isolation valves, and blowdown valves.

- Centrifugal compressor emissions from isolation valves, blowdown valves, wet seal degassing vents, and dry seals. (The latter is not included in Subpart W reporting.)

- Emissions through storage tank vents from leaking condensate tank dump valves.

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- Equipment leaks from equipment and components other than those listed above (i.e., "other" leak emissions).

Blowdowns are a separate category of emissions and a significant contributor to overall facility emissions. Because blowdowns are a different category than leaks and EPA has not included facility blowdown reductions in proposed mitigation programs, and compressor station methane leak mitigation is the focus of a DI&M program, blowdown emissions in Figure 1 are not included in analysis or discussion below. Pneumatic device vented emissions are also a different category than leaks, but EPA proposed programs include reducing pneumatic device emissions, so limited additional discussion on pneumatic emissions is provided below.

Pneumatic device emissions are relatively small for the transmission and storage segments. Pneumatic device emissions are included in Figure 3 to compare emissions for methane emission sources recommended as reduction opportunities in proposed EPA programs: the EPA voluntary Methane Challenge program for existing sources, and the proposed NSPS rule that regulates methane emissions from new facilities (Subpart OOOOa).

Figure 3 shows the same PRCI data as Figure 1, using a different bar chart format and excluding blowdowns. The "other" leak emissions (Subpart W leaks not from compressors or tanks) are presented in two categories consistent with Subpart W methodology, where leaks survey results track whether or not the leaking component is in compressor service (i.e., thermal cycling and vibration from compressors may affect leak size and frequency).

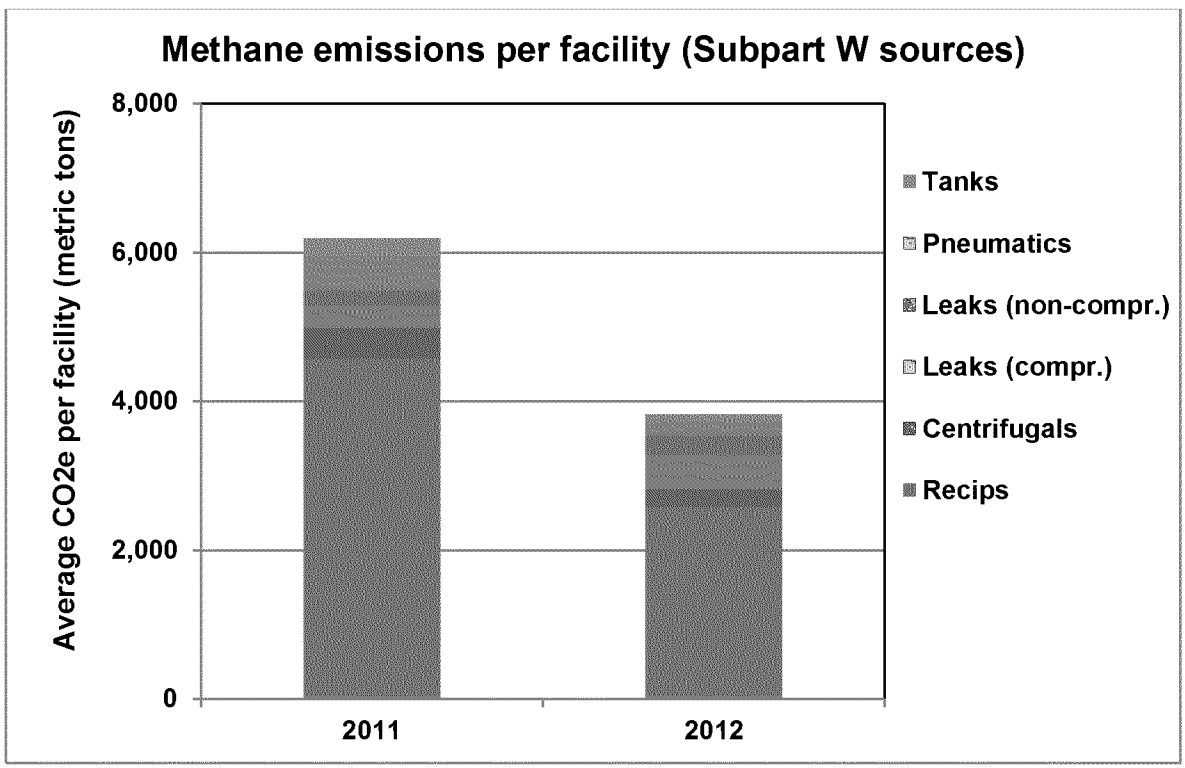

Figure 3. Subpart W emissions by source type for leaks and pneumatic venting.

Pneumatic device venting is 7% of these emissions in 2011 and 5% in 2012. For the remaining leak sources, reciprocating compressors, centrifugal compressors and tanks are included in the INGAA DI&M Guidelines. These sources comprise over 90% of the total leak emissions in 2011 and over 80% of the total in 2012. Addressing compressors and tanks requires surveying a limited number of vents, while the remaining 10 to 20% of leak emissions are associated with hundreds of components spread over the entire facility. Additional detail on leak emissions is provided in figures below.

In addition, the emission estimates from "other" leak sources excluded from the INGAA DI&M guidelines are based on a count of leaks detected in the annual survey and emission factors. The component-specific emission factors in Subpart W are based on 10 to 20 year old data, and it is likely that emissions have decreased as leak mitigation programs have become more common. Thus, if "other" leak emission estimates based on older data over-estimate emissions, then measured Subpart W leak data from compressors and tanks would comprise a larger percentage of the leak emissions than indicated by the Subpart W data.

The PRCI leak data from the figures is also presented in Figure 4 and Figure 5, which show additional details for the 2011 and 2012 Subpart W data for leak emission sources. Additional details associated with the leak sources that comprise total compressor leak emissions is available based on the emission source-operating mode combinations measured for Subpart W. The five categories include reciprocating compressors, centrifugal compressors, storage tank (dump valve leakage), and "other leaks" for components either in compressor service or non-compressor service. EPA usually groups the "other leaks" into a single category, but the Subpart W emission estimate uses different emission factors for each component type depending on whether or not the component is in compression service. For the categories other than tanks, the total emissions are comprised of emissions from multiple sources and different compressor modes, including:

1. Reciprocating compressors (typically released to atmosphere through elevated vents):
    a) Rod packing emissions when the unit is operating;
    b) Isolation valve emissions when the unit is shutdown and de-pressurized;
    c) Blowdown valve emissions when the unit is operating or in standby-pressurized mode.
2. Centrifugal compressors (typically released to atmosphere through elevated vents):
    a) Wet seal degassing vent emissions when the unit is operating (this is more a vent source than a leak source, but is grouped with centrifugal compressor leak emissions for tracking purposes);
    b) Isolation valve emissions when the unit is shutdown and de-pressurized; and
    c) Blowdown valve emissions when the unit is operating.
3. "Other leaks" in either compressor or non-compressor service, with the total emissions estimate based on emissions from each of five component types:

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a) Connectors;

b) Valves;

c) Open ended lines (OELs);

d) Pressure relief valves (PRVs); and

e) Meters.

The figures show each of the categories (i.e., the primary bullet in this list), as well as the emissions from the specific leak sources associated with each category (i.e., the sub-bullets in this list). The percentage of total leak emissions for each source or category is shown in the figures. For "other leaks," where total emissions for the five component types are a small overall contributor to leak emissions, the percentage shown is for the total rather than for each of the five component types.

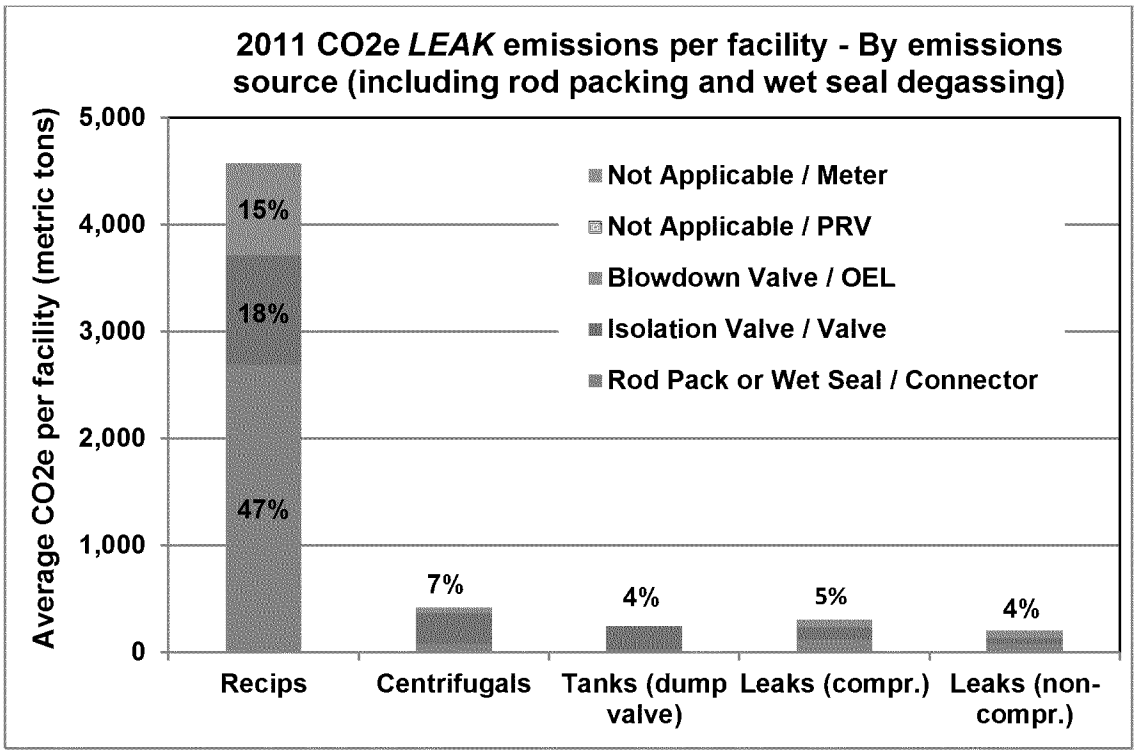

Figure 4. 2011 leak emissions by category and emissions source for Subpart W reported emissions compiled for the PRCI project.

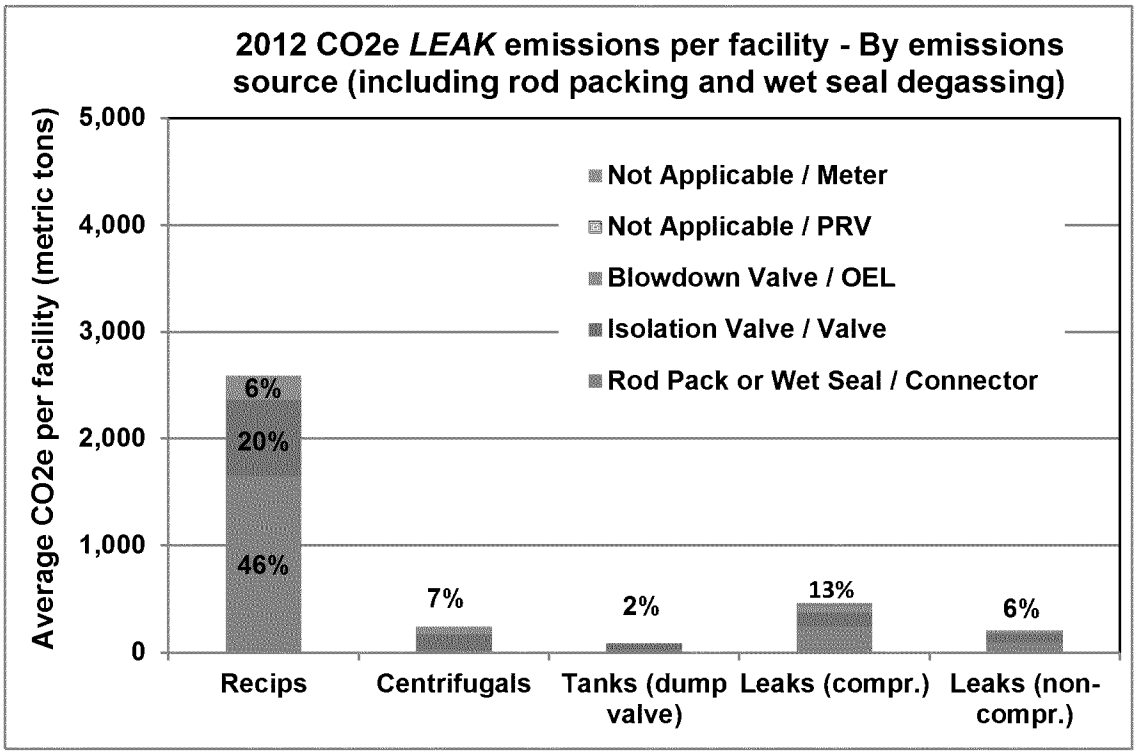

Figure 5. 2012 leak emissions by category and emissions source for Subpart W reported emissions compiled for PRCI project.

The first three leak categories – reciprocating compressors, centrifugal compressors, and storage tank dump valves – are included in the INGAA DI&M Guidelines and the latter two are not directly included in the program. Existing programs, such as walk-throughs that conduct audio-visual-olfactory (AVO) review for safety purposes will address "other leaks" within the facility, but those activities are not detailed in the INGAA DI&M Guidelines.

The number of potential leaks surveyed varies significantly for the first three categories compared to "other leaks." To reiterate, the three categories included in the INGAA DI&M Guidelines are based on sources that are measured for Subpart W and require surveying a minimal number of sources. The other leaks category requires surveying hundreds of additional components.

For example, potential leak sources for a reciprocating compressor (see items 1(a), 1(b) and 1(c) in the list above) will include rod packing leakage, two isolation valves (suction and discharge side of the compressor) and a blowdown valve. Thus, a limited number of vent lines need to be surveyed to identify leakage for the three leak categories in the INGAA DI&M Guidelines. In contrast, the other potential leak sources (see five component types in items 3(a) through 3(e) in the list above) are comprised of *hundreds* of components throughout the compressor station that would require surveying. About 80% or more of leak emissions are covered through the focused program in the INGAA DI&M Guidelines.

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These two figures show the relative contribution of leak emissions by category and associated leak source for the first two years of Subpart W reporting. For 2011 (Figure 4):

- The three categories included in the INGAA DI&M Guidelines **comprise 91% of the total** leak emissions.
  - 5,240 metric tons CO_2 equivalent emissions on average for all facilities in the PRCI dataset.
- The two leak categories not included in the INGAA DI&M Guidelines – other equipment leaks in compressor service or non-compressor service – comprise 9% of the total emissions and less than 500 metric tons.

For 2012, total leak emissions are lower, which is likely due to repair of some of the larger leaks discovered in 2011 (e.g., reciprocating compressor leak emissions). From Figure 5:

- The three categories included in the INGAA DI&M Guidelines **comprise 81% of the total** leak emissions.
  - 2,915 metric tons CO_2 equivalent emissions on average for all facilities in the PRCI dataset.
- The two leak categories not included in the INGAA DI&M Guidelines – other equipment leaks in compressor service or non-compressor service – comprise 19% of the total emissions and approximately 665 metric tons.

Additional detail on individual measurements and the contribution of large leaks to the overall total is available for the three leak categories included in the INGAA DI&M Guidelines. Data presented in the figures below show that a DI&M program following the INGAA Guidelines may ultimately demonstrate that an even more focused program is warranted (e.g., the relative emissions from blowdown valve leakage compared to isolation valve leakage may have implications for requirements such as survey frequency).

Figures 6 and 7 present PRCI measured emissions by source type and compressor mode – e.g., rod packing emissions in operating mode, isolation valve emissions in shutdown de-pressurized mode. Figure 6 presents a cumulative distribution of reciprocating compressor emissions for the four unique source-operating mode combinations in Subpart W. In Figures 4 and 5 above, the blowdown valve emissions for two different compressor modes are combined for the portion of the bar chart that shows "blowdown valve" emissions. The blowdown valve emissions are separated by Subpart W mode in Figure 5. Figure 7 presents the same information for the three source-compressor mode combinations for centrifugal compressors.

For the cumulative distribution plots, all of the measurement data are ranked from largest to smallest and cumulatively added. Only the "non-zero" measurements are included in these figures (i.e., the tail would be longer if additional measurements showing no leakage were

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included). These data show that leaking blowdown valves and centrifugal compressor degassing vents are smaller contributors to facility emissions than isolation valves and reciprocating compressor rod packing.

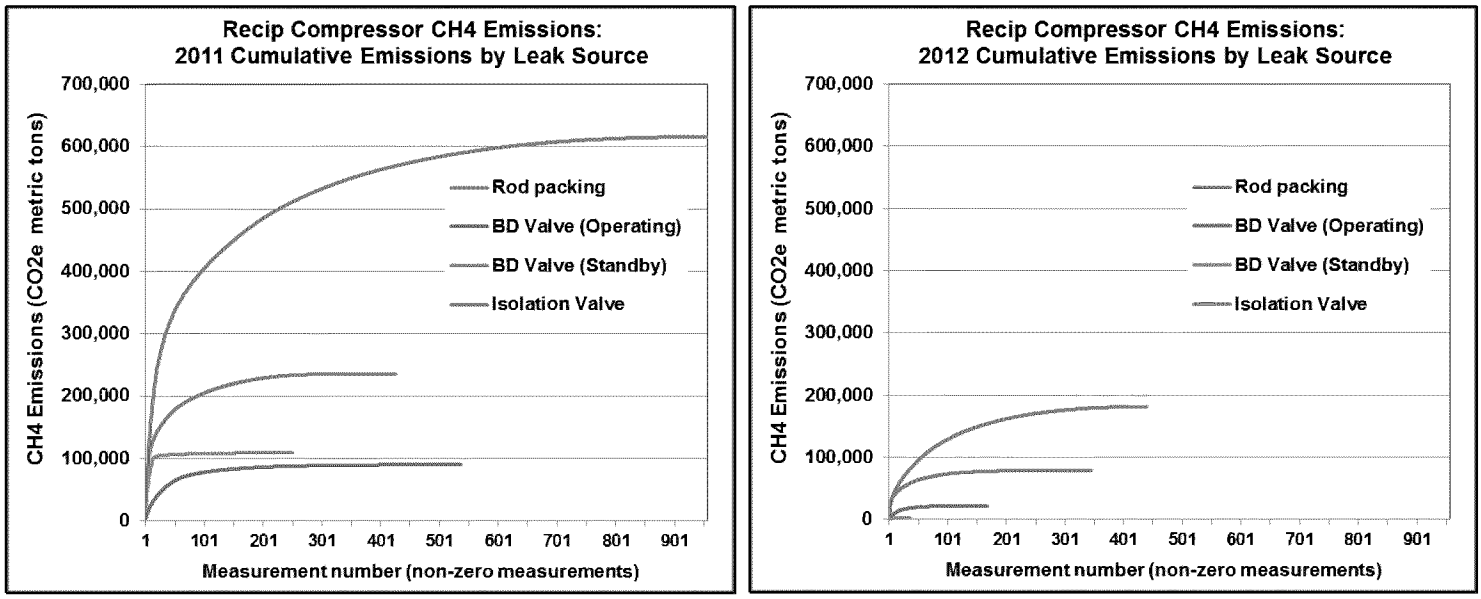

Figure 6. Reciprocating compress emissions by source – mode combination: Rod packing (operating mode), blowdown valve (operating mode or standby-pressurized mode) and isolation valve (shutdown-depressurized mode).

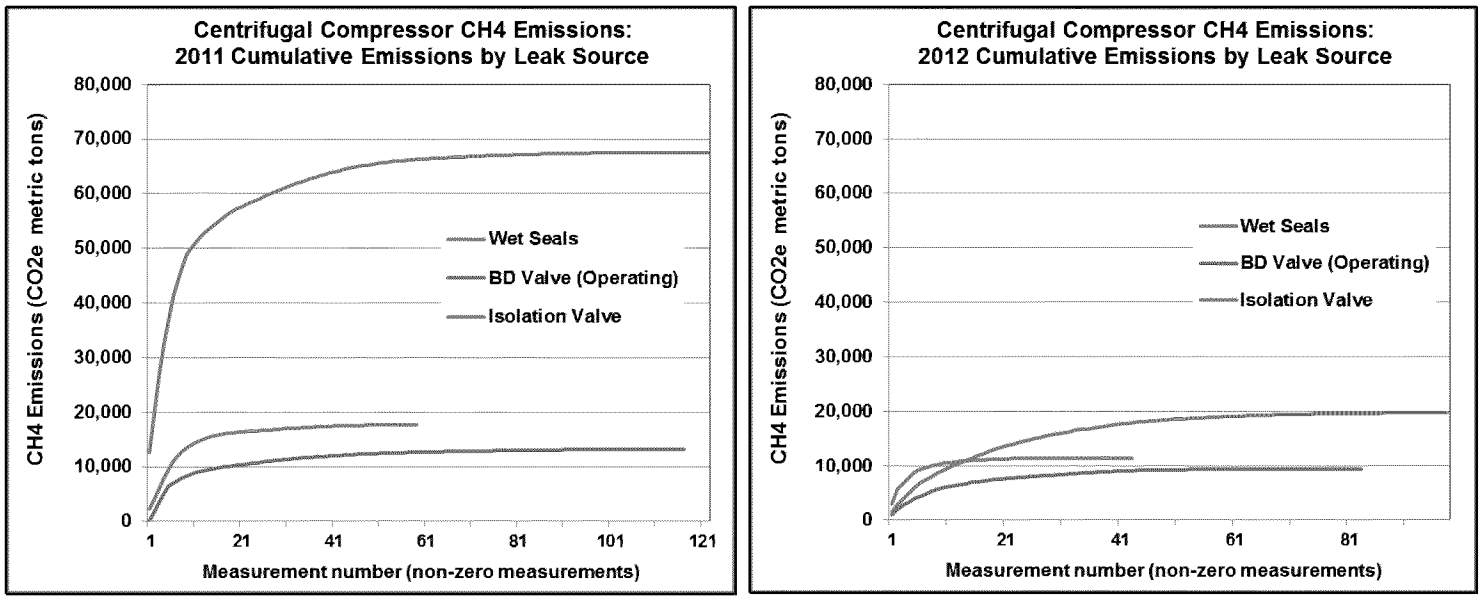

Figure 7. Centrifugal compress emissions by source – mode combination: Wet seal degassing (operating mode), blowdown valve (operating mode) and isolation valve (shutdown-depressurized mode).

For reciprocating compressors, rod packing leakage is a large contributor to total emissions. For both reciprocating and centrifugal compressors, isolation valves are an important source. In a DI&M

program, repair decisions consider the leak size and the repair cost (or degree of difficulty). This approach is based on historical data that shows that a relatively small number of leaks comprise the majority of emissions. The same phenomenon is demonstrated in Figures 6 and 7. For example, in 2011 there were about 440 measurements of reciprocating compressor isolation valve emissions. The top 20% (about 90 measurements) comprise over 85% of the emissions from isolation valves. This trend is even more pronounced for the reciprocating compressor blowdown valves measured in standby mode in 2011. Several measurements (about 2% of the total) account for nearly all of the emissions from this source.

These figures, along with the storage tank figure below, show that the INGAA DI&M Guidelines include leak sources that PRCI Subpart W data shows as relatively small contributors. However, the INGAA Guidelines chose to include sources associated with Subpart W measurements, and additional sources not covered by Subpart W (e.g., rod packing in standby-pressurized mode) to provide the opportunity to develop a larger dataset and more clearly demonstrate larger leak sources. While total emissions for other leak sources are a larger percentage than some categories included in the INGAA Guidelines (e.g., Figure 5 shows that 13% of total leak emissions in 2012 are from other leaks for components in compressor service), those total emissions are from many components, while sources with smaller relative emissions included in the INGAA Guidelines (e.g., tanks are 2% in 2012) are associated with discrete sources that have a higher risk of large leaks.

A focus on the "gross emitters" is the most effective approach to reduce methane emissions. The data collected from a DI&M program, in conjunction with other ongoing data being reported for Subpart W (e.g., leak surveys for "other" leaks), will provide insight into program performance. As the program is implemented, performance will be defined, and the need to consider program adjustments (e.g., to focus on *more or fewer* potential leak sources) will be identified.

Storage Tanks Emissions

Although a relatively small source compared to compressor leaks, EPA has expressed concern regarding leaking dump valves, and Subpart W requires measurement of the associated tank vents. Thus, storage tanks are included in the INGAA DI&M Guidelines. Figure 6 shows PRCI data results from *non-zero* measurements in 2011 (111 non-zero measurements) and 2012 (51 non-zero measurements). *Cumulative* emissions for all tank measurements are shown in the left graph. The graph on the right shows each individual measurement. These data show that total tank emissions are relatively small and decreased from 2011 to 2012. Additional observations include: a relatively small number of facilities / measurement contribute most of the emissions; there were fewer leaks in 2012 than in 2011; and, there were fewer large leaks in 2012 than in 2011.

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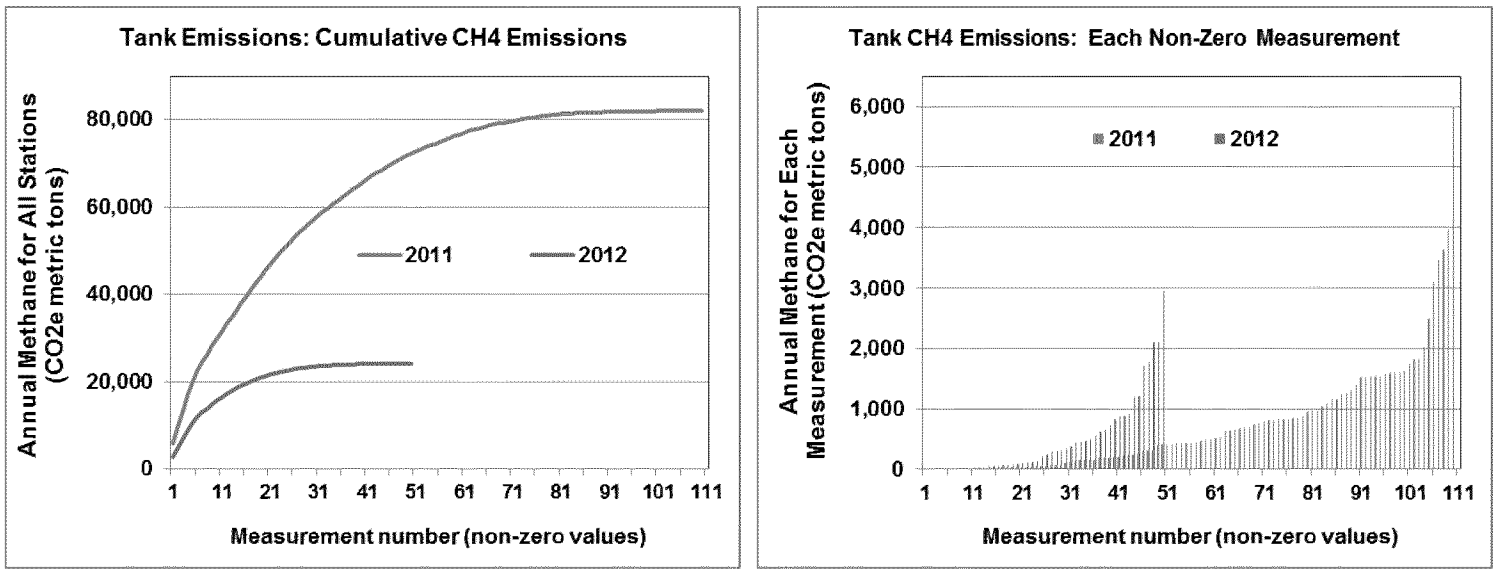

Figure 6. Storage tank emissions from leaking dump valves in 2011 and 2012. Cumulative distribution of all non-zero measurements (left graph) and leak rate for each non-zero measurement (right graph).

CONCLUSIONS

DI&M is a proven approach for reducing methane emissions from leaks at natural gas transmission and storage compressor stations. The INGAA DI&M Guidelines focus on compressor station leak sources that pose a higher risk of being a large leaker, include compressor and storage tank sources that require leak rate measurement under Subpart W, and include additional leak sources excluded from Subpart W (e.g., reciprocating compressor rod packing in standby-pressurized mode, centrifugal compressor dry seals).

Subpart W data and supplemental data from a PRCI project shows that the leak sources included in the INGAA DI&M Guidelines address more than 80% of emissions from compressor station leaks. Thus, a focused DI&M program provides an effective leak mitigation approach. Data gathered as a DI&M program is implemented also provides the ability to assess performance, ensure that the appropriate sources are included, and consider program adjustments to address insights gained from facility leaks and reduction opportunities.

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APPENDIX B

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RELEVANT PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION REGULATIONS

49 C.F.R. Part 192

§ 192.703 General.

(a) No person may operate a segment of pipeline, unless it is maintained in accordance with this subpart.

(b) Each segment of pipeline that becomes unsafe must be replaced, repaired, or removed from service.

(c) Hazardous leaks must be repaired promptly.

§ 192.705 Transmission lines: Patrolling.

(a) Each operator shall have a patrol program to observe surface conditions on and adjacent to the transmission line right-of-way for indications of leaks, construction activity, and other factors affecting safety and operation.

(b) The frequency of patrols is determined by the size of the line, the operating pressures, the class location, terrain, weather, and other relevant factors, but intervals between patrols may not be longer than prescribed in the following table:

	Maximum interval between patrols	
Class location of line	**At highway and railroad crossings**	**At all other places**
1, 2	71/2 months; but at least twice each calendar year	15 months; but at least once each calendar year.
3	41/2 months; but at least four times each calendar year	71/2 months; but at least twice each calendar year.
4	41/2 months; but at least four times each calendar year	41/2 months; but at least four times each calendar year.

(c) Methods of patrolling include walking, driving, flying or other appropriate means of traversing the right-of-way.

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§ 192.706 Transmission lines: Leakage surveys.

Leakage surveys of a transmission line must be conducted at intervals not exceeding 15 months, but at least once each calendar year. However, in the case of a transmission line which transports gas in conformity with §192.625 without an odor or odorant, leakage surveys using leak detector equipment must be conducted—

(a) In Class 3 locations, at intervals not exceeding 7½ months, but at least twice each calendar year; and

(b) In Class 4 locations, at intervals not exceeding 4½ months, but at least four times each calendar year.

49 C.F.R. Part 191

§ 191.3 Definitions.

As used in this part and the PHMSA Forms referenced in this part—

.....

Incident means any of the following events:

(1) An event that involves a release of gas from a pipeline, or of liquefied natural gas, liquefied petroleum gas, refrigerant gas, or gas from an LNG facility, and that results in one or more of the following consequences:

(i) A death, or personal injury necessitating in-patient hospitalization;

(ii) Estimated property damage of $50,000 or more, including loss to the operator and others, or both, but excluding cost of gas lost;

(iii) Unintentional estimated gas loss of three million cubic feet or more;

(2) An event that results in an emergency shutdown of an LNG facility. Activation of an emergency shutdown system for reasons other than an actual emergency does not constitute an incident.

(3) An event that is significant in the judgment of the operator, even though it did not meet the criteria of paragraphs (1) or (2) of this definition.

§191.5 Immediate notice of certain incidents.

(a) At the earliest practicable moment following discovery, each operator shall give notice in accordance with paragraph (b) of this section of each incident as defined in §191.3.

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(b) Each notice required by paragraph (a) of this section must be made to the National Response Center either by telephone to 800-424-8802 (in Washington, DC, 202 267-2675) or electronically at *http://www.nrc.uscg.mil* and must include the following information:

(1) Names of operator and person making report and their telephone numbers.

(2) The location of the incident.

(3) The time of the incident.

(4) The number of fatalities and personal injuries, if any.

(5) All other significant facts that are known by the operator that are relevant to the cause of the incident or extent of the damages.

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APPENDIX C

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Directed Inspection and Maintenance
Voluntary Program Elements and Procedures for
Natural Gas Transmission and Storage Compressor Stations

1.0 PURPOSE

The purpose of a Directed Inspection and Maintenance (DI&M) program is to identify leak sources and mitigate methane emissions based on a prioritization process that assesses emissions potential. It has been shown that a relatively small percentage of leaks contribute the vast majority of emissions for natural gas operations – e.g., 95% of methane emissions from equipment leak are from 20% of the leaks at compressor stations.[82] DI&M leverages this characteristic of compressor station leaks through procedures that focus repairs on larger leaks and avoid unnecessary repairs to inconsequential leaks. DI&M is an effective and practical approach for reducing methane emissions from equipment/component leaks. A DI&M program involves periodic component and vent leak screening at a facility, leak characterization, and prioritized repair of leaking components. Implementing DI&M is a proven, cost-effective way to reduce methane emissions from leaks. This guideline document provides the structure, program elements, and procedures for a voluntary company-specific DI&M program. The program elements in this document discuss options for program implementation, such as facilities that will be included and the implementation schedule. The facilities included, as well as the specific components and metrics of a company's program, will be defined in their company-specific DI&M Plan (hereinafter referred to as "the DI&M Plan"). The DI&M Plan will be reviewed and updated as necessary to reflect program maturation as data is collected.

2.0 APPLICABILITY

2.1 Affected Facilities and Phase-in Period

The company will define a basis for phasing in surveys at compressor stations (hereinafter referred to as facilities) in the DI&M Plan. All facilities will be surveyed over a five-year phase-in period.

2.2 Affected Equipment / Emissions Sources

The company DI&M Plan shall include surveys focused on key leak sources within a facility with a higher probability of significant leakage, based on key sources of leakage identified in previous studies and available company (and other) information. The list will include the equipment and components identified in Table 1, and the DI&M Plan will include additional information on the emission sources, such as compressor counts, compressor type, etc. Table 1 includes equipment/component leak sources associated with reciprocating compressors, centrifugal compressors, and storage tanks. This focuses resources

[82] "Directed Inspection and Maintenance at Compressor Stations." U.S. EPA Natural Gas STAR, Lessons Learned (see http://epa.gov/gasstar/documents/ll_dimcompstat.pdf), EPA430-B-03-008 (October 2003).

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and efforts on leak sources that have been historically proven as the main contributors to total leak emissions.

In addition, the company DI&M program will track leaks repaired during standard operational activities associates with safety and maintenance practices. Company practices (e.g., daily or routine facility walk-through) will be outlined in the DI&M Plan.

As data is obtained through the voluntary DI&M program, methane emissions from facility surveys may be used to refine the basis for focused surveys and survey intervals, as detailed in the DI&M Plan. At their discretion, companies may include other equipment / components in the DI&M Plan.

Table 1. Affected Equipment / Component List for DI&M Program.

<table>
<tr><td>• Reciprocating compressor blowdown valve leakage through blowdown vent in any mode as found:
3. Leakage during “Operating” mode
4. Leakage during “Standby Pressurized” mode</td><td rowspan="2">• Reciprocating rod packing leakage[A] in any mode as found:
3. Reciprocating rod packing emissions during “Operating” mode
4. Reciprocating rod packing emissions during “Standby Pressurized” mode</td></tr>
<tr><td>• Reciprocating compressor unit isolation valves (suction and discharge) leakage through the associated vent during “Not Operating, Depressurized” mode</td></tr>
<tr><td rowspan="2">• Centrifugal compressor blowdown valve leakage through the blowdown vent in any mode as found:
3. Leakage during “Operating” mode
4. Leakage during “Standby Pressurized” mode</td><td>• Centrifugal compressor unit isolation valves (suction and discharge) leakage through the associated vent during “Not Operating, Depressurized” mode.</td></tr>
<tr><td>• Centrifugal compressor wet or dry seal leakage through associated vent(s) in any mode as found (see modes listed above for rod packing).</td></tr>
<tr><td colspan="2">• Storage tank vents to atmosphere from scrubber dump valve leakage.</td></tr>
</table>

[A] Reciprocating compressor rod packing is designed to leak, even when new.[83] Repair decisions and timing that considers condition-based maintenance for rod packing will be defined in the DI&M Plan.

2.3 Exclusions

Facilities or units subject to leak detection and repair (LDAR) requirements under an existing air quality regulation or permit condition(s) will be identified in the

[83] EPA Natural Gas STAR Lessons Learned document, “Reducing Methane Emissions From Compressor Rod Packing Systems.” October 2006. http://www.epa.gov/gasstar/documents/ll_rodpack.pdf

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DI&M Plan. The operator may elect to achieve leak reductions at these facilities through that existing program rather than through DI&M (see Section 4.2). Elements of an LDAR program are not discussed further in this document, although select criteria herein are based on LDAR[84] approaches (e.g., delay of repair) and citations are provided.

In addition, a company may elect to monitor a potential leak source such as a compressor vent by using a continuous flow indicator (e.g., flow meter). The approach used for flow monitoring will be identified in the DI&M Plan, however leak screening and characterization procedures discussed in this document would not apply to these vent lines.

3.0 STANDARDS FOR IDENTIFYING LEAKS AND INITIAL REPAIR

Facilities will implement a defined and documented process for identifying and characterizing leaks. This section identifies provisions for leak screening, leak tracking, immediate repair, and leak rate characterization.

3.1 Survey Schedule

Per Section 2.1, an initial leak survey will be completed at all facilities over a five-year phase-in period. Subsequent to the initial phase-in period, all facilities will continue to be surveyed as defined in the DI&M Plan. Leak surveys will address the equipment / components discussed in Section 2.2.

3.2 Standard Maintenance Repairs and Immediate Repairs During the Survey

In addition to scheduled leak surveys according to Section 3.1, and repairs according to Section 4, leaks may be identified and repaired during normal site operations and maintenance activities. In addition, a leak discovered during the facility survey may be immediately repaired. The operator can repair these leaks without determining the leak concentration or completing the characterization described in Section 3.5. Records of successful repairs shall be retained according to Section 5.

3.3 Identification and Screening of Equipment / Component Leaks

3.3.1 Leak *Identification* Procedures

Facilities will follow industry standard test methods and procedures for identifying and screening leaks. Standard instrumentation will be used, including but not limited to an optical imaging (e.g., infrared) camera (hereinafter referred to as "IR camera"). Methods and instrumentation will be identified in the DI&M Plan, and may include advanced or innovative monitoring technologies if the instrument or method is appropriately demonstrated. In addition, rather than leak screening, a company may elect to measure the leak rate for a particular

[84] For example, see 40 CFR, Part 60, Subpart VVa, "Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006." §60.480a through §60.489a.

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component or potential leak source (as discussed in Section 3.5) and not conduct leak screening based on exceeding the concentration threshold.

The accuracy of leak measurement methods varies and can be affected by operational and meteorological conditions. The DI&M Plan will identify industry standard practices, methods, and instrumentation available for leak characterization, and the associated quality assurance / quality control (QA/QC) measures.

If leakage is detected, the leaking component shall be assessed using one of the following procedures to determine if the leak threshold (see Section 7 and the DI&M Plan) is exceeded:

- Leak Concentration: Natural gas detectors or gas sensors are required if determining whether the measured concentration exceeds the leak threshold defined in the DI&M Plan.
  - If the measured concentration does not exceed the leak threshold, the component is not considered a "leak" for the purposes of the DI&M program.
- Leak Rate: As an alternative to assessing the leak concentration, owners can characterize the leak *rate* (see methodology in Section 3.5) for any leaking component identified using an IR camera (or comparable screening method).
  - If the measured rate does not exceed the leak threshold, the component is not considered a "leak" for the purposes of the DI&M program.
- Leak Categorization using IR camera:[85] A trained IR camera operator can categorize a detected leak as below the leak threshold, in which case the component is not considered a leak for the purposes of the DI&M program.
- The operator may choose to conduct an immediate repair according to Section 3.2 rather than measuring the leak concentration or characterizing the leak rate.

For equipment/components that are not accessible from the ground, the IR camera should be used to screen for leaks (e.g., for elevated vents without sample ports).

3.3.2 Equipment/Component Leak Sources and Screening

The sources in Table 1 and discussed in the company DI&M Plan shall be screened for leaks. The survey team should be experienced to identify and screen these sources, and discern the difference between leaks from these sources and other releases, such as maintenance related blowdowns, vent line differentiation, and emissions from combustion stacks (e.g., engines, turbines, heaters, or boilers).

[85] The company DI&M Plan may include a methodology for an experienced IR camera operator to assess the leak image and categorize the leak. For example, visualization of a "wisp" would be classified as a small leak that is commensurate with a leak concentration or leak rate less than the leak threshold, and not considered a leak for the purposes of the DI&M program.

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For reciprocating and centrifugal compressors, leak screening (and leak characterization conducted according to Section 3.5) should be completed in the as-found mode of operation and the operating mode identified in Table 1 should be logged. As discussed in Section 2.3, vents equipped with a meter or instrument to identify leakage are excluded from the DI&M survey and those sources are monitored as defined in the DI&M Plan.

3.4 Tracking Leaks

Any equipment or components with a leak screening value greater than the leak threshold value defined in Section 7 or the DI&M Plan is considered a "leak" for subsequent program considerations (i.e., the procedures that follow). These components will be entered into a company management system for tracking leaks, as defined in the DI&M Plan.

3.5 Leak Rate Determination

The objective of measuring or characterizing a leak is to obtain a relative understanding of the magnitude of emissions and associated potential for reductions. Unless immediately repaired, leaks screening above the leak threshold (as defined in Section 7 or the DI&M Plan) will be tracked in a company-defined management system, and characterized.

(a) *Exceptions*

The company DI&M Plan will identify exceptions[86], such as the following:

1. Unsafe, Inaccessible, or Difficult to Monitor:
    a. If the leak is unsafe, inaccessible, or difficult to monitor, the component will be placed on the delay of repair list (see Section 4.3) and, if feasible, repaired during the next planned unit or station shut down.

    b. For (a) and per item (3) below, the DI&M Plan may specify a procedure for an experienced IR camera operator to assess the visual image and identify insignificant leaks that do not warrant follow-up action (i.e., repair, inclusion on delay of repair list, or addition of sample ports).

2. Manifolded or merged vent lines may not isolate the source of the leak and often cannot segregate individual leak source contribution. For example, if compressor cylinder rod packing vent lines may be manifolded together, individual lines may not be accessible, and it may not be possible to isolate the individual cylinder(s) leaking rod packing.

    The company owner or operator shall complete a review and document options for installing sample ports upstream in the vent lines prior to the manifold following the initial leak discovery. If sample ports cannot be

[86] Exceptions are based on existing leak mitigation programs. For example, LDAR programs include Delay of Repair provisions, such as 40 CFR, Part 60, Subpart VVa, §60.482-9a.

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installed, document the finding, and complete a review to document potential alternatives to mitigate or eliminate the leak.

3. For exceptions from leak characterization, the company may include a methodology in its DI&M Plan for a trained IR camera operator to assess the leak image and conclude that further characterization is not necessary.

(b) Leak rate characterization or estimation

Measurements will be completed using industry standard methods, practices, and instrumentation, including but not limited to a high volume sampler, calibrated vent bag, or other standard combination of flow rate and concentration characterization such as a totalizing vane anemometer or intrinsically safe hot wire anemometer, and natural gas detectors or gas sensors. Acceptable methods may also include monitoring techniques, such as the IR camera, that indicate the relative leak rate compared to other sources at the facility, as defined in the DI&M Plan.

For exceptions in (a) where leak rate measurement is not conducted, the leak rate shall be estimate using a company-specific or company-defined emission factor, as defined in the DI&M Plan.

3.6 Survey Frequency Review

The company DI&M Plan may include provisions to revise the survey frequency defined in Section 3.1 as information is gathered over multiple surveys. The decision should be based on performance metrics related to the prevalence of leaks, the leak rate characterization, and/or the need for repairs. The DI&M Plan will be reviewed and updated as necessary to reflect program maturation as data is collected, as discussed in Section 4.4.

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4.0 PRIORITIZATION OF LEAKS FOR REPAIR

The characterized leak rates will be recorded according to Section 5. Leaks repaired immediately will be recorded but are excluded from the following process. The remaining leak rate volumes from a survey will be prioritized and repaired based on a performance metric, or combination of metrics, defined in the company DI&M Plan. Leak reduction metrics should be based on a multi-year programmatic approach where the metric is achieved over a multi-year period defined in the DI&M Plan. Implementation of the DI&M program is expected to achieve substantial methane emission reductions from compressor station components.

Progress toward meeting the metric will be tracked based on data acquired. Data currently available to establish a performance metric is limited.[87] Thus, annual and cumulative performance will be assessed and the metric will be refined as needed per the objectives of the DI&M Plan. The metric will be based on:

- Reducing leakage by a defined percentage or mass (tons) over an estimated baseline emission level, and/or
- Reducing leakage to a performance level (e.g., emissions per facility, emissions as a percentage of throughput) commensurate with leak mitigation best practices.

Program data will be assessed annually to demonstrate progress towards meeting the metric(s). Company data will be analyzed to assess annual and cumulative emissions performance since program inception to demonstrate methane emission reduction progress. The program data may be compared to historical company data, EPA National GHG Inventory emissions, or other appropriate historical data.

4.1 Repairs and Repair Confirmation

As described in Section 3.2, the company may elect to repair a leak following the leak screening step. Those actions will be recorded, but that repair decision is separate from Section 4 repairs. For a leak selected for repair based on the Section 4 prioritization, the following steps will be taken:

1. Leaks selected for repair (i.e., high priority leaks) will be repaired as soon as practical, as defined in the DI&M Plan. In some cases (e.g., extended facility outage where the system is not pressurized), repair confirmation may be delayed, in which case repair status will be checked when practical.
2. Priority leaks that cannot be repaired according to the schedule defined in the DI&M Plan will be identified as outlined in Section 4.3 (Delay of Repair).
3. Repairs will be confirmed by demonstrating that leaks are eliminated per the leak threshold definition.

[87] As the program is implemented and data become available, larger leaks will be addressed. In future surveys, fewer leaks that warrant repair would be expected. As the program matures, the data is predicted to identify a stable performance level (e.g., emissions per facility, emissions as a percentage of throughput) commensurate with a rigorous leak mitigation best practices program.

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A repair attempt by the company is not required for a component or equipment that is under warranty. The company will vigorously seek repairs to be completed by the warrantor per the terms and conditions of the warranty.

4.2 Alternative Program Approaches

As discussed in Section 2.3, the company may elect to reduce leak emissions by satisfying conventional LDAR requirements for VOCs, such as those in 40 CFR Part 60 Subpart KKK– Standards of Performance for Equipment Leaks of VOC From Onshore Natural Gas Processing Plants.

4.3 Delay of Repair (DOR)

Repairs can be delayed if *one* of the following conditions is satisfied. The justification for each leak repair delay will be documented.

1. Repair Requires Unit / Station Shutdown – If the repair of any component is technically infeasible without a process unit shut down or if the source cannot be repaired during operation of the source.
2. Equipment Isolated From Process – If the repair is unnecessary because the equipment is isolated from the process (i.e., the component/equipment is taken out of gas service, and repair is completed before a return to service).
3. Valves Where Purged Gas Would Exceed Leaking Gas – If immediate repair of the equipment would result in vented emissions (from equipment purge) greater than the emissions resulting from delay.
4. Valves Where Leakage Would Be Controlled – If leaked gas is collected and destroyed, recovered in a control device, or used for some other beneficial purpose.
5. Valve Assembly Supplies Unavailable – If valve assembly replacement is necessary during the process unit shutdown, and valve assembly supplies have been depleted.
6. Repair Is Unsafe, Inaccessible, or Difficult to Monitor – If a repair cannot be made due to safety issues.
7. Repair Cannot Be Accommodated in Current Budget Cycle – If repair costs exceed a reasonable annual budget, repair will be addressed in a subsequent budget cycle.
8. Equipment Must Be Ordered for Repair – If additional time is needed to procure equipment or components necessary to complete the repair, the repair timing will be based on equipment delivery dates that may depend upon manufacturer stock and shipment schedules.
9. Specialized Skill Set Must Be Scheduled – If the repair requires a specialized technical skillset, the repair timing will be based on personnel scheduling.

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10. Equipment/Component Is Under Warranty – If a repair is delayed due to warranty issues.

In some cases, a delayed repair can be cancelled before the repair is performed. When delay of repair applies for a leaking component or equipment that remains in service, the component or equipment may be considered to be repaired and removed from the DOR list if subsequent monitoring indicates readings below the leak threshold. In this case, the basis for removing the leak from the repair list will be documented.

The DI&M Plan may include alternative monitoring schedules for leaks on the DOR list.

4.4 Review of Program Results and the Company-Specific DI&M Plan

The DI&M Plan will be assessed and may be updated to reflect implementation insights from program results. At a minimum, the DI&M Plan will be reviewed, and revised as appropriate, after the initial 5-year phase-in period is completed.

5.0 RECORDKEEPING

The company will maintain records in hard copy or electronic format for at least five years following the date of the survey, including the following records:

1. Survey dates, log including personnel performing the leak survey/characterizations, and Quality Assurance and Quality Control (QA/QC) for survey methods;
2. Record of each repaired leak by source type, including leak screening or leak rate record, date of repair, and verification of repair;
3. Delay of Repair (DOR) list and justification;
4. For leaks not repaired or on the DOR list, the count of leaks and the total leak rate.

6.0 DATA QUALITY ASSURANCE AND CONTROL

Leak screening, concentration measurements, leak characterization, instrument calibrations and performance checks shall follow industry standard methods, procedures, and guidance.

7.0 DEFINITIONS AND COMMON TERMS

Accessible from the ground means within 2 meters (6.5 feet) of the grate or surface. Does not require a ladder or step to access.

Calibrated bag (also known as a vent bag) means a flexible, non-elastic, antistatic bag of a calibrated volume that can be affixed to an emitting source such that the emissions inflate the bag to its calibrated volume.

Compressor service refers to equipment and components associated with a compressor.

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DI&M Plan means the company-specific plan that defines detailed criteria for the company's directed inspection and maintenance program, such as: the included facilities and sources within the facility, implementation schedule, survey schedule, performance metric, and leak screening and characterization methods and QA/QC.

Equipment leak detection means the process of identifying leakage from equipment, components, and other point sources.

Facility means an affected compressor station.

Flowmeter means a device that measures the mass or volumetric rate of flow of a gas, liquid, or solid moving through an open or closed conduit (e.g., flowmeters include, but are not limited to, rotameters, turbine meters, coriolis meters, orifice meters, ultra-sonic flowmeters, and vortex flowmeters).

Inaccessible component means a component meeting any of the following criteria:

1. Buried,
2. Insulated in a manner that prevents access to the component by a monitor probe,
3. Obstructed by equipment or piping that prevents access to the component by a monitoring probe,
4. Obstructed or covered by floor grating that would require removal and replacement of flooring using a crane or other mechanical lifting method,
5. A component where access would require entry into a confined space as defined by OSHA,
6. Inaccessible because it would require elevating the monitoring personnel more than 2 meters above a permanent support surface or would require the erection of scaffold or use of a manlift, or
7. Not able to be accessed at any time in a safe manner to perform monitoring. Unsafe access includes, but is not limited to access that would require near proximity to hazards such as electrical lines, excessive noise, vented gas releases or would risk damage to equipment.

Leak means any unintended methane vapor release from a component into the ambient air or into a building. This may include leakage above an acceptable threshold defined by the manufacturer.

Leak characterization means flow rate measurement or otherwise categorizing (e.g., by a trained IR camera operator) the size of a leak. A company may elect to omit leak screening and proceed immediately to the leak characterization step.

Leak screening means the initial procedure to assess whether leakage is occurring based on methods such as IR camera screening. If the initial screening does not measure concentration (e.g., an IR camera is used for leak screening) and a concentration measurement is conducted for comparison against the leak threshold concentration, the concentration measurement is also part of the leak screening procedure.

Leak survey or Survey means the complete on-site procedures associated with screening for leaks and characterizing the leak rate from identified leaks.

Leak threshold means the local concentration as measured by natural gas detectors / gas sensors at the surface of a leak source that indicates that a methane emission (leak) is present, or a

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measured leak rate. The leak threshold is an instrument meter reading based on methane as the reference compound or a measured methane leak rate as follows:

Option 1: If an instrument reading of 25,000 ppm or greater of methane is measured, a leak is detected.

> 25,000 ppm or 2.5%

OR

Option 2: If a leak rate exceeds 6.0 SCFH or an alternative identified in the DI&M Plan based on company experience from their leak mitigation program or manufacturer's data.

Leaks observed by the IR Camera in the absence of an associated concentration measurement or leak rate measurement are considered a leak, unless documented otherwise based on a procedure for a trained IR Camera operator to classify leaks defined in the DI&M Plan. For rod packing, a separate threshold or condition-based maintenance approach may be defined in the DI&M Plan (see Table 1, footnote A).

Natural gas means a naturally occurring mixture or process derivative of hydrocarbon and non-hydrocarbon gases found in geologic formations beneath the earth's surface, of which its constituents include, but are not limited to, methane, heavier hydrocarbons and carbon dioxide.

Repair means that equipment is adjusted, repaired, replaced or otherwise altered, in order to eliminate or reduce a leak below the applicable leak threshold. A successful repair is confirmed using any qualitative or quantitative screening instrument or method.

Valve means any device for halting or regulating the flow of a liquid or gas through a passage, pipeline, inlet, outlet, or orifice; including, but not limited to, gate, globe, plug, ball, butterfly and needle valves.

Vent means an open-ended line or pipe from which emissions are released to atmosphere.

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APPENDIX D

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Diagrams/illustrations of Compressor Station Repair Processes and Timing Needed for Making Repairs Once Existing Sources Are Affected by Modification Language

The examples below show four scenarios with the many components and pieces of equipment at a typical compressor station that could trigger a leak repair and what a repair would entail. INGAA emphasizes that no two repairs are alike and the repair schedule varies depending on how long it takes the pipeline to order and receive the piece of equipment from the compressor manufacturer, and how long the repair takes. These four examples assist in explaining what a compressor station repair may involve.

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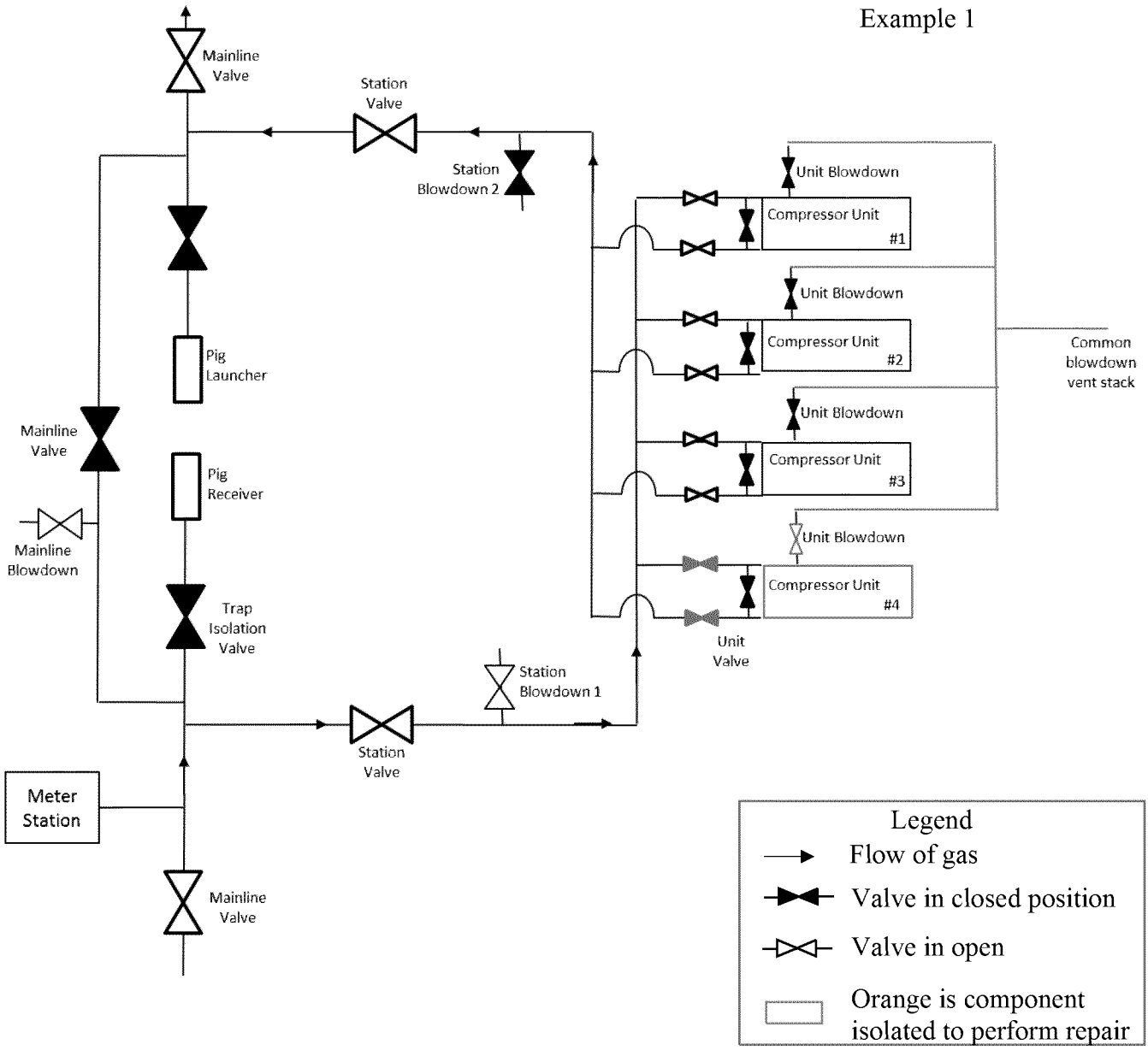

Example 1: Small repair on single compressor unit

A leak on a single compressor unit can be isolated without blowing down the compressor station. In this example prior to making any repairs on compressor unit number 4, the operator must take the single unit offline reducing the volume of gas in the unit and then close the unit valves to the compressor unit from the station piping. The compressor station crew needs to vacate the remaining gas from compressor unit number 4 by conducting a unit blowdown through the highlighted unit blowdown valve. A repair in this section of the station likely involves small diameter piping and valves which can be replaced in a short period of time (e.g. three to four days) once parts are available. However, some vintage components are no longer produced by the manufacture and a custom piece would need to be manufactured to replace the component. This vintage piece may take up to six months to design and manufacture.

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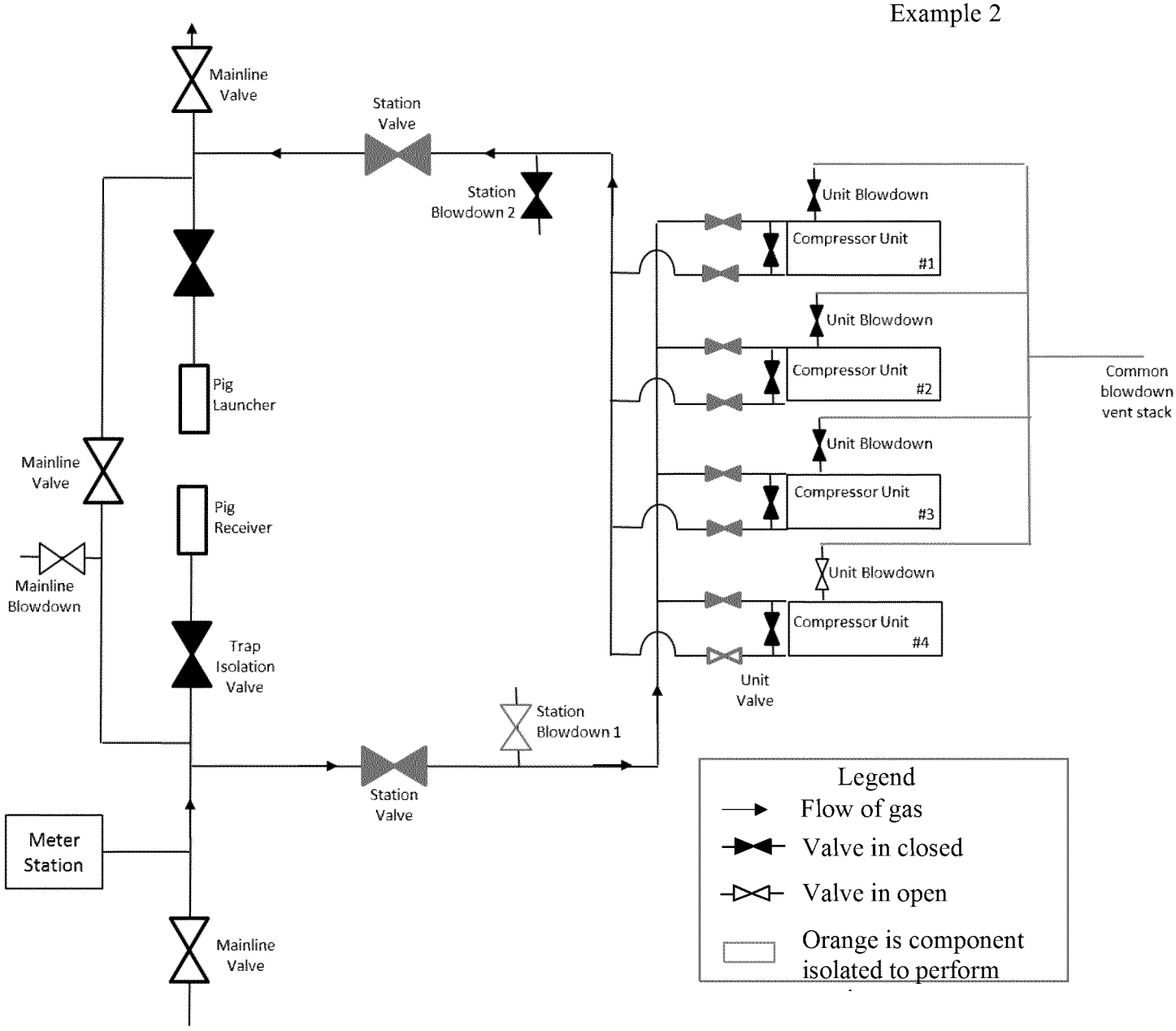
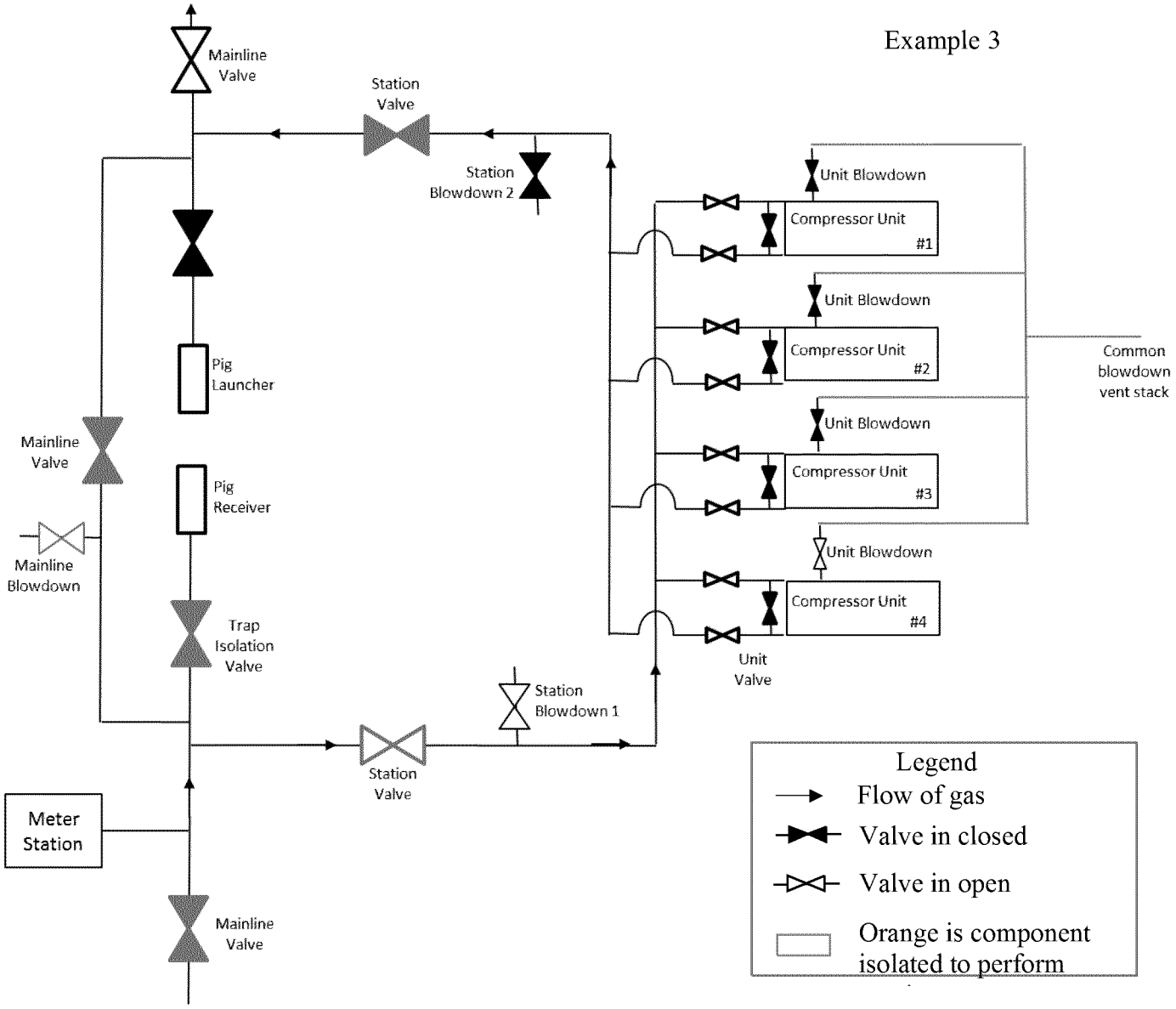
Example 2



Example 2: Medium size repair within a compressor station

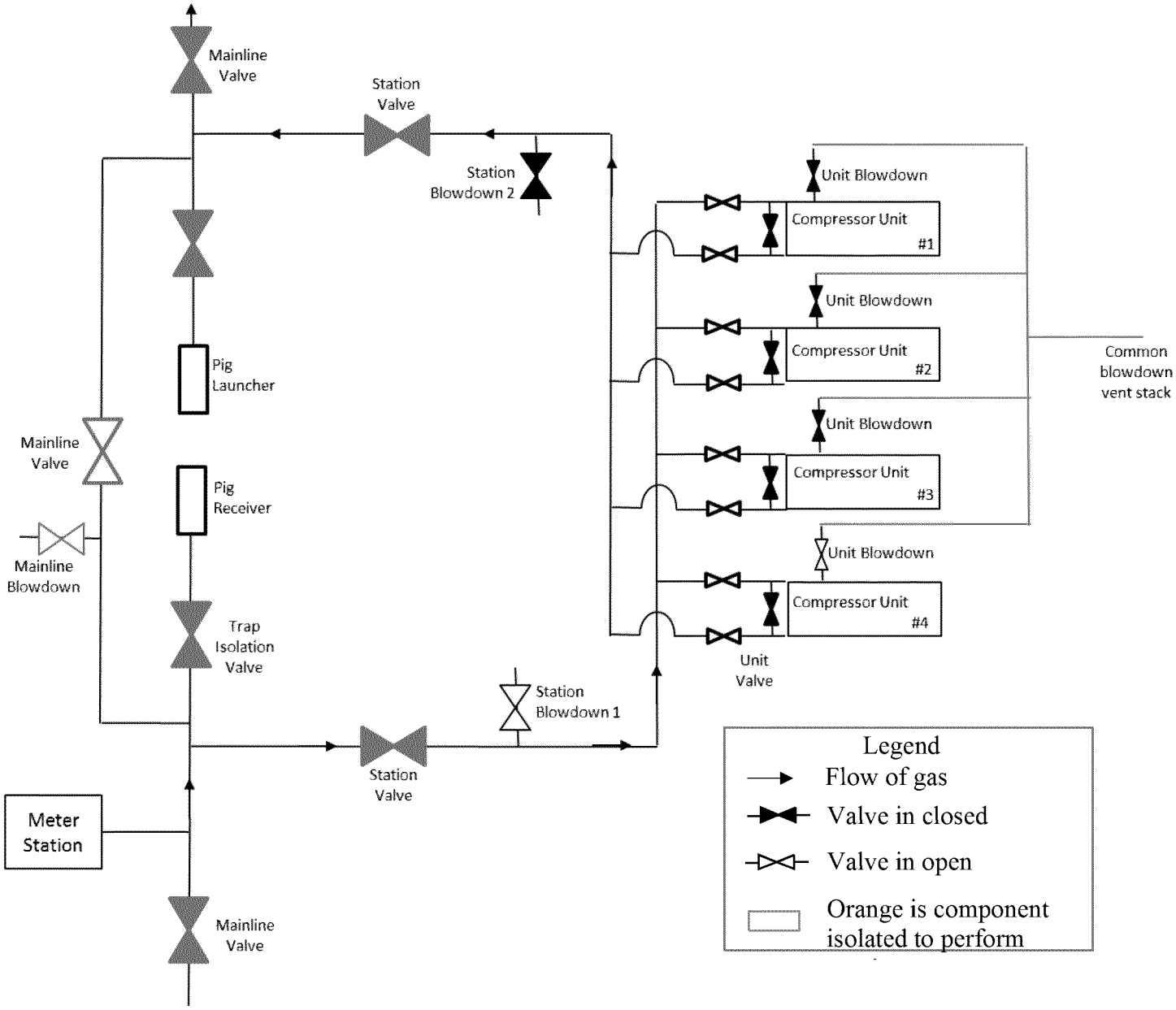
There are multiple pieces of equipment between the mainline pipe and the compressor units, this equipment includes scrubbers, valves, tanks and various equipment. If a repair must be made to this equipment the compressor station must be taken offline. Once the station is taken offline the compressor station crew will perform a station blowdown from the station blowdown valve highlighted. A repair in this section is likely to involve large diameter pipe and large diameter valves which will require a longer time period to complete the repair. This repair is likely to trigger various permits and will need to have soil erosion and sediment control for the excavation area. Once the station is taken offline the operator will lose the horsepower associated with the station and there will likely be customer impact on deliveries.



Example 3: Large repair that involves mainline pipe

A leak at the station valve would require the compressor station and the upstream segment of the mainline pipeline to be taken out of service. The amount of gas in the mainline pipe will vary significantly depending on pipe diameter and the distance to next mainline valve. In a PHMSA Class 1 location, that can be as much as 20 miles. A repair in this section of pipe will require a blowdown either through the station blowdown or through the mainline blowdown. Pipe in this section tends to be large diameter along with large diameter valves, if the repair requires excavation the amount of time to complete this repair could be several days to a week. This repair will likely trigger various permits and will need to have soil erosion and sediment controls for the excavation area. Once the station and segment of pipe is taken offline the operator will lose the horsepower associated with the station and pipeline capacity which will likely cause customer impact.

Example 4



Example 4: Large repair that involves the mainline valve

A leak on the mainline valve would require the compressor station along with the upstream and downstream pipeline segments to be taken out of service. In a PHMSA Class 1 location the valves could be as much as 20 miles, in each direction, from the compressor station. This repair could result in gas being blowdown for 40 miles of pipe. Pipe in this section tends to large diameter along with large diameter valves. This repair could be one week to several weeks. This repair will likely trigger various permits and will need to have soil erosion and sediment controls for the excavation area. Once the station and segment of pipe is taken offline the operator will lose the horsepower associated with the station and pipeline capacity which will likely cause customer impact.

From: Atkinson, Emily
Location: Nashville, TN
Importance: Normal
Subject: ECOS Meeting (Confirmed)
Categories: Green Category
Start Date/Time: Tue 4/12/2016 9:00:00 PM
End Date/Time: Tue 4/12/2016 11:30:00 PM
McCabe Invite Spring Mtg 2016.pdf
FW: Specific Invitation to ECOS Spring Meeting in Nashville for Assistant Administrator McCabe
Re: Specific Invitation to ECOS Spring Meeting in Nashville for Assistant Administrator McCabe

February 17, 2016

Ms. Janet McCabe
Acting Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, DC 20460

Via e-mail

Dear Assistant Administrator McCabe:

On behalf of ECOS, I am delighted to invite you to participate in the 2016 ECOS Spring Meeting, planned for April 11 – 13 in Nashville, Tennessee. It would be an honor to have you with us as we bring to fruition the meeting's theme of *Pathways to Partnership: Advancing Environmental Protection*. The latest agenda follows.

In particular, we invite you to speak at a plenary roundtable discussion on Monday, April 11 from 1:30 to 2:30 pm central time focused on *Partnerships to Advance Air Quality: Focus on Ozone and Regional Haze.* This discussion will explore recent changes to the national ambient air quality standards (NAAQS) for ozone and the planed update to the regional haze program. The dialogue will center on strategies states and EPA are pursuing to address the new ozone NAAQS and regional haze requirements – including the Advance program we discussed . We hope that the roundtable members will reflect on how their Departments/Agencies are working together with members of the business, local government, and academic communities to creatively and effectively meet their goals. The moderator of the roundtable will be Chairman Bryan Shaw of the Texas Commission on Environmental Quality and Chair of the ECOS Air Committee. Also invited to participate in the discussion is Secretary Ben Grumbles of the Maryland Department of the Environment and Director Craig Butler of the Ohio Environmental Protection Agency.

In addition to your participation in the above-referenced discussion, we hope you can stay for other meeting events, including the Clean Power Plan discussion from 4 to 5 pm on the 12th, and breakfast and conversation with Administrator McCarthy and ECOS President Martha Rudolph at 8 am on the 13th, followed by a U.S. EPA-State closed session discussion on crisis management from 9:30 to 10:30 am. ECOS offers one-day and full registration.

To access the latest agenda and to register, please visit http://ecos.org/section/events/?id=4934. If you have any questions or need additional information – and to confirm your availability – please have your staff contact Kelly Poole at (202) 266-4939 or kpoole@ecos.org.

Best Regards,

Alexandra Dapolito Dunn
Executive Director & General Counsel

ECOS

THE ENVIRONMENTAL COUNCIL OF THE STATES

50 F Street, N.W.
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Martha Rudolph
Director of Environmental Programs, Colorado Department of Public Health and Environment
PRESIDENT

John Linc Stine
Commissioner, Minnesota Pollution Control Agency
VICE PRESIDENT

Todd Parfitt
Director, Wyoming Department of Environmental Quality
SECRETARY-TREASURER

Robert Martineau
Commissioner, Tennessee Department of Environment and Conservation
PAST PRESIDENT

Alexandra Dapolito Dunn
Executive Director & General Counsel

2016 ECOS Spring Meeting
Fifth Draft Agenda: *Pathways to Partnerships: Advancing Environmental Protection*
April 10–13, 2016 (followed by E-Enterprise Meeting on April 13–14)
Music City Center (Meetings and Meal Functions)/Omni Nashville Hotel (Lodging)
Nashville, Tennessee

Notes:
(1) Twitter users are encouraged to use #ECOSpringMtg16 to tweet about the meeting.
(2) Dress for the meetings is business casual.
(3) All meeting space is located on the main level of the Music City Center across the street from the Omni (use the exit near the Country Music Hall of Fame and cross 5th Avenue).
(4) Draft resolutions will be posted near the registration desk.
(5) All meetings are open to all registrants, including press, except where indicated.

Sunday, April 10 – Open to All Attendees

5:15 – 6:45 p.m.	After-Hours Tour of the Country Music Hall of Fame and Museum
6:30 – 8:30 p.m.	Dinner with Musical Entertainment at the Country Music Hall of Fame

Monday, April 11 – Open to All Attendees until 3:45 p.m.

7:15 a.m.	Registration Opens (104 A-D Corridor)
7:30 – 8:45 a.m.	Breakfast for All (103 A-B); Side Session of the Shale Gas Caucus (SGC) (103 C) *After having focused since its inception primarily on air and methane issues, the Shale Gas Caucus adds water to its portfolio. The caucus kicks off its next phase with a discussion of alternative water management for water produced from oil and gas wells. A variety of state partners will participate.* 103 C
9:00 – 10:30 a.m.	Opening Plenary Session (104 A-D) • Call to Order by ECOS President Martha Rudolph of Colorado • Host State Welcome by Nashville Mayor Megan Barry (confirmed) and ECOS Past President Bob Martineau of Tennessee • Introductions by Martha Rudolph and Self-Introduction of Members • Keynote on the Environment-Public Health Nexus by Bryn Barnard (confirmed), author of *Outbreak! Plagues That Changed History* • Agenda Overview by Martha Rudolph
10:30 – 11:00 a.m.	Break and Book Signing with Bryn Barnard (104 A-D Corridor)
11:00 a.m. – 12:15 p.m.	Roundtable Discussion on the Nexus between Environment and Public Health (104 A-D), facilitated by Martha Rudolph of Colorado *This dynamic discussion will focus on techniques and approaches for enhancing partnerships between environmental regulators and public health professionals. Examples will be shared to show how decision-making and public outcomes can be improved through these*

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collaborations. Participants include Dr. Thomas Burke, Deputy Assistant Administrator and Science Advisor, U.S. EPA Office of Research and Development, and Former ECOS President Richard Opper, Director, Montana Department of Public Health and Human Services.

12:15 – 1:30 p.m.	Keynote Lunch (103 A-B) with Presentation by Local Speaker
1:30 – 2:30 p.m.	Roundtable Discussion on Partnerships to Advance Air Quality: Focus on Ozone and Regional Haze (104 A-D), facilitated by the Air Committee leaders. *Under U.S. EPA's recent tightening of the national ambient air quality standards (NAAQS) for ozone, state recommendations on nonattainment area designations are due in October. The agency also plans to finalize a rule by the end of the year updating its regional haze program and already is taking local action in many states. This discussion will center on strategies states are pursuing to address the new ozone NAAQS and regional haze requirements.*
2:30 – 3:15 p.m.	Featured Speaker: Major General Donald E. (Ed) Jackson Jr. (confirmed) (104 A-D), Deputy Commanding General for Civil and Emergency Operations, U.S. Army Corps of Engineers, on State-Army Corps Relations, introduced by Michael Teague of Oklahoma
3:15 – 3:45 p.m.	Break (104 A-D Corridor)
3:45 – 4:45 p.m.	States-Only Business Session (104 A-D): Resolutions, Bylaws, and Strategic Plan Voting
4:45 – 5:00 p.m.	Selection of 2018 Spring Meeting Host State (104 A -D)
5:00 – 5:30 p.m.	Executive Committee Meeting (104 A-D)
5:30 p.m.	Evening Open for Dinners and Alumni Dinner

<u>Tuesday, April 12</u> – Open to All Attendees

6:15 – 8:30 a.m.	Optional Walking Tour at RadnorLake State Park & Natural Area, hosted by ECOS Past President Bob Martineau of Tennessee *See signup sheet posted near registration desk.*
7:30 a.m.	Registration Opens (104 A-D Corridor)
7:30 – 9:00 a.m.	Breakfast for All (103 A-B) Side Sessions of the Environmental Research Institute of the States (ERIS) (105 A) and Data Management Workgroup (DMWG) (103 C)
9:00 – 10:15 a.m.	Roundtable Discussion: Restoring Urban Waters to Bring Economic and Environmental Vitality "Downtown" (104 A-D), facilitated by the Water Committee leaders *This roundtable will feature partnerships working to restore urban waterways in cities around the country, and will present transferable experiences in protecting human health and the environment.*

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10:15 – 10:45 a.m.	Break (104 A-D Corridor)
10:45 a.m. – 12:00 p.m.	Corporate Roundtable: The Recovered Material Role in Sustainable Materials Management (104 A-D), facilitated by the Waste Committee leaders *Representatives of industries at various stages of maturity – coal ash recycling, waste-to-energy, and biomass – will spotlight strides in curbing waste streams and promoting air quality and renewable energy and discuss how states can partner in these initiatives.*
12:00 – 1:15 p.m.	Lunch with Regional Discussions (103 A-B)
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2:30 – 3:30 p.m.	Roundtable Discussion: Beyond the Bean Counting: Measuring the Impact of Environmental Enforcement Actions (104 A -D), facilitated by the Compliance Committee leaders *This roundtable discussion will explore how federal and state agencies are measuring the environmental, public health, and worker safety results of enforcement actions. While number of actions brought, or penalty dollars collected, can certainly serve as indicators of such results, enforcement officials are employing new and more refined approaches to communicate why actions were brought and to quantify how the environment, the public, and even violating entities will be in better positions post enforcement action. This roundtable also will address how private environmental governance approaches are supplementing state and federal enforcement activities. Among the confirmed speakers is John Cruden, Assistant Attorney General, Environment and Natural Resources Division, U.S. Department of Justice.*
3:30 – 4:00 p.m.	Break (104 A-D Corridor)
4:00 – 5:00 p.m.	Moderated Dialogue: The Clean Power Plan– What's Next (104 A-D), Featuring U.S. EPA General Counsel Avi Garbow (confirmed) and ECOS Secretary-Treasurer Todd Parfitt of Wyoming, and Facilitated by ECOS President Martha Rudolph of Colorado *Following the U.S. Supreme Court stay of Clean Power Plan (CPP) implementation while the D.C. Circuit reviews its legality, EPA and some states announced plans to continue moving ahead with the CPP's concepts, framework, and complementary activities. Other states determined it was time to "put the pen down" and refocus on their existing heavy workload of core air quality and protection work. Some states remain in an evaluation mode. This session will focus on the current status of state and federal responses, actions, and perspectives and*

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"what's next" across the nation, providing ample opportunity for ECOS member and attendee participation.

7:30 p.m. — Optional Evening Event at "We're All for the Hall" Benefit Concert featuring Keith Urban, Vince Gill, and many others, Bridgestone Arena
Attendees will walk to the nearby arena. Pre-purchased tickets will be available for pickup at the registration desk on April 12.

Wednesday, April 13 – Open to All Attendees until 9:30 a.m.

7:30 a.m. — Registration Opens (104 A-D Corridor)

8:00 – 9:15 a.m. — Plated Breakfast with Moderated Dialogue: Progress and Plans for the State-Federal Partnership (103 A-B), Featuring U.S. EPA Administrator Gina McCarthy (confirmed) and ECOS President Martha Rudolph of Colorado, and Facilitated by ECOS Executive Director and General Counsel Alexandra Dunn
This dialogue will highlight U.S. EPA and state priorities for the coming months, explore the rich potential of the state-federal partnership, and invite audience participation.

9:15 – 9:30 a.m. — Break (104 A-D Corridor)

9:30 – 10:30 a.m. — State-U.S. EPA Closed Session (104 A-D)
Representing U.S. EPA will be Administrator Gina McCarthy (confirmed), Acting Deputy Administrator Stan Meiburg (confirmed), and several Assistant Administrators and Regional Administrators.

10:30 – 10:45 a.m. — Break (104 A-D Corridor)

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This session will provide an opportunity for ECOS members to spend time at three different topically oriented tables. Preliminarily identified topics include: methane, toxics, federal facilities, nuclear decommissioning, state agency budgets, grants, management innovations and lean, crisis management, and Partnership Action Plans.

1:15 – 3:15 p.m. — Natural Resources Forum (open to states and invited guests) (104 A-D), facilitated by Cathy Stepp of Wisconsin
This always popular forum will explore the nexus – and even conflict – between natural resource and pollution control goals. Partnerships for success will be highlighted.

1:15 – 5:15 p.m. — State-U.S. EPA E-Enterprise Session (open to states and U.S. EPA) (103 C)

Thursday, April 14 – Open to States and U.S. EPA

8:00 a.m. – 2:00 p.m. — State-U.S. EPA Closed E-Enterprise Session (continued) (103 C)

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February 17, 2016

Ms. Janet McCabe
Acting Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, DC 20460

Via e-mail

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Alexandra Dapolito Dunn
Executive Director & General Counsel

ECOS

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Martha Rudolph
Director of Environmental Programs, Colorado Department of Public Health and Environment
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Thursday, April 14 – Open to States and U.S. EPA

8:00 a.m. – 2:00 p.m. — State-U.S. EPA Closed E-Enterprise Session (continued) (103 C)

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From: Atkinson, Emily
Location: Nashville, TN
Importance: Normal
Subject: ECOS Meeting (Confirmed)
Categories: Green Category
Start Date/Time: Mon 4/11/2016 6:30:00 PM
End Date/Time: Mon 4/11/2016 11:00:00 PM
FW: Specific Invitation to ECOS Spring Meeting in Nashville for Assistant Administrator McCabe
McCabe Invite Spring Mtg 2016.pdf
Re: Specific Invitation to ECOS Spring Meeting in Nashville for Assistant Administrator McCabe
RE: Specific Invitation to ECOS Spring Meeting in Nashville for Assistant Administrator McCabe
ECOS Payment receipt

Panel is at 1:30pm

February 17, 2016

Ms. Janet McCabe
Acting Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, DC 20460

Via e-mail

Dear Assistant Administrator McCabe:

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In particular, we invite you to speak at a plenary roundtable discussion on Monday, April 11 from 1:30 to 2:30 pm central time focused on *Partnerships to Advance Air Quality: Focus on Ozone and Regional Haze.* This discussion will explore recent changes to the national ambient air quality standards (NAAQS) for ozone and the planed update to the regional haze program. The dialogue will center on strategies states and EPA are pursuing to address the new ozone NAAQS and regional haze requirements – including the Advance program we discussed . We hope that the roundtable members will reflect on how their Departments/Agencies are working together with members of the business, local government, and academic communities to creatively and effectively meet their goals. The moderator of the roundtable will be Chairman Bryan Shaw of the Texas Commission on Environmental Quality and Chair of the ECOS Air Committee. Also invited to participate in the discussion is Secretary Ben Grumbles of the Maryland Department of the Environment and Director Craig Butler of the Ohio Environmental Protection Agency.

In addition to your participation in the above-referenced discussion, we hope you can stay for other meeting events, including the Clean Power Plan discussion from 4 to 5 pm on the 12th, and breakfast and conversation with Administrator McCarthy and ECOS President Martha Rudolph at 8 am on the 13th, followed by a U.S. EPA-State closed session discussion on crisis management from 9:30 to 10:30 am. ECOS offers one-day and full registration.

To access the latest agenda and to register, please visit http://ecos.org/section/events/?id=4934. If you have any questions or need additional information – and to confirm your availability – please have your staff contact Kelly Poole at (202) 266-4939 or kpoole@ecos.org.

Best Regards,

Alexandra Dapolito Dunn
Executive Director & General Counsel

ECOS

THE ENVIRONMENTAL COUNCIL OF THE STATES

50 F Street, N.W.
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Washington, D.C. 20001

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Martha Rudolph
Director of Environmental Programs, Colorado Department of Public Health and Environment
PRESIDENT

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Commissioner, Minnesota Pollution Control Agency
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SECRETARY-TREASURER

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2016 ECOS Spring Meeting
Fifth Draft Agenda: *Pathways to Partnerships: Advancing Environmental Protection*
April 10–13, 2016 (followed by E-Enterprise Meeting on April 13–14)
Music City Center (Meetings and Meal Functions)/Omni Nashville Hotel (Lodging)
Nashville, Tennessee

Notes:
(1) Twitter users are encouraged to use #ECOSpringMtg16 to tweet about the meeting.
(2) Dress for the meetings is business casual.
(3) All meeting space is located on the main level of the Music City Center across the street from the Omni (use the exit near the Country Music Hall of Fame and cross 5th Avenue).
(4) Draft resolutions will be posted near the registration desk.
(5) All meetings are open to all registrants, including press, except where indicated.

Sunday, April 10 – Open to All Attendees

5:15 – 6:45 p.m.	After-Hours Tour of the Country Music Hall of Fame and Museum
6:30 – 8:30 p.m.	Dinner with Musical Entertainment at the Country Music Hall of Fame

Monday, April 11 – Open to All Attendees until 3:45 p.m.

7:15 a.m.	Registration Opens (104 A-D Corridor)
7:30 – 8:45 a.m.	Breakfast for All (103 A-B); Side Session of the Shale Gas Caucus (SGC) (103 C) *After having focused since its inception primarily on air and methane issues, the Shale Gas Caucus adds water to its portfolio. The caucus kicks off its next phase with a discussion of alternative water management for water produced from oil and gas wells. A variety of state partners will participate.* 103 C
9:00 – 10:30 a.m.	Opening Plenary Session (104 A-D) • Call to Order by ECOS President Martha Rudolph of Colorado • Host State Welcome by Nashville Mayor Megan Barry (confirmed) and ECOS Past President Bob Martineau of Tennessee • Introductions by Martha Rudolph and Self-Introduction of Members • Keynote on the Environment-Public Health Nexus by Bryn Barnard (confirmed), author of *Outbreak! Plagues That Changed History* • Agenda Overview by Martha Rudolph
10:30 – 11:00 a.m.	Break and Book Signing with Bryn Barnard (104 A-D Corridor)
11:00 a.m. – 12:15 p.m.	Roundtable Discussion on the Nexus between Environment and Public Health (104 A-D), facilitated by Martha Rudolph of Colorado *This dynamic discussion will focus on techniques and approaches for enhancing partnerships between environmental regulators and public health professionals. Examples will be shared to show how decision-making and public outcomes can be improved through these*

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collaborations. Participants include Dr. Thomas Burke, Deputy Assistant Administrator and Science Advisor, U.S. EPA Office of Research and Development, and Former ECOS President Richard Opper, Director, Montana Department of Public Health and Human Services.

12:15 – 1:30 p.m.	Keynote Lunch (103 A-B) with Presentation by Local Speaker
1:30 – 2:30 p.m.	Roundtable Discussion on Partnerships to Advance Air Quality: Focus on Ozone and Regional Haze (104 A-D), facilitated by the Air Committee leaders. *Under U.S. EPA's recent tightening of the national ambient air quality standards (NAAQS) for ozone, state recommendations on nonattainment area designations are due in October. The agency also plans to finalize a rule by the end of the year updating its regional haze program and already is taking local action in many states. This discussion will center on strategies states are pursuing to address the new ozone NAAQS and regional haze requirements.*
2:30 – 3:15 p.m.	Featured Speaker: Major General Donald E. (Ed) Jackson Jr. (confirmed) (104 A-D), Deputy Commanding General for Civil and Emergency Operations, U.S. Army Corps of Engineers, on State-Army Corps Relations, introduced by Michael Teague of Oklahoma
3:15 – 3:45 p.m.	Break (104 A-D Corridor)
3:45 – 4:45 p.m.	States-Only Business Session (104 A-D): Resolutions, Bylaws, and Strategic Plan Voting
4:45 – 5:00 p.m.	Selection of 2018 Spring Meeting Host State (104 A -D)
5:00 – 5:30 p.m.	Executive Committee Meeting (104 A-D)
5:30 p.m.	Evening Open for Dinners and Alumni Dinner

<u>Tuesday, April 12</u> – Open to All Attendees

6:15 – 8:30 a.m.	Optional Walking Tour at RadnorLake State Park & Natural Area, hosted by ECOS Past President Bob Martineau of Tennessee *See signup sheet posted near registration desk.*
7:30 a.m.	Registration Opens (104 A-D Corridor)
7:30 – 9:00 a.m.	Breakfast for All (103 A-B) Side Sessions of the Environmental Research Institute of the States (ERIS) (105 A) and Data Management Workgroup (DMWG) (103 C)
9:00 – 10:15 a.m.	Roundtable Discussion: Restoring Urban Waters to Bring Economic and Environmental Vitality "Downtown" (104 A-D), facilitated by the Water Committee leaders *This roundtable will feature partnerships working to restore urban waterways in cities around the country, and will present transferable experiences in protecting human health and the environment.*

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12:00 – 1:15 p.m.	Lunch with Regional Discussions (103 A-B)
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2:30 – 3:30 p.m.	Roundtable Discussion: Beyond the Bean Counting: Measuring the Impact of Environmental Enforcement Actions (104 A -D), facilitated by the Compliance Committee leaders *This roundtable discussion will explore how federal and state agencies are measuring the environmental, public health, and worker safety results of enforcement actions. While number of actions brought, or penalty dollars collected, can certainly serve as indicators of such results, enforcement officials are employing new and more refined approaches to communicate why actions were brought and to quantify how the environment, the public, and even violating entities will be in better positions post enforcement action. This roundtable also will address how private environmental governance approaches are supplementing state and federal enforcement activities. Among the confirmed speakers is John Cruden, Assistant Attorney General, Environment and Natural Resources Division, U.S. Department of Justice.*
3:30 – 4:00 p.m.	Break (104 A-D Corridor)
4:00 – 5:00 p.m.	Moderated Dialogue: The Clean Power Plan– What's Next (104 A-D), Featuring U.S. EPA General Counsel Avi Garbow (confirmed) and ECOS Secretary-Treasurer Todd Parfitt of Wyoming, and Facilitated by ECOS President Martha Rudolph of Colorado *Following the U.S. Supreme Court stay of Clean Power Plan (CPP) implementation while the D.C. Circuit reviews its legality, EPA and some states announced plans to continue moving ahead with the CPP's concepts, framework, and complementary activities. Other states determined it was time to "put the pen down" and refocus on their existing heavy workload of core air quality and protection work. Some states remain in an evaluation mode. This session will focus on the current status of state and federal responses, actions, and perspectives and*

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7:30 p.m. — Optional Evening Event at "We're All for the Hall" Benefit Concert featuring Keith Urban, Vince Gill, and many others, Bridgestone Arena
Attendees will walk to the nearby arena. Pre-purchased tickets will be available for pickup at the registration desk on April 12.

Wednesday, April 13 – Open to All Attendees until 9:30 a.m.

7:30 a.m. — Registration Opens (104 A-D Corridor)

8:00 – 9:15 a.m. — Plated Breakfast with Moderated Dialogue: Progress and Plans for the State-Federal Partnership (103 A-B), Featuring U.S. EPA Administrator Gina McCarthy (confirmed) and ECOS President Martha Rudolph of Colorado, and Facilitated by ECOS Executive Director and General Counsel Alexandra Dunn
This dialogue will highlight U.S. EPA and state priorities for the coming months, explore the rich potential of the state-federal partnership, and invite audience participation.

9:15 – 9:30 a.m. — Break (104 A-D Corridor)

9:30 – 10:30 a.m. — State-U.S. EPA Closed Session (104 A-D)
Representing U.S. EPA will be Administrator Gina McCarthy (confirmed), Acting Deputy Administrator Stan Meiburg (confirmed), and several Assistant Administrators and Regional Administrators.

10:30 – 10:45 a.m. — Break (104 A-D Corridor)

10:45 a.m. – 12:45 p.m. — States-Only Breakouts on Cutting-Edge Topics with Boxed Lunch (103 A-B)
This session will provide an opportunity for ECOS members to spend time at three different topically oriented tables. Preliminarily identified topics include: methane, toxics, federal facilities, nuclear decommissioning, state agency budgets, grants, management innovations and lean, crisis management, and Partnership Action Plans.

1:15 – 3:15 p.m. — Natural Resources Forum (open to states and invited guests) (104 A-D), facilitated by Cathy Stepp of Wisconsin
This always popular forum will explore the nexus – and even conflict – between natural resource and pollution control goals. Partnerships for success will be highlighted.

1:15 – 5:15 p.m. — State-U.S. EPA E-Enterprise Session (open to states and U.S. EPA) (103 C)

Thursday, April 14 – Open to States and U.S. EPA

8:00 a.m. – 2:00 p.m. — State-U.S. EPA Closed E-Enterprise Session (continued) (103 C)

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February 17, 2016

Ms. Janet McCabe
Acting Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, DC 20460

Via e-mail

Dear Assistant Administrator McCabe:

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Executive Director & General Counsel

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7:30 a.m. — Registration Opens (104 A-D Corridor)

8:00 – 9:15 a.m. — Plated Breakfast with Moderated Dialogue: Progress and Plans for the State-Federal Partnership (103 A-B), Featuring U.S. EPA Administrator Gina McCarthy (confirmed) and ECOS President Martha Rudolph of Colorado, and Facilitated by ECOS Executive Director and General Counsel Alexandra Dunn
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Thursday, April 14 – Open to States and U.S. EPA

8:00 a.m. – 2:00 p.m. — State-U.S. EPA Closed E-Enterprise Session (continued) (103 C)

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February 17, 2016

Ms. Janet McCabe
Acting Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, DC 20460

Via e-mail

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collaborations. Participants include Dr. Thomas Burke, Deputy Assistant Administrator and Science Advisor, U.S. EPA Office of Research and Development, and Former ECOS President Richard Opper, Director, Montana Department of Public Health and Human Services.

12:15 – 1:30 p.m.	Keynote Lunch (103 A-B) with Presentation by Local Speaker
1:30 – 2:30 p.m.	Roundtable Discussion on Partnerships to Advance Air Quality: Focus on Ozone and Regional Haze (104 A-D), facilitated by the Air Committee leaders. *Under U.S. EPA's recent tightening of the national ambient air quality standards (NAAQS) for ozone, state recommendations on nonattainment area designations are due in October. The agency also plans to finalize a rule by the end of the year updating its regional haze program and already is taking local action in many states. This discussion will center on strategies states are pursuing to address the new ozone NAAQS and regional haze requirements.*
2:30 – 3:15 p.m.	Featured Speaker: Major General Donald E. (Ed) Jackson Jr. (confirmed) (104 A-D), Deputy Commanding General for Civil and Emergency Operations, U.S. Army Corps of Engineers, on State-Army Corps Relations, introduced by Michael Teague of Oklahoma
3:15 – 3:45 p.m.	Break (104 A-D Corridor)
3:45 – 4:45 p.m.	States-Only Business Session (104 A-D): Resolutions, Bylaws, and Strategic Plan Voting
4:45 – 5:00 p.m.	Selection of 2018 Spring Meeting Host State (104 A -D)
5:00 – 5:30 p.m.	Executive Committee Meeting (104 A-D)
5:30 p.m.	Evening Open for Dinners and Alumni Dinner

<u>Tuesday, April 12</u> – Open to All Attendees

6:15 – 8:30 a.m.	Optional Walking Tour at RadnorLake State Park & Natural Area, hosted by ECOS Past President Bob Martineau of Tennessee *See signup sheet posted near registration desk.*
7:30 a.m.	Registration Opens (104 A-D Corridor)
7:30 – 9:00 a.m.	Breakfast for All (103 A-B) Side Sessions of the Environmental Research Institute of the States (ERIS) (105 A) and Data Management Workgroup (DMWG) (103 C)
9:00 – 10:15 a.m.	Roundtable Discussion: Restoring Urban Waters to Bring Economic and Environmental Vitality "Downtown" (104 A-D), facilitated by the Water Committee leaders *This roundtable will feature partnerships working to restore urban waterways in cities around the country, and will present transferable experiences in protecting human health and the environment.*

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10:15 – 10:45 a.m.	Break (104 A-D Corridor)
10:45 a.m. – 12:00 p.m.	Corporate Roundtable: The Recovered Material Role in Sustainable Materials Management (104 A-D), facilitated by the Waste Committee leaders *Representatives of industries at various stages of maturity – coal ash recycling, waste-to-energy, and biomass – will spotlight strides in curbing waste streams and promoting air quality and renewable energy and discuss how states can partner in these initiatives.*
12:00 – 1:15 p.m.	Lunch with Regional Discussions (103 A-B)
1:15 – 2:30 p.m.	Roundtable Discussion: How Lean is Your Machine (104 A-D), facilitated by the Innovation and Productivity Committee leaders *This discussion will present the results of ECOS' national inventory of state lean activities and offer case studies of transformative efforts at state environmental agencies. EPA also will share lean work occurring across the agency, often in partnership with states.*
2:30 – 3:30 p.m.	Roundtable Discussion: Beyond the Bean Counting: Measuring the Impact of Environmental Enforcement Actions (104 A -D), facilitated by the Compliance Committee leaders *This roundtable discussion will explore how federal and state agencies are measuring the environmental, public health, and worker safety results of enforcement actions. While number of actions brought, or penalty dollars collected, can certainly serve as indicators of such results, enforcement officials are employing new and more refined approaches to communicate why actions were brought and to quantify how the environment, the public, and even violating entities will be in better positions post enforcement action. This roundtable also will address how private environmental governance approaches are supplementing state and federal enforcement activities. Among the confirmed speakers is John Cruden, Assistant Attorney General, Environment and Natural Resources Division, U.S. Department of Justice.*
3:30 – 4:00 p.m.	Break (104 A-D Corridor)
4:00 – 5:00 p.m.	Moderated Dialogue: The Clean Power Plan– What's Next (104 A-D), Featuring U.S. EPA General Counsel Avi Garbow (confirmed) and ECOS Secretary-Treasurer Todd Parfitt of Wyoming, and Facilitated by ECOS President Martha Rudolph of Colorado *Following the U.S. Supreme Court stay of Clean Power Plan (CPP) implementation while the D.C. Circuit reviews its legality, EPA and some states announced plans to continue moving ahead with the CPP's concepts, framework, and complementary activities. Other states determined it was time to "put the pen down" and refocus on their existing heavy workload of core air quality and protection work. Some states remain in an evaluation mode. This session will focus on the current status of state and federal responses, actions, and perspectives and*

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"what's next" across the nation, providing ample opportunity for ECOS member and attendee participation.

7:30 p.m. — Optional Evening Event at "We're All for the Hall" Benefit Concert featuring Keith Urban, Vince Gill, and many others, Bridgestone Arena
Attendees will walk to the nearby arena. Pre-purchased tickets will be available for pickup at the registration desk on April 12.

Wednesday, April 13 – Open to All Attendees until 9:30 a.m.

7:30 a.m. — Registration Opens (104 A-D Corridor)

8:00 – 9:15 a.m. — Plated Breakfast with Moderated Dialogue: Progress and Plans for the State-Federal Partnership (103 A-B), Featuring U.S. EPA Administrator Gina McCarthy (confirmed) and ECOS President Martha Rudolph of Colorado, and Facilitated by ECOS Executive Director and General Counsel Alexandra Dunn
This dialogue will highlight U.S. EPA and state priorities for the coming months, explore the rich potential of the state-federal partnership, and invite audience participation.

9:15 – 9:30 a.m. — Break (104 A-D Corridor)

9:30 – 10:30 a.m. — State-U.S. EPA Closed Session (104 A-D)
Representing U.S. EPA will be Administrator Gina McCarthy (confirmed), Acting Deputy Administrator Stan Meiburg (confirmed), and several Assistant Administrators and Regional Administrators.

10:30 – 10:45 a.m. — Break (104 A-D Corridor)

10:45 a.m. – 12:45 p.m. — States-Only Breakouts on Cutting-Edge Topics with Boxed Lunch (103 A-B)
This session will provide an opportunity for ECOS members to spend time at three different topically oriented tables. Preliminarily identified topics include: methane, toxics, federal facilities, nuclear decommissioning, state agency budgets, grants, management innovations and lean, crisis management, and Partnership Action Plans.

1:15 – 3:15 p.m. — Natural Resources Forum (open to states and invited guests) (104 A-D), facilitated by Cathy Stepp of Wisconsin
This always popular forum will explore the nexus – and even conflict – between natural resource and pollution control goals. Partnerships for success will be highlighted.

1:15 – 5:15 p.m. — State-U.S. EPA E-Enterprise Session (open to states and U.S. EPA) (103 C)

Thursday, April 14 – Open to States and U.S. EPA

8:00 a.m. – 2:00 p.m. — State-U.S. EPA Closed E-Enterprise Session (continued) (103 C)

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From: Atkinson, Emily
Location: WJC-N 5400 + Video with RTP and Ann Arbor + Conference Code
Participant Code: Conference Code
Importance: Normal
Subject: Meet with Ozone Transport Commission (OTC) (Confirmed)
Categories: Blue Category
Start Date/Time: Thur 1/28/2016 6:00:00 PM
End Date/Time: Thur 1/28/2016 7:00:00 PM
Re: Scheduling: Meeting with Ozone Transport Commission in January
Confirmed 1/28 at 1pm: Scheduling: Meeting with Ozone Transport Commission in January
Meeting of OTC Officers and Janet McCabe
RE: Confirmed 1/28 at 1pm: Scheduling: Meeting with Ozone Transport Commission in January

To: Harvey, Reid; Simon, Karl; Grundler, Christopher; Dunham, Sarah; Koerber, Mike; Stewart, Lori; Page, Steve; Hengst, Benjamin; Cook, Leila; Cyran, Carissa; Haeuber, Richard; Ruvo, Rick; Wieber, Kirk
Cc: Charmley, William; Sargeant, Kathryn; Moltzen, Michael
Outside Attendees (in person): Jared Snyder, OTC Chair (NY); Ben Grumbles, OTC Vice-Chair (MD); Tad (George) Aburn, MD State Air Director; and David Foerter, OTC Exec. Director
Draft Agenda for OTC-EPA meeting

- Status of ozone transport efforts (SCOOT, CSAPR, 176A petition) in regards to 2008 and 2015 ozone standards

1. Critical need for mobile source NOx reductions is the largest challenge for continuing progress on ozone
    a. Heavy duty NOx reductions
    b. Other local and national strategies
2. How can states incorporate/credit clean energy programs' emission reduction benefits and other programs into multipollutant SIP planning?
3. OTC meetings:
    a. Increasing EPA participation in OTC meetings, including committees
    b. Planning for OTC Annual Meeting in June 2016

To: Kromeklia Bryant[kbryant@otcair.org]
Cc: David Foerter[dfoerter@otcair.org]
From: Atkinson, Emily
Sent: Tue 12/22/2015 9:37:07 PM
Subject: Confirmed 1/28 at 1pm: Scheduling: Meeting with Ozone Transport Commission in January

Hi Kromeklia,

You are confirmed for a one hour meeting on Thursday, January 28 at 1:00pm with Janet McCabe.

Directions and procedures to 1200 Pennsylvania Avenue NW:

Metro: If you come by Metro get off at the Federal Triangle metro stop. Exit the metro station and go up two sets of escalators to the surface level and turn right. You will see a short staircase and wheelchair ramp leading to a set of glass doors with the EPA logo - that is the William Jefferson Clinton Federal Building, North Entrance.

Taxi: Direct the taxi to drop you off on 12th Street NW, between Constitution and Pennsylvania Avenues, at the elevator for the Federal Triangle metro stop - this is almost exactly half way between the two avenues on 12th Street NW. Facing the building with the EPA logo and American flags, walk toward the building and take the glass door on your right hand side with the escalators going down to the metro on your left – that is the North Lobby of the William Jefferson Clinton building.

Security Procedures: A government issued photo id is required to enter the building and it is suggested you arrive 15 minutes early in order to be cleared and arrive at the meeting room on time. Upon entering the lobby, the meeting attendees will be asked to pass through security and provide a photo ID for entrance. Let the guards know that you were instructed to call Personal Privacy for a security escort.

Please send me a list of participants in advance of the meeting and feel free to contact me should you need any additional information.

Emily

Emily Atkinson
Staff Assistant

Immediate Office of the Acting Assistant Administrator
Office of Air and Radiation, USEPA
Room 5406B, 1200 Pennsylvania Avenue NW
Washington, DC 20460

Voice: 202-564-1850
Email: atkinson.emily@epa.gov

From: Kromeklia Bryant [mailto:kbryant@otcair.org]
Sent: Tuesday, December 22, 2015 4:03 PM
To: Atkinson, Emily <Atkinson.Emily@epa.gov>
Cc: David Foerter <dfoerter@otcair.org>
Subject: RE: Scheduling: Meeting with Ozone Transport Commission in January

Good afternoon Emily,

Yes that will be fine. Please confirm.

Kromeklia

Kromeklia Bryant

Office Manager

Ozone Transport Commission

444 North Capital St., NW Suite 322

Washington, DC 20001

202-508-3840

From: Atkinson, Emily [mailto:Atkinson.Emily@epa.gov]
Sent: Monday, December 21, 2015 11:21 AM
To: Kromeklia Bryant <kbryant@otcair.org>
Subject: FW: Scheduling: Meeting with Ozone Transport Commission in January

Hi Kromeklia,

It looks like we could fit this in as a one hour meeting on Thursday, January 28 at 1:00pm. Let me know if this could work on your end.

Emily

Emily Atkinson
Staff Assistant

Immediate Office of the Acting Assistant Administrator
Office of Air and Radiation, USEPA
Room 5406B, 1200 Pennsylvania Avenue NW
Washington, DC 20460
Voice: 202-564-1850
Email: atkinson.emily@epa.gov

From: Kromeklia Bryant [mailto:kbryant@otcair.org]
Sent: Thursday, December 17, 2015 12:19 PM
To: Atkinson, Emily <Atkinson.Emily@epa.gov>
Cc: David Foerter <dfoerter@otcair.org>
Subject: Scheduling: Meeting with Ozone Transport Commission in January

Good morning Emily,

Thank you for your assistance this morning. Our Executive Director, David Foerter, Chair, Jared Snyder, Asst. Commissioner, NY DEC and Secretary, Ben Grumbles, Secretary, MDE would like to meet with Janet McCabe to discuss transport planning issues and mobile source regulations in the Ozone Transport Region. As well as funding for the Ozone Transport Commission. They are looking at early January if possible, at EPA's offices for 1 hour. If you need any additional information please contact me at 202-508-3840 or at kbryant@otcair.org.

Best regards,

Kromeklia Bryant

Ozone Transport Commission

444 North Capitol St., NW Suite 322

Washington, DC 20001

202-508-3840

To: Dennis, Allison[Dennis.Allison@epa.gov]; Atkinson, Emily[Atkinson.Emily@epa.gov]
Cc: McCabe, Janet[McCabe.Janet@epa.gov]
From: David Foerter
Sent: Wed 1/6/2016 3:46:49 PM
Subject: Meeting of OTC Officers and Janet McCabe

Thank you for confirming our meeting on Jan. 28th at 1:00 PM with Acting Assistant Administrator Janet McCabe and Jared Snyder, OTC Chair (NY), Ben Grumbles, OTC Vice-Chair (MD), and David Foerter, OTC Exec. Director.

While we will continue to refine discussion points, we wanted to share an early draft agenda so Janet McCabe has the opportunity to introduce additional topics or an EPA perspective on topics in this draft. Please share if there is a point of contact for this meeting.

Draft Agenda for OTC-EPA meeting

•□□□□□□□□ Status ozone transport efforts (CSAPR, 176A petition, SCOOT) and potential to expedite addressing transport under 2015 NAAQS

•□□□□□□□□ Crediting clean energy programs in SIP submissions

•□□□□□□□□ Heavy duty NOx reductions in mobile sector

•□□□□□□□□ OTC meetings:

- EPA participation in OTC meetings, including committees

- Planning for OTC Annual Meeting in June 2016

I look forward to input on this draft agenda.

Thank you.

Dave

David C. Foerter

Executive Director

Ozone Transport Commission

and MANE-VU

444 N. Capitol Street, NW

Suite 322

Washington, DC 20001

Phone: (202) 508-3840

Cell: (703) 402-6921

FAX: (202) 508-3841

Email: dfoerter@otcair.org

To: Atkinson, Emily[Atkinson.Emily@epa.gov]
Cc: McCabe, Janet[McCabe.Janet@epa.gov]
From: David Foerter
Sent: Wed 1/27/2016 7:12:27 PM
Subject: RE: Confirmed 1/28 at 1pm: Scheduling: Meeting with Ozone Transport Commission in January

We are looking forward to meeting with Acting Assistant Administrator Janet McCabe tomorrow at 1:00 pm. The Ozone Transport Commission (OTC) group will be OTC Chair Jared Snyder (NY DEC), OTC Vice-Chair Ben Grumbles (MDE), MD State Air Director Tad (George) Aburn, and OTC Exec. Director Dave Foerter. Assuming we have 1-hour with Janet McCabe, we suggest the following agenda.

If convenient, please let me know who from EPA will be included in this meeting.

Thank you and Best Regards,

Dave

Suggested Agenda for OTC-EPA meeting on January 28, 2016

Status of ozone transport efforts (SCOOT, CSAPR, 176A petition) in regards to 2008 and 2015 ozone standards

1. Critical need for mobile source NOx reductions is the largest challenge for continuing progress on ozone

a. Heavy duty NOx reductions

b. Other local and national strategies

2. How can states incorporate/credit clean energy programs' emission reduction benefits and

other programs into multipollutant SIP planning?

3. OTC meetings:

a. Increasing EPA participation in OTC meetings, including committees

b. Planning for OTC Annual Meeting in June 2016

David C. Foerter

Executive Director

Ozone Transport Commission

and MANE-VU

444 N. Capitol Street, NW

Suite 322

Washington, DC 20001

Phone: (202) 508-3840

Cell: Personal Privacy

FAX: (202) 508-3841

Email: dfoerter@otcair.org

From: Atkinson, Emily [mailto:Atkinson.Emily@epa.gov]
Sent: Tuesday, December 22, 2015 4:37 PM
To: Kromeklia Bryant <kbryant@otcair.org>
Cc: David Foerter <dfoerter@otcair.org>
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Hi Kromeklia,

You are confirmed for a one hour meeting on Thursday, January 28 at 1:00pm with Janet McCabe.

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Security Procedures: A government issued photo id is required to enter the building and it is suggested you arrive 15 minutes early in order to be cleared and arrive at the meeting room on time. Upon entering the lobby, the meeting attendees will be asked to pass through security and provide a photo ID for entrance. Let the guards know that you were instructed to call 202-564-7404 for a security escort.

Please send me a list of participants in advance of the meeting and feel free to contact me should you need any additional information.

Emily

Emily Atkinson
Staff Assistant

Immediate Office of the Acting Assistant Administrator
Office of Air and Radiation, USEPA
Room 5406B, 1200 Pennsylvania Avenue NW
Washington, DC 20460
Voice: Personal Privacy
Email: atkinson.emily@epa.gov

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To: Atkinson, Emily <Atkinson.Emily@epa.gov>
Cc: David Foerter <dfoerter@otcair.org>
Subject: RE: Scheduling: Meeting with Ozone Transport Commission in January

Good afternoon Emily,

Yes that will be fine. Please confirm.

Kromeklia

Kromeklia Bryant

Office Manager

Ozone Transport Commission

444 North Capital St., NW Suite 322

Washington, DC 20001

202-508-3840

From: Atkinson, Emily [mailto:Atkinson.Emily@epa.gov]
Sent: Monday, December 21, 2015 11:21 AM
To: Kromeklia Bryant <kbryant@otcair.org>
Subject: FW: Scheduling: Meeting with Ozone Transport Commission in January

Hi Kromeklia,

It looks like we could fit this in as a one hour meeting on Thursday, January 28 at

1:00pm. Let me know if this could work on your end.

Emily

Emily Atkinson
Staff Assistant

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Office of Air and Radiation, USEPA
Room 5406B, 1200 Pennsylvania Avenue NW
Washington, DC 20460
Voice: 202-564-1850
Email: atkinson.emily@epa.gov

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Cc: David Foerter <dfoerter@otcair.org>
Subject: Scheduling: Meeting with Ozone Transport Commission in January

Good morning Emily,

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Best regards,

Kromeklia Bryant

Ozone Transport Commission

444 North Capitol St., NW Suite 322

Washington, DC 20001

202-508-3840

To: Harvey, Reid[Harvey.Reid@epa.gov]
Cc: Atkinson, Emily[Atkinson.Emily@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Dunham, Sarah[Dunham.Sarah@epa.gov]; Koerber, Mike[Koerber.Mike@epa.gov]; Stewart, Lori[Stewart.Lori@epa.gov]
From: Simon, Karl
Sent: Sat 12/19/2015 1:23:57 PM
Subject: Re: Scheduling: Meeting with Ozone Transport Commission in January

Agree with Reid

Driving Innovation in Clean Transportation

On Dec 18, 2015, at 5:27 PM, Harvey, Reid <Harvey.Reid@epa.gov> wrote:

Yes, this makes sense to me for Janet to take the meeting. At the last OTC meeting, which Karl and I covered for Janet, there was some discussion around whether a small group wanted to come meet with us next year on these topics.

Reid

On Dec 18, 2015, at 10:29 AM, Atkinson, Emily <Atkinson.Emily@epa.gov> wrote:

Janet has reviewed this request and would like to confirm with you all that this is a meeting she should take before I get back to the requestor.

Please let me know your thoughts.

Thanks.

Emily

Emily Atkinson
Staff Assistant

Immediate Office of the Acting Assistant Administrator
Office of Air and Radiation, USEPA
Room 5406B, 1200 Pennsylvania Avenue NW
Washington, DC 20460
Voice: 202-564-1850

Email: atkinson.emily@epa.gov

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Best regards,

Kromeklia Bryant

Ozone Transport Commission

444 North Capitol St., NW Suite 322

Washington, DC 20001

202-508-3840

From: Atkinson, Emily
Location: 1886 Crescent Hotel & Spa, 75 Prospect Avenue, Eureka Springs, AR 72632
Importance: Normal
Subject: Arkansas Bar Association- Environmental Law Section Keynote Address (Confirmed)
Categories: Green Category
Start Date/Time: Thur 4/21/2016 3:45:00 PM
End Date/Time: Thur 4/21/2016 4:45:00 PM
RE: Follow-up from Teresa Marks' email
Janet McCabe Event Form.AR Env. Law Conf..docx
2016 Environmental Law Conference 10282015.docx

10:45 - 11:45am Central Time

Event Information Form

This form has been designed to assist in planning participation in events and activities.
This is not a confirmation of DAA Janet McCabe's attendance.

Basic Background

Name of Event	20th Annual Environmental Law Conference
Sponsoring Organization	Arkansas Bar Association- Environmental Law Section
Date of Event	April 21, 2016
Time of Event	8:30 a.m.-5:15 p.m. April 21, 2016
Expected time of remarks or participation by DAA McCabe	1 hour [10:45 a.m.-11:45 a.m. April 21, 2016]
Location (please include city/town and street address)	1886 Crescent Hotel & Spa 75 Prospect Avenue, Eureka Springs, AR 72632 Ph. (800) 342-9766 www.crescent-hotel.com
Directions to the event (if appropriate, please also include relevant information about parking, the specific building, and best entrance to use)	Event will be in reserved conference room in main part of hotel. Parking is ample and adequate.
Where to meet POC	Registration table will have an Arkansas Bar Association banner.

Event Description and Role of the DAA

Brief description or outline of the event	Annual Arkansas Environmental Law Conference
Brochure, invitation and/or other event material(s)	Brochure is not yet published. Tentative agenda is attached.
Agenda and order of speakers and biography/information of other speakers	See attached.
Name of person introducing DAA McCabe	Lorielle Gutting, Chair of the Environmental Law Section of the Arkansas Bar Association
Basic information about the role of the DAA official at the event. (For example, will they serve as a keynote speaker? Participate on a panel? Take part in a press conference? Tour a facility?)	Keynote speaker address
If the DAA official is a featured speaker, which topic(s) should they address and how long?	Scheduled for 1 hour. Prefer discussion of Clean Power Plan or discussion of priorities/directives from EPA Headquarters
What rules would the audience like to hear about?	Clean Power Plan, Regional Haze, Ozone
Will there be time for Q&A? If so, who will be moderating?	Only if you choose to reserve time for Q&A.
Do you have a sense of the types of questions that may be asked?	Some may question how the federal rules could impact Arkansas.
Recommendations on the use of	PowerPoint is requested. For Continuing Legal Education of those attending, written materials of

visuals/PowerPoint. Should the DAA official plan on using a PowerPoint Presentation?	some form are required; a PowerPoint presentation (even if not used but provided for dissemination) will meet this requirement.
What is the physical layout of the room (e.g. size, and format of the interaction; podium, seated in armchair dialogue, or at a table, etc.)	Podium with projector and laptop provided.

About the Audience

Please tell us about the make-up of the audience for the event:	Attorneys, primarily those who practice almost exclusively environmental law.
Expected number in attendance at the event	75-100
Will it be largely members of your organization?	Yes.
Will others be in attendance? If so, who will be at the event? (General public, Businesspeople, Educators, Families, Students – what grade level, Children – how old)	Some businesspeople and environmental consultants attend.
Others? (Please describe)	N/A
Is the event open to press?	Press is not invited, but is not prohibited from attending.

Contact Information

Your name:	Lorielle Gutting
Telephone Number:	(501) 682-0886 work; Personal Privacy cell
Mailing Address:	2617 Timbermist Drive Benton, AR 72015
E-Mail Address:	gutting@adeq.state.ar.us
Cell Phone Number:	Personal Privacy
Fax Number:	(501) 682-0891
Best way to reach you at the event?	Cell phone, Personal Privacy Arkansas Bar Association staff also will be looking for you and available.

EPA Contact Person

Emily Atkinson, Administrative Assistant to Janet McCabe: 202-564-7403
Andrea Drinkard, Public Affairs Specialist: 202-564-1601

Event Information Form

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This is not a confirmation of DAA Janet McCabe's attendance.

Basic Background

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Sponsoring Organization	Arkansas Bar Association- Environmental Law Section
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What rules would the audience like to hear about?	Clean Power Plan, Regional Haze, Ozone
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Recommendations on the use of	PowerPoint is requested. For Continuing Legal Education of those attending, written materials of

visuals/PowerPoint. Should the DAA official plan on using a PowerPoint Presentation?	some form are required; a PowerPoint presentation (even if not used but provided for dissemination) will meet this requirement.
What is the physical layout of the room (e.g. size, and format of the interaction; podium, seated in armchair dialogue, or at a table, etc.)	Podium with projector and laptop provided.

About the Audience

Please tell us about the make-up of the audience for the event:	Attorneys, primarily those who practice almost exclusively environmental law.
Expected number in attendance at the event	75-100
Will it be largely members of your organization?	Yes.
Will others be in attendance? If so, who will be at the event? (General public, Businesspeople, Educators, Families, Students – what grade level, Children – how old)	Some businesspeople and environmental consultants attend.
Others? (Please describe)	N/A
Is the event open to press?	Press is not invited, but is not prohibited from attending.

Contact Information

Your name:	Lorielle Gutting
Telephone Number:	(501) 682-0886 work; (501) 860-3601 cell
Mailing Address:	2617 Timbermist Drive Benton, AR 72015
E-Mail Address:	gutting@adeq.state.ar.us
Cell Phone Number:	(501) 860-3601
Fax Number:	(501) 682-0891
Best way to reach you at the event?	Cell phone, (501) 860-3601. Arkansas Bar Association staff also will be looking for you and available.

EPA Contact Person

Emily Atkinson, Administrative Assistant to Janet McCabe: 202-564-7403
Andrea Drinkard, Public Affairs Specialist: 202-564-1601

From: Atkinson, Emily
Location: San Diego Convention Center, Upper Level Room 1, Ballroom6, 111 W. Harbor Dr., San Diego, CA.
Importance: Normal
Subject: EUEC Speech (Confirmed)
Categories: Green Category
Start Date/Time: Wed 2/3/2016 5:00:00 PM
End Date/Time: Wed 2/3/2016 5:30:00 PM
RE: Welcome Keynote Speaker Ms. Janet McCabe, US EPA at EUEC 2016 Feb 3 in San Diego, CA.
Janet McCabe Event Form AAA for EUEC 2016 Feb 3 San Diego CA.DOCX
2016EUEC-Brochure.pdf
Attendee List EUEC 2016 jan 10.xlsx
Janet McCabe Bio_AAA.DOCX

9:00 - 9:30am Pacific Time

Electric Utilities Attending EUEC

Includes senior management & technical experts
from Generating Companies attending & speaking at EUEC

AES
ALLETE
Alliant Energy Corporation
Alstom Power
Ameren Corporation
American Electric Power
American Municipal Power, Inc.
Arizona Public Service Company
Associated Electric Cooperative, Inc.
Basin Electric Power Cooperation
Big Rivers Electric
Buckeye Power
Burbank Water & Power
Calpine Corporation
Carbon Creek Energy
Central Iowa Power Cooperative
Central Minnesota Municipal Power Agency
City Water Light and Power
Clarke Public Utilities
Cleco Corporation
Con Edison
Consumers Engergy
Deseret Power
Dominion Generation
DTE Energy
Duke Energy
Dynegy
East Kentucky Power Cooperative
Electricité de France
Empire District Electric Company
Entergy Services
Eversource Energy
Exelon Power
Florida Power & Light Company
GDF Suez
Guam Public Utilities Commission
Hoosier Energy
Idaho Power Company
Independence Power & Light
Intermountain Power Service Corporation
Kansas City Board of Public Utilities
Kansas City Power & Light
Korea Electric Power Corporation
KU Energy,LLC
LG&E
Lower Colorado River Authority
Luminant
Madison Gas & Electric
Michigan South Central Power Agency
MidAmerican Energy Company
Minnesota Power
Minnkota Power Cooperative, Inc.
Montana-Dakota Utilities Company
Muscatine Power and Water
Nebraska Pulbic Power District
Newmont Nevada Energy Investment
NextEra Energy
NiSource
Northern Indiana Public Service Co.(NIPSCO)
Northern Star Generation
NorthWestern Energy
Nova Scotia Power
NRECA
NRG Energy
NV Energy
ODEC
Oklahoma Gas & Electric Company
Old Dominion Electric Cooperative
Omaha Public Power District
Orange Grove Energy
Pacific Gas & Electric
PCPS Energy
Portland General Electric
PPL EnergyPlus LLC
PPL Montana LLC
PSE
Raven Power
Rochester Public Utilities
Rodan Energy Solutions Inc.
Rural Electric
Sacramento Municipal Utility District
Salt River Project
SAN DIEGO GAS AND ELECTRIC
Santee Cooper
SCANA
Schneider Electric
Sempra US Gas and Power
Southern California Edison
Southern Company
Southern Power Company
Sunflower Electric Power Corporation
Tennessee Valley Authority
Texas Municipal Power Agency
Tri-State Generation and Transmission
Tucson Electric Power
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USA's Largest
EUEC2016
Energy, Utility & Environment Conference
Feb 3 - 5 | San Diego, CA

19th Annual Conference & Expo
Wednesday Feb 3 to Friday Feb 5, 2016

San Diego Convention Center
111 W Harbor Dr., San Diego, CA 92101

2,000 ATTENDEES | 400 SPEAKERS | 200 EXHIBITS

Program Guide

TECHNICAL TRACKS

A. AIR POLICY & CPP REGS
B. CEMS, AQ & EPA REGS
C. MERCURY CONTROL
D. ENERGY POLICY & SECURITY
E. SO2, NOx, TSP CONTROL
F. RENEWABLE ENERGY
G. O&M and EHS
H. CLIMATE, CCS & CCR
I. WATER 316(b)
J. FLEET, EV & HYBRID
K. BATTERY & ENERGY STORAGE

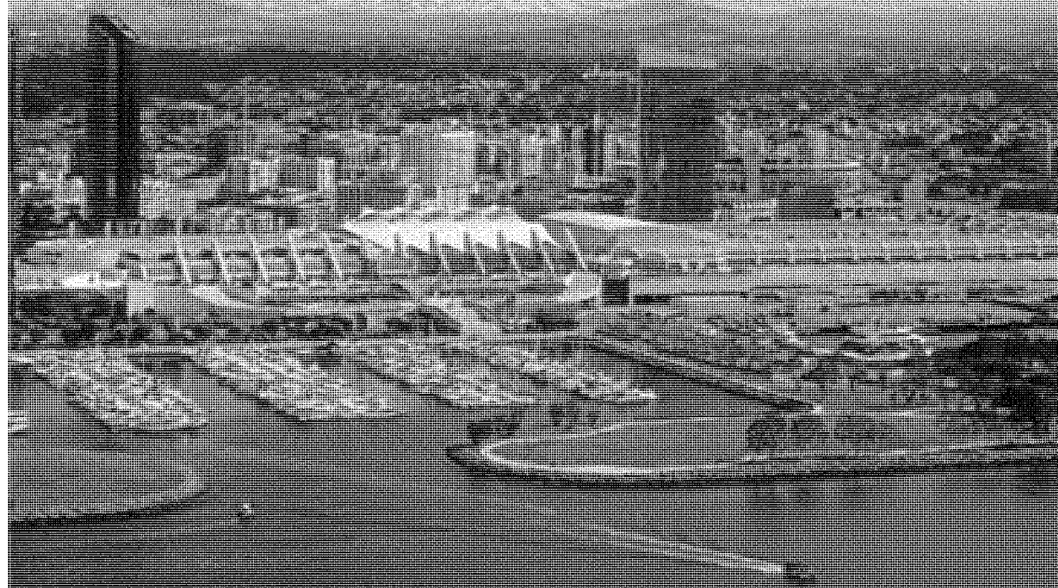

EXHIBIT SHOW HOURS

Tue. Setup	1 pm to 6 pm
Wed.Feb 3	7 am to 7 pm
Thur. Feb 4	7 am to 7 pm
Friday Feb 5	7 am to 12 pm
Breakdown	12 pm to 4 pm

NETWORK RECEPTIONS
located in Exhibit Hall

AM Breaks	9:30 am to 10 am
Lunches	12 pm to 1 pm
PM Breaks	3 pm to 3:30 pm
Receptions	5 pm to 7 pm

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EUEC Tracks

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What is EUEC?

EUEC2016: The19th Annual Energy, Utility & Environment Conference, is USA's largest professional networking & educational event of its kind, to be held February 3 to 5, 2016, at the San Diego Convention Center, San Diego, CA, with 2,000 delegates, 400 speakers and 200 exhibits.

HISTORY: The first EUEC conference was held in 1995 in Tempe, Arizona. 17 annual EUEC conferences were held in Arizona until 2014, and then moved to San Diego in 2015.

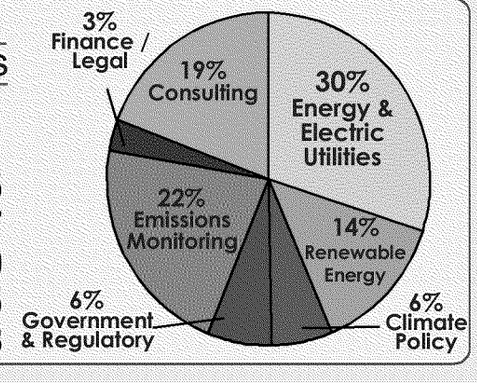
SCHEDULE

EUEC 2015 - February 16 to 18, 2015 in San Diego, CA.
EUEC 2016 - February 3 to 5, 2016 in San Diego, CA.
EUEC 2017 - February 8 to10, 2017 in San Diego, CA

See **www.euec.com** to speak or exhibit in the last few available spots.

Who Attended

Year	Delegates
EUEC2015	2,236
EUEC2014	1,605
EUEC2013	1,705
EUEC2012	2,037
EUEC2011	1,830
EUEC2010	1,945
EUEC2009	1,783



REGISTRATION COST	Now	Jan 8	Jan 15	On-Site
Attendee - Registration	$995	$1,095	$1,195	$1,395
Exhibitor/Speaker/Gov't/VIP	$895	$995	$1095	$1,295
VIP	$895	$995	$1095	$1,295

REGISTRATION COST INCLUDES:

- Admission to any of the 400+ presentations in 10 track rooms
- 13 food and beverage tickets ($300 value)
- 8 networking breaks & meals served in exhibit halls
- Flash Drive containing 400 presentations with audio ($495 value)
- Free spouse registration and welcome reception (495 value)

Media Partners

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Fuel Cell & Hydrogen Energy Association
The Hydrogen & Fuel Cell Letter
Life Sciences an Informa business
INSTITUTE OF CLEAN AIR COMPANIES
IETA CLIMATE CHALLENGES. MARKET SOLUTIONS

EUEC 2016 SCHEDULE

Tuesday | Feb. 2nd		
7:00 am - 7:00 pm	Registration	
12:00 pm - 6:00 pm	Exhibit Set-up	
5:00 pm - 7:00 pm	Welcome Reception	

Wednesday | Feb. 3rd		
7:00 am - 7:00 pm	Registration	
12 pm - 7:00 pm	Exhibits Open	
9:00 am - 12:00 pm	Plenary Session	
12:00 pm - 1:00 pm	**Networking Lunch 1**	
1:00 pm - 3:00 pm	Tech Session 1	
3:00 pm - 3:30 pm	**Networking Break 2**	
3:30 pm - 5:30 pm	Tech Session 2	
5:00 pm - 7:00 pm	**Networking Reception 3**	

Thursday | Feb. 4th		
7:00 am - 7:00 pm	Exhibits Open	
7:30 am - 9:30 am	Tech Session 3	
9:30 am - 10:00 am	**Networking Break 4**	
10:00 am - 12:00 pm	Tech Session 4	
12:00pm - 1:00 pm	**Networking Lunch 5**	
1:00 pm - 3:00 pm	Tech Session 5	
3:00 pm - 3:30 pm	**Networking Break 6**	
3:30 pm - 5:30 pm	Tech Session 6	
5:00 pm - 7:00 pm	**Networking Reception 7**	

Friday | Feb. 5th		
7:00 am - 12:00 pm	Exhibits Open	
7:30 am - 9:30 am	Tech Session 7	
9:30 am - 10:00 am	**Networking Break 8**	
10:00 am - 12:00 pm	Tech Session 8	
12:00 pm - 4:00 pm	Exhibit Tear Down	

ALL 8 NETWORKING EVENTS ARE HELD IN EXHIBIT HALL

Mission Statement

EUEC facilitates information exchange and fosters cooperation between industry, government, regulators, academia and stake-holders for the protection of our environment and energy security.

Keynote

Wednesday, February 3rd, 9:00 AM - 12:00 PM
San Diego Convention Center | 111 W. Harbor Dr. | San Diego, CA.

UPDATE FROM U.S. EPA
JANET MCCABE — 9:00 AM - 9:30 AM
Assistant Administrator | U.S. Environmental Protection Agency
EPA United States Environmental Protection Agency

FOSSIL ENERGY & AMERICA'S ENERGY SECURITY
David Mohler — 9:30 - 10:00AM
Deputy Assistant Secretary for Clean Coal and Carbon Mgmt
U.S. Department of Energy
U.S. DEPARTMENT OF ENERGY

ELECTRIC UTILITY SOLUTIONS FOR REGULATORY CHALLENGES
PAT VINCENT-COLLAWN - 10:00 AM - 10:30 AM
Chairman, President and CEO | PNM Resources
PNM Resources

DECARBONIZING ENERGY: WHY IT TAKES EVERYTHING
ARMOND COHEN- 10:30 AM - 11:00 AM
Executive Director | Clean Air Task Force
CLEAN AIR TASK FORCE

HIGHLIGHTS OF EUEC2016
DR. PRABHU DAYAL — 11:00 AM - 11:30 AM
Chairman | EUEC
EUEC

SPEAKER FORMAT

- All speakers limited to 20 minutes using PowerPoint
- Submit abstract online and select track and session of choice
- Each session is 2 hours long with 6 speakers and 2 co-chairs

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EUEC Program At - A - Glance

Track	A	B	C	D	E	F	G	H	I	J
Room #	Room 1	Room 2	Room 3	Room 4	Room 5A	Room 5B	Room 8	Room 9	Room 10	Room 11A
Sessions	AIR POLICY & REGS	CEMS & AIR QUALITY	MERCURY CONTROL	ENERGY POLICY & SECURITY	CONTROL TECH-NOLOGIES	RENEWABLE ENERGY	OPERATIONS & MGMT	CLIMATE, ELG & CCS	WATER 316(b)	FLEET, BATTERY & STORAGE
Wednesday| February 3										
1 1:00PM to 3:00PM	Regulatory Update	CEMS & Air Quality	Hg Control Demon-strations	Energy Policy & Security	Control Tech.	Renewable Energy Markets	Decommiss-ioning of Power Plants	Climate Change & GHG	Wastewater Mgmt.	Fleet
2 3:30PM to 5:30PM	CCP-Clean Power Plan	CEMS & MATS	Activated Carbon - Hg	Sustainability Projects & Data	ESP & PM	Waste to Energy	Compliance Strategies & Plant Conversions	Post COP21 & Inventories	Water & Electric Utilities	EV, PHEV & Charging
Thursday| February 4										
3 7:30AM to 9:30AM	NAAQS	EPA Regulatory Update	Hg Control Technologies	Transmission & Distribution	SO2, SO3 & Additives - DSI	Renewable Development Analysis	Power Plant & Boiler Optimization	ELG - Utility Perspective	316b	Battery & Storage Systems
4 10:00AM to 12:00PM	NSR	PM, CEMS	DSI & Activated Carbon	Smart Grid & Micro Grid	SO2, SO3 & Additives -WFDG	Renewable Project Development	EHS & EMIS	CCR & ELG Compliance Mgmt	FGD Wastewater -ZLD	Battery & Storage
5 1:00PM to 3:00PM	Next Gen. Compliance Strategies	Modeling - 1hour So2	Hg MATS Compliance	Energy & Environment	NOx CONTROL	Solar & Wind	EHS & Risk Mgmt.	CCR & ELG	FGD Wastewater	Back-up Power & Energy Storage
6 3:30PM to 5:30PM	111(D)- CPP Compliance	Modeling	Hg Control Tech	Energy Efficiency	SCR	Solar & PV	Operations & Optimization	Coal Ash & FGD	316(b), ELG, Wastewater	Flow & Li-Ion Batteries
Friday| February 5										
7 7:30AM to 9:30AM	Permits & Compliance	Monitoring , Testing & HCL	Young Power Professionals	Natural Gas	Remediation	Community Solar	Operations & Mgmt.	CCS: Carbon Capture & Storage	Water Sustainability	
8 10:00AM to 12:00PM	Permitting, Air Policy & Regulaitons	Air Quality - Fenceline Monitoring		Distributed Generation	Compliance Tech & Strategies	Renewable Energy & Geothermal	Operations & Mgmt.	CCS II	Water Supply & Security	

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Wednesday | February 3 | 1PM - 3 PM

A1. REGULATORY UPDATE

A1.1 ELECTRIC GENERATOR REGULATORY UPDATE
Co-chair - John Kinsman, Sr. Director - Environment, Edison Electric Institute

A1.2 VIEW FORM THE CLEAN POWER PLAN TRENCH
Co-chair -Jay Holloway, Partner, Sutherland, Asbill & Brennan, LLP

A1.3 NEW DEVELOPMENTS IN STATE ENERGY POLICY
John Finnigan, Lead Counsel, Environmental Defense Fund

A1.4 A MINNESOTA UTILITY OUTLOOK ON CLEAN POWER PLAN REQUIREMENTS
Michael Cashin, Environmental Policy Advisor, Minnesota Power (ALLETE)

A1.5 HOW EPA MADE A MOCKERY OF THE GUIDELINE ON AIR QUALITY MODELS
Gale Hoffnagle, Senior Vice President, TRC Environmental Corporation

A1.6 ENVIRONMENTAL DISPATCH: THE NEW PARADIGM?
Block Andrews, Burns & McDonnell; Mike Borgstadt

Wednesday | February 3 | 3:30PM - 5:30PM

A2. CPP - CLEAN POWER PLAN

A2.1 WORKING TOWARD THE BEST STATE PLAN UNDER EPA'S NEW CLEAN POWER PLAN
Eric Hiser, Partner, Jorden Bischoff & Hiser, PLC

A2.2 THE CLEAN POWER PLAN: TOWARD IMPLEMENTATION AND COMPLIANCE
Co-chair - Marc Chupka, Principal, The Brattle Group

A2.3 THE "NEW" CLEAN POWER PLAN
William Campbell, Principal Engineer, Environmental Consulting and Technology

A2.4 CPP LITIGATION: EPA REGULATION OF GHGS UNDER THE CLEAN AIR ACT
Allison Wood, Partner, Hunton & Williams LLP

A2.5 IMPACTS OF CPP POLICY SCENARIOS ON FOSSIL FUEL WHOLESALE POWER MARKETS
Phillip Graeter, Associate, Energy Ventures Analysis

A2.6 EXPECTED EFFECTS OF THE CLEAN POWER PLAN
Walter Wooten, Director of Sales, Energy & Utilities, 360factors, Inc.; Randall Rosengarten

Thursday | February 4 | 7:30AM - 9:30AM

A3. NAAQS

A3.1 PROBABILISTIC & SOURCE CHARACTERIZATION TECHNIQUES IN AERMOD COMPLIANCE
Session Sponsor & Co-chair - Sergio Guerra, Cpp, Inc.; Ron Petersen

A3.2 2016: A YEAR OF INTENSIVE ACTIVITY FOR SO2 NAAQS IMPLEMENTATION
Co-chair - Robert Paine, VP, AECOM; David Heinold, Mary Kaplan & Bob Iwanchuk

A3.3 SO2 NAAQS DESIGNATIONS & IMPLEMENTATION OF THE DATA REQUIREMENTS RULE
Joe Hammond, Principal Consultant, Trinity Consultants

A3.4 REDEFINING AQ REGULATION TO ADDRESS HEALTH RISKS FROM CLIMATE CHANGE
Sonja Sax, Senior Environmental Health Scientist, Gradient

A3.5 THE NEW OZONE NAAQS: ISSUES AND IMPLICATIONS
Richard Hamel, Senior Project Manager, Environmental Resources Management (ERM)

A3.6 UNPACKING THE REVISED OZONE NAAQS
Brian O'Neal, Air Permitting Manager, Black & Veatch

TRACK | A | AIR POLICY & REGULATION

Thursday | February 4 | 10AM - 12PM

A4. NSR

A4.1 NSR 2016 - THE CHALLENGE CONTINUES
Ken Weiss, Managing Partner-Global Power Service, ERM

A4.2 RECENT DEVELOPMENTS IN NSR SETTLEMENTS & CONSENT DECREE IMPLEMENTATION
Jay Holloway, Partner, Sutherland, Asbill & Brennan, LLP

A4.3 THE UTILITY NEW SOURCE REVIEW ENFORCEMENT INITIATIVE
Makram Jaber, Partner, Hunton & Williams LLP

A4.4 EPA MODELING GUIDANCE CHANGES: IMPORTANT UPDATES FOR NSR PERMITTING
Robert Iwanchuk, Program Manager, AECOM; Mary Kaplan & Robert Paine

A4.5 NSR REFORM IMPLEMENTATION CHALLANGES
Gurinder Saini, Sr. Environmental Engineer, RTP Environmental Assoc. Inc.; Thomas Emmel

A4.6 OZONE IMPACT ANALYSIS IN PSD PERMITTING
Larry Moon, Principal, Zephyr Environmental Corporation

Thursday | February 4 | 1PM - 3PM

A5. NEXT GEN. COMPLIANCE STRATEGIES

A5.1 COMPLIANCE WITH THE CLEAN POWER PLAN
Sponsor & Co-chairs - Mack McGuffey, Partner, Troutman Sanders; **Randy Brogdon**

A5.2 MATS - WHAT'S NEXT AFTER MICHIGAN V. EPA?
Stephanie Sebor, Associate Attorney, Winston & Strawn LLP

A5.3 ECONOMIC IMPACT ON U.S. REFINING INDUSTRY OF CAA & GHG CONTROLS
Bill Smalling, Attorney, The Law Office of C. William Smalling, PC

A5.4 WHAT EPA'S "NEXT GEN" COMPLIANCE INITIATIVE MEANS FOR THE POWER SECTOR
Alexandra Bromer, Counsel, Perkins Coie LLP

A5.5 NEXT GENERATION COMPLIANCE AND THE CITIZEN SCIENTIST
David Elam, Principal, TRC Environmental

A5.6 THE ROLE OF UTILITIES IN STATE PLAN DEVELOPMENT
Maureen Gannon, Executive Director of Environmental Services, PNM Resources

Thursday | February 4 | 3:30PM - 5:50PM

A6. 111(D): CPP COMPLIANCE

A6.1 EPA'S CLEAN POWER PLAN AND EMISSION QUANTIFICATION APPROACHES
Co-chair - David Sumi, Executive Director, Cadmus; Kate Wilson& Kimberlee Rankin

A6.2 CARBON CAPTURE & UTILIZATION - STRATEGIES FOR CPP COMPLIANCE
Erin Heitkamp, Global Sustainability Practice Leader, Wenck Asst.; Patrick Ahlm, Algenol

A6.3 HEAT RATE IMPROVEMENT DEMONSTRATION AND CO-BENEFITS
Sterling Gray, Business Dev. Mgr., AECOM; Kevin O'Boyle & Gus Shearer, ARVOS Inc.

A6.4 CONTROLLING SLAG & FOULING AS A COMPLIANCE STRATEGY FOR EPA'S CPP
Ian Saratovsky, Fuel Tech, Inc.; Kent W Schulz, Chris R Smyrniotis & Emil P Rivera

A6.5 RATE VS. MASS: INSIGHTS FROM EPRI'S STATE-LEVEL ANALYSES OF THE CPP
Victor Niemeyer, Senior Technical Exectutive, EPRI; David Young, PRI; John Bistline, EPRI

A6.6 THE CLEAN POWER PLAN – STATE AND REGIONAL PERSPECTIVES
Scott Osbourn, Partner, ERM, Inc.; Mike Kennedy, Duke Energy Florida

A6.7 COAL BENEFICIATION TO MEET CLEAN POWER PLAN EFFICIENCY TARGETS
Co-chair - Keith Moore, President, CastelLight Energy Corp

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TRACK | A | AIR POLICY & REGULATION

Friday | February 5 | 7:30AM - 9:30AM

A7. PERMITS & COMPLIANCE

A7.1 THE CCR RULE AND CORRECTIVE ACTION: PLAN NOW TO SAVE LATER
Co-chair - Katie Bland, Senior Enviro. Engineer, Burns & McDonnell; John Hesemann

A7.2 PERMITTING CHALLENGES FOR A COMBINED CYCLE COMBUSTION TURBINE
Dwain Kincaid, Senior Env. Consultant, Air Quality Services, LLC

A7.3 COMPLIANCE WITH PERMITS DOES NOT PREVENT CIVIL SUITS UNDER STATE LAW
Co-chair - Michael McMenus, Senior Process Specialist, Kiewit Engineering & Design Co.

A7.4 NEW OEHHA TOXICS GUIDELINES, EFFECTS ON AB2588, AND PERMITTING
Gregory Wolffe, Principal , Yorke Engineering, LLC; Judith Yorke

A7.5 BOILER MACT IMPLEMENTATION – RECORDKEEPING AND DATA MANAGEMENT
Karin Greenacre, Senior Project Manager, TRC

A7.6 CITIZEN SCIENCE CAMPAIGN: SPOT THE SMOKE
Shawn Dolan, President, Virtual Technology, LLC; Randi Ryan, Sustainable Skys

Friday | February 5 | 10AM - 12PM

A8. PERMITTING, AIR POLICY & REGULATIONS

A8.1 YOUR PROPOSED SIMPLE- OR COMBINED-CYCLE FACILITY AIR PERMIT
Mary Hauner-Davis, Manager, Air/Noise Department, Burns & McDonnell; Minda Nelson

A8.2 PERMITTING - MORE THAN PSD AND NPDES PERMITS...
Joseph Takats, Environmental Consultant, WorleyParsons Group Ltd; Jack Senthilvel

A8.3 REVIEW OF GHG BACT DETERMINATIONS FOR GAS TURBINES
Co-chair - George Lipka, Consulting Engineer, Tetra Tech, Inc.

A8.4 GREENHOUSE GAS CHALLENGES FOR NEW GAS TURBINE-BASED PLANTS
Terrance Unrein, Associate Manager, Luminate, LLC

A8.5 COMPARISON US/EU REGULATIONS ON AIR POLLUTANTS FROM LARGE FOSSIL FUEL POWER PLANTS
Eric Joos, Expert, Electricité de France (EDF)

A8.6 HEALTH IMPACT ASSESSMENT - TOOL FOR MANAGING PROJECT'S NON-TECHNICAL RISK
Scott Weaver, Partner, ERM; Sharon Quiring CIH & Kristina Mitchell

TRACK | B | CEMS & AIR QUALITY

Wednesday | February 3 | 1PM - 3PM

B1. CEMS & AIR QUALITY

B1.1 FIELD EVALUATION OF AN FTIR CEMS AGAINST PS-15, PS-18 AND PROCEDURE 6
Steve Gibbons, Business Development Manager, ABB Inc.; Jim Peeler

B1.2 COMPARISON OF NO2 MONITORING AND MODELING CONCENTRATIONS FOR CTS
Salahuddin Mohammad, Senior Engineer, Golder Associates Inc.; Kennard F. Kosky

B1.3 EMISSIONS MONITORING BEST MGMT PRACTICES: IS YOUR SYSTEM A CADILLAC OR A VW?
Co-chair - Matthew DeSorbo, Senior Project Manager, Tetra Tech, Inc.; Lynn Gresock

B1.4 MULTI MODULE BAGHOUSE LEAK DETECTOR IMPLEMENTATION
Co-chair - John Brown, PCME Sales Manager, Altech PCME

B1.5 EPA PROTOCOL GAS ACCURACY & TRACEABILITY
Albert Guitjens, U.S. Market Segment Manager - Automotive & Power Generation
Air Liquide America Specialty Gases, LLC

Submit Abstract

Wednesday | February 3 | 3:30PM - 5:30PM

B2. CEMS & MATS

B2.1 MATERIALS SELECTION ON CONTINUOUS EMISSIONS MONITORING OF REACTIVE GASES
Roberto Bosco, Principal Applications Engineer, MKS Instruments, Inc.; Peter Zemek

B2.2 A CHEMILUMINESCENCE NOX ANALYZER WITH A DIFFERENCE
Co-chair - Steve Gibbons, Business Development Manager, ABB Inc.

B2.3 RELIABLE HG EMISSIONS MEASUREMENTS: CEMS, PROCESS ANALYZERS, & PEMS
Co-chair - Sharon Sjostrom, CPO, ADA-ES; C. Senior, E. Zipp, C. Wilson & D. Montano

B2.4 SUCCESSFUL MATS CEMS UPGRADE CASE STUDY AT A CITY OF FREMONT UNIT #8
Brian Petermann, Sega, Inc.; Thomas, Teledyne ML; Nielsen, Fagen; Boothe, City of Fremont

Submit Abstract

Submit Abstract

Thursday | February 4 | 7:30AM - 9:30AM

B3. EPA REGULATORY UPDATE

B3.1 TBA
Art Diem, US EPA

B3.2 EGRID2012 - NEW DATA, RENEWED FOCUS
Travis Johnson, Environmental Protection Specialist, U.S. EPA; Jeremy Schreifels, US EPA

B3.3 MATS ECMPS REPORTING UPDATE
Charles R. Frushour II, Clean Air Markets Division, U.S. EPA

Nick Hutson

Christian Fellner

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Thursday | February 4 | 10AM - 12PM

B4. PM, CEMS

B4.1 DIGITAL OPACITY SUCCESS STORIES
Shawn Dolan, President, Virtual Technology, LLC; Scot Hicks, Virtual Technology, LLC

B4.2 PM10/2.5 EMISSIONS FROM GAS-FIRED BOILERS & HEATERS
Co-chair - Glenn England, Ramboll Environ; M. Asti & E. Benson, Woods Cross; S. Croghan, Montrose

B4.3 QUARTERLY PM TESTING: UPGRADING TO PM CEMS
John Brown, PCME Sales Manager, Altech PCME

B4.4 PM CEMS VS PM CPMS
Co-chair - Robert Baxter, President, B3 Systems, Inc.

B4.5 COMPLIANCE STRATEGY FOR USING PM MONITORS AS A CPMS
Rick Krenzke, Project Director, TRC

Submit Abstract

Thursday | February 4 | 1PM - 3PM

B5. MODELING & 1-HOUR SO2

B5.1 STRATEGIES TO DEAL W/ MONITORED EXCEEDANCES WHEN AERMOD CAN'T BE USED
Co-chair - Ron Petersen, Vice President, CPP, Inc

B5.2 1-HOUR SO2 AREA DESIGNATION IN THE VICINITY OF A COAL-FIRED POWER PLANT
Salahuddin Mohammad, Senior Engineer, Golder Associates Inc.; Kennard F. Kosky

B5.3 SO2 1-HOUR DESIGNATION MODELING – WHY DO YOUR OWN?
George Schewe, Principal Consultant & Meteorologist, Trinity Consultants

B5.4 1-HOUR SO2 COMPLIANCE CHALLENGES
Jeffrey Hanson, Senior Manager - Environmental Services, Alliant Energy Corp

B5.5 MODELING EMISSION RATES OF SO2 FOR AREA DESIGNATIONS FOR 1-HR SO2
Moha Parikh, Project Manager, CH2M; Don Caniparoli

Submit Abstract

Thursday | February 4 | 3:30PM - 5:30PM

B6. MODELING

B6.1 REVISIONS TO THE TIER-2 AND TIER-3 NO2 MODELING REFINEMENTS
Richard Hamel, Partner, Environmental Resources Management; Mark Garrison

B6.2 SOURCE CHARACTERIZATION REFINEMENTS FOR DISPERSION MODELING APPS
Co-chair - Robert Paine, Associated Vice President, AECOM; Mary Kaplan

B6.3 SINGLE-SOURCE PHOTOCHEM. MODELING FOR PSD PERMITTING FOR OZONE & PM
Co-chair - Krish Vijayaraghavan, Ramboll Environ; Ralph Morris

B6.4 EXPERIENCE WITH THE SCICHEM MODEL
Jason Reed, Meteorologist, SLR; Bruce Macdonald & Matt Porter

Submit Abstract

Submit Abstract

Friday | February 5 | 7:30AM - 9:30AM

B7. MONITORING, TESTING & HCL

B7.1 PREDICTIVE EMISSIONS MONITORING (PEMS) THE NEXT GENERATION
Co-chair - David Triebel, President, Durag Group; Richard Hovan

B7.2 CASE STUDIES OF MERCURY SORBENT TRAP SAMPLING AT COAL-FIRED BOILERS
Daniel Todd, President, Air Quality Services, LLC

B7.3 EMISSION TESTING ISSUES AND INNOVATIONS
Co-chair - Kevin Crosby, VP-Technical, Montrose Air Quality Services, LLC

B7.4 A COST/BENEFIT ANALYSIS OF HCL CEMS
Ed Burgher, Air Quality Measurement Consultant, Tiger Optics; Lisa Bergson & Yu Chen

B7.5 MEASURING HCL USING HOT/WET EXTRACTIVE FTIR CEMS
Jim Cornish, Sales & Support Manager, Gasmet Technologies

B7.6 PEOPLE-SPECIFIC HEALTH ASSESSMENT & CHARACTERIZATION BY INDOOR AQ
Jong-Ryeul Sohn, Professor, Korea University; Hyeon-Ju Oh, Woobae Chi, Nana Jeong

Friday | February 5 | 10AM - 12PM

B8. AIR QUALITY - FENCELINE MONITORING

B8.1 CONSIDERATIONS FOR SUCCESFULLY DEPLOYING REAL-TIME PHOTOMETRIC SYSTEMS FOR FENCELINE MONITORING -
Co-chair - Robert Anderson, TSI Inc.; Scott Norman, Robert Anderson & Tim Johnson

B8.2 DEMONSTRATION OF WORLD'S MOST COMPREHENSIVE FENCELINE MONITORING NETWORK USING OPEN-PATH FTIR -
Matthew McCormick, IMACC, LLC; Ralph Brewer,Robert Spellicy & Troy Boley

B8.3 DESIGNING AND IMPLEMENTING PERIMETER AIR MONITORING PROGRAMS
Melissa McLaughlin, Project Manager, AECOM; Leo Gendron, AECOM

B8.4 AIR QUALITY CONSIDERATIONS FOR POWER PLANT SITING AND DEVELOPMENT
Karin Fickerson, Program Director, ERM

B8.5 OPTICAL TECHNOLOGY FOR TRACKING TURBULENCE, VISIBILITY & HAZARDOUS WIND
James Shinkle, Optical Scientific; Dr. Ting-i Wang, Sung Kim & Donn Williams

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Wednesday | February 3 | 1PM - 3PM

C1. HG CONTROL DEMONSTRATIONS

C1.1 WET SCRUBBER ADDITIVE EVALUATION FOR THE GIBBONS CREEK POWER STATION
Philip Flowers, Project Manager, Texas Municipal Power Agency (TMPA)

C1.2 NEW FULL-SCALE RESULTS ON GORE™ MERCURY CONTROL SYSTEM
Jeff Kolde, Product Specialist, W.L. Gore & Asso.; D. Casarino, M. DeGarbolewski & J. Knotts

C1.3 ADVANCED MERCURY CONTROL TECH. COMMISSIONING & DEMONSTRATION
Nicholas Lentz, Field Technical Mgr., ME2C; John Pavlish, Marcus Sylvester & James Trettel

C1.4 WHEN MERCURY RE-EMISSION ISN'T
Steven Feeney, Product Line Manager, Babcock & Wilcox; Joe Stuart, Sulfide Systems

Sulfide Systems, LLC

C1.5 HG RE-EMISSION CONTROL–NEW, SIMPLE, LOW-COST APPROACH DEMONSTRATED
Joe Stuart, President, Sulfide Systems, LLC

Submit Abstract

Wednesday | February 3 | 3:30PM - 5:30PM

C2. ACTIVATED CARBON - HG

C2.1 IMPACTS OF DSI ON ACI FOR MERCURY CONTROL
Richard Mimna, Sr. R&D Associate, Calgon Carbon Corporation

C2.2 ACTIVATED CARBON OVERVIEW WITH SAFE HANDLING PRACTICES
Sponsor & Co-chair - Robert Huston, Sr. Director - Technical Svcs., ADA Carbon Solutions

C2.3 MERCURY REMOVAL PERFORMANCE WITH NON-TRADITIONAL SORBENTS
Conner Cox, Strategic Project Manager, United Conveyor Corporation; Jon Norman

C2.4 MERCURY ADSORPTION OF ACTIVATED CARBON WITH SIMULATED GAS CONDITION
Sang-Sup Lee, Associate Professor, Chungbuk National University

C2.5 POWDERED ACTIVATED CARBON INJECTION IN THE WFGD FOR MERCURY CAPTURE
Erica Gonzaga, Engineer, Carbonxt; David Mazyck, Christine Valcarce & Regina Rodriguez

Submit Abstract

Thursday | February 4 | 7:30AM - 9:30AM

C3. HG CONTROL TECHNOLOGIES

C3.1 DRY SCRUBBER ADDITIVE FACILITATES MERCURY EMISSION COMPLIANCE
Tommy Chen, Lead Chemist, Nalco,; Keiser, Yuan, Denny, Showalter & Carlson

C3.2 ULTRA ADVANCED AMENDED-SILICATES FOR HG CONTROL IN COLD-SIDE ESPS
Thomas Gale, Director of Tech. Development, Novinda; James R. Butz & Cliff H. Brown

C3.3 FINDING A SOLUTION TO PAC INDUCED SDA SCALING
Co-chair - Jon Miller, Technology Manager - Mercury Control, Albemarle Corp.

C3.4 FABRIC FILTERS FOR EFFICIENT AND SUSTAINED MERCURY REDUCTION
Tim Trimble, Managing Director, TTG Inc.; Eduardo Torres, Dan Mcbride & Xinfei Yu

Submit Abstract

Submit Abstract

TRACK | C | MERCURY CONTROL

Thursday | February 4 | 10AM - 12PM

C4. DSI & ACTIVATED CARBON

C4.1 BALANCE OF PLANT EFFECTS FROM LARGE DSI SYSTEMS
Jon Norman, Sales and Technology Manager, United Conveyor Corporation

C4.2 OPERATIONAL COST SAVINGS WITH NEW DSI/ACI TECHNOLOGIES
Michael Thiel, Regional Sales Manager , Nol-Tec Systems; Mitch Lund

C4.3 REDUCING REAGENT & SORBENT COSTS FOR HG & PARTICULATE MATTER CONTROL
Co-chair - Constance Senior, PhD, VP, ADA-ES; D. Young, S. Sjostrom & D. Bertelson

C4.4 TECH. TO MITIGATE THE IMPACT OF ACTIVATED CARBON INJECTION ON AQ
Rafc MInkara, PhD, PE, Vice President, Headwaters Incorporated

C4.5 POWDERED ACTIVATED CARBON INJECTION RESULTING IN IMPROVED DISPERSION
Regina Rodriguez, Carbon Specialist, Carbonxt; D. Mazyck, C. Valcarce & E. Gonzaga

Submit Abstract

Thursday | February 4 | 1PM - 3PM

C5. HG MATS COMPLIANCE

C5.1 PLANT OPERATIONAL EXPERIENCE USING AMENDED SILICATES FOR HG CONTROL
Clifton Brown Jr., VP Applied Engineering, Novinda Corp.; James Butz

C5.2 PS-12A COMPLIANCE HGCEMS WITHOUT CALIBRATION GENERATORS
Co-chair - Richard Hovan, Director - Environmental Division, Durag Group

C5.3 REDUCING THE COST OF MERCURY CONTROL, AND IMPROVING PLANT OPERATIONS
Session Sponsor & Co-chair - Constance Senior, PhD, VP, ADA-ES; S. Sjostrom & Wilson

C5.4 IMPACT OF MATS ON ESPS AND HOW TO DEAL WITH IT
John A. Knapik, Precipitator Technical Consultant, The Babcock & Wilcox Company

C5.5 MINIMIZING COSTS & LOST GENERATION FROM MATS WORK PRACTICE STANDARDS
Peter J. Spinney, Director, Markets & Technology, NeuCo, Inc.

Submit Abstract

Thursday | February 4 | 3:30PM - 5:30PM

C6. HG CONTROL TECHNOLOGIES

C6.1 MERCURY MONITORING AND TESTING FOR PERFORMANCE EVALUATION
Steve Baloga, VP Environmental Services, Novinda

C6.2 REDUCING OPERATING COSTS AND RISKS OF HG CONTROL WITH FUEL ADDITIVES
Co-chair - Scott Terhune, VP, ADA-ES; D. Young, S. Sjostrom, C. Senior & S. Meinhardt

C6.3 PROCESS-INTEGRATED TECH. FOR HG ABATEMENT IN THE CEMENT INDUSTRY
Holger Reinhold, Process Engineer, Scheuch GmbH; Andreas Gangl

C6.4 PAC AND SORBENT HANDLING FOR MERCURY CONTROL
Mitch Lund, Technical Engineer, Nol-Tec Systems Submit Abstract

Submit Abstract

Submit Abstract

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TRACK | C | MERCURY CONTROL

Friday | February 5 | 7:30AM - 9:30AM

C7. YOUNG POWER PROFESSIONAL

C7.1 ARE YOU A RAINMAKER? CAREER ADVICE FOR THE YOUNG POWER PROFESSIONAL
Priscilla Kissinger, Special Projects Manager, Carbonxt

C7.2 GROWING AS A LEADER
David Mazyck, PhD, CEO, Carbonxt

C7.3 VERSATILITY & ADAPTABILITY TO GROW YOUR CAREER
Rick Sparrow, President, Lathrop-Trotter Company

C7.4 THE IMPORTANCE OF INVOLVEMENT WITH INDUSTRY AGENCIES
Jerry Purvis, Director of Environmental Affairs, East Kentucky Power

C7.5 TRANSITIONING INTO VARIOUS ROLES WITHIN THE UTILITY INDUSTRY

C7.6 THE VALUE OF SEEKING OUT UNTRADITIONAL APPROACHES
Conner Cox, Strategic Project Manager, United Conveyor Corporation

Q&A
Panel Members

TRACK | D | ENERGY POLICY & SECURITY

Wednesday | February 3 | 1PM - 3PM

D1. ENERGY POLICY & SECURITY

D1.1 HOW TO MAKE DRIVING ON SUNSHINE A REALITY WHILST INCREASING ENERGY SECURITY
Desmond Wheatley, CEO, Envision Solar

D1.2 A TALE OF TWO WINTERS
Stephen Slocomb, Principal, Epsilon Associates

D1.3 SECURITY PROGRAMS AND PROTECTIVE MEASURES
Joachim Gloschat, Senior Intelligence & Security Analyst, Gannett Fleming

D1.4 GAS & ELEC. INTERDEPENDENCIES: NEAR-TERM INFRASTRUCTURE OUTLOOK PJM
Co-chair - Justin Adder, NETL/U.S. DOE; Tarka, NETL/U.S. DOE; Myles & Brewer, ESPA

D1.5 40CFR 1506.11 - NEPA EMERGENCY CLAUSE
Richard Knox, Regulatory Compliance Specialist, Amec Foster Wheeler

D1.6 INVESTING IN AMERICAN ENERGY: U.S. DOE'S LOAN PROGRAMS OFFICE
Sydney Schneir, Special Advisor, U.S. DOE Loan Programs Office; Kerri Neary

Wednesday | February 3 | 3:30PM - 5:30PM

D2. SUSTAINABILITY PROJECTS & DATA

D2.1 OPPORTUNITIES FOR COAL POWER GENERATION IN THE 21ST CENTURY
Co-chair - Thomas Tarka, Sr. Engineer, NETL; Robert James & Patrick Le, NETL / U.S. DOE

D2.2 JOURNEY OF SUSTAINABILITY
Co-chair - Ensan El-Ayoubi, Facilities Planning Consultant, SAUDI ARAMCO

D2.3 DISTRIBUTED BIO-HYDROGEN REFUELING STATIONS
Peter Schubert, Professor, Indiana University-Purdue University Indianapolis

D2.4 BIG DATA ANALYSIS: MINING & ANALYZING UTILITY DATA
Michael Steifman, CEO/Founder, UtiliSave

D2.5 NEXRAD PRODUCTS AND NOAA'S BIG DATA PARTNERSHIP
Amy Gaskins, Big Data Project Director, National Oceanic & Atmospheric Administration

D6.6 WHOLE BUILDING DATA ACCESS: A UTILITIES PERSPECTIVE
Erica Cochran, Assistant Professor, Carnegie Mellon; Parekh & Marion, CMU; Wagner, PSU

Thursday | February 4 | 7:30AM - 9:30AM

D3. TRANSMISSION & DISTRIBUTION

D3.1 DISTRIBUTED GEN. IN STANDABY: ADDRESS UTILITY BARRIERS TO CLEAN DG INSTALLATION
Graeme Miller, Energy Policy Analyst, Energy Resources Center; Stefano Galiasso

D3.2 LONG-EARED BAT &INTERIM 4(D) RULE: TRANSMISSION LINE SITING & PERMITTING
Russell Light, Environmental Specialist, Sargent & Lundy; Daniel Laubenthal

D3.3 UNDERSTANDING NOISE COMPLAINTS FROM RELATIVELY LOW-NOISE UTILITY PROJECTS
Eddie Duncan, Director, RSG

D3.4 GIS TRANSMISSION PLANNING TOOLS FOR THE WESTERN INTERCONNECT
Daniel Moreno, GIS Manager, ICF

D3.5 GRID RESILIENCE INDICATORS FOR A SUSTAINABLE FUTURE
Thierry Spiess, PhD and Research Assistant, Centre for Urban Energy

Submit Abstract

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Thursday | February 4 | 10AM - 12PM

D4. SMART GRID & MICRO GRID

D4.1 MIRCOGRID– DESCRIPTION OF INSTALLATIONS AND OPERATING EXPERIENCE
Co-chair - Uwe Schmiemann, Marketing & Strategy Mgr., Solar Turbines International

D4.2 MICROGRID DEVELOPMENT - REGULATORY AND LEGAL CONSIDERATIONS
Will DuBois, Partner, Venable LLP

D4.3 SUCCESSFUL MICROGRID IMPLEMENTATION
Lucas Oehlerking, Microgrid Solution Lead, Black & Veatch

D4.4 DISTRIBUTED INTELLIGENCE: CHANGING THE CALCULUS FOR SMART GRID INVESTMENT
Tim Wolf, Director of Marketing, Itron Inc.

D4.5 NANO-GRIDS; FUTURE POWER GRIDS - STATE OF THE ART
Co-chair - Adel El Shahat, Assistant Professor, Georgia Southern University; Allen E. Paulson

Submit Abstract

Thursday | February 4 | 1PM - 3PM

D5. ENERGY & ENVIRONMENT

D5.1 FUNDING SUSTAINABILITY FOR SUSTAINABLE OUTCOMES
Co-chair - Doug Smith, CEO - Founder, Village Green Global Inc.; Helen Hannah

D5.2 ENERGY SAVINGS FOR STATE & FEDERAL ENERGY EFFICIENCY PROGRAMS
Ricson Chude, Project Manager, Southern California Edison

D5.3 TBD
Co-chair - Bapanaiah Penugonda, Associate Professor, NYU College of Dentistry

D5.4 HOW TO ATTRACT WALL STREET INVESTORS TO FINANCE ALTERNATIVE ENERGY
Nedia Miller, Founder, MILLER, CTA

D5.5 BOOM OR BUST: RENEWABLE FUELS MARKETS IN 2016
Jordan Godwin, Biofuels Analyst, Platts

D5.6 MERG EU ENERGY & ENV. POLICY TO ACHIEVE ENERGY INDEPENDENCE FROM RUSSIA
Nadya Zhukova, Student, Burns School of Real Estate & Construction Management
Stephen Sewalk & Vincent Buscarello

Thursday | February 4 | 3:30PM - 5:50PM

D6. ENERGY EFFICIENCY

D6.1 ELECTRONIC UTILITY INVOICING HELPS TO TACKLE ENERGY USE
Co-chair - Lori Herrick, Energy Management Administrator, City of Virginia Beach

D6.2 TABLETS & MOBILE GIS TO SAVE MONEY & TIME ON AERIAL RAPTOR NEST SURVEYS
Co-chair - Matt Alexander, Vice President, Anatum Field Solutions

D6.3 FUNDING LARGE SCALE, RESIDENTIAL TREE PLANTINGS + TECHNOLOGY = ENERGY CONSERVATION FOR EVERYONE!
Kristen Bousquet, Business Development Manager, Arbor Day Foundation

D6.4 VIRTUALIZE ENERGY FUNCTIONS & PROCESSES INTO A CLOUD BASED MODEL
Mark Hauenstein, Managing Partner, UC-Won

D6.5 CPP COMPLIANCE AND REDUCING SYSTEM CONGESTION THROUGH DEPLOYED EE
Robert Neumann, Associate Director, Navigant Consulting; Amanvir Chahal

TRACK | D | ENERGY POLICY & SECURITY

Friday | February 5 | 7:30AM - 9:30AM

D7. NATURAL GAS

D7.1 FRAC FREE NATURAL GAS - CONSUMERS DO HAVE A CHOICE
Co-chair - Tom Fitzsimmons, President, Carbon Creek Energy; John Harpole, Mercator Energy

D7.2 SMALL SCALE LNG FOR DISTRIBUTED GENERATION – "DOES IT MAKE CENTS"?
Michael Nicoloro, Sr. VP - Energy Services; Sanborn, Head & Associates; Joan Fontaine

D7.3 METHANE REGS IN COLORADO: BUSINESS RISK EXPOSURE FOR NATURAL GAS USERS
Co-chair - Carolyn Dunmire, Senior Project Manager, Ecosphere Environmental Services

D7.4 COMBINED CYCLE SITE LICENSABILITY ANALYSIS: FATAL FLAWS & CRITICAL ISSUES
David Shotts, Partner, ERM; Tom Wickstrom

D7.5 ADDING DUAL-FUEL CAPABILITY AT EXISTING COMBUSTION TURBINE POWER PLANTS
Michael Keller, Senior Project Manager, TRC

Submit Abstract

Friday | February 5 | 10AM - 12PM

D8. DISTRIBUTED GENERATION

D8.1 REACHING NET ZERO AND WWTPS
Paul Hughes , North America Representative, ElectraTherm; Rob Emrich

D8.2 CONSOLIDATION IN THE DISTRIBUTED GENERATION MARKET
Co-chair - Edwin Feo, Chief Operating Officer/Founder, Coronal Group LLC

D8.3 KEY CONSIDERATIONS IN EVALUATING THE BUSINESS CASE FOR UTILITY-OWNED DISTRIBUTED GENERATION ASSETS
Ajay Kasarabada, Project Manager, Black & Veatch; Ed. H. Overcast

D8.4 MOBILE AND MODULAR GAS TURBINE POWER PLANT SOLUTIONS SUPPORTING DISTRIBUTED POWER - CASE STUDIES
Dalia El Tawy, Program Manager, Solar Turbines Incorporated

D8.5 NET METERING & MARKET FEEDBACK: THE IMPACT OF RETAIL RATE DESIGN ON DISTRIBUTED PV DEPLOYMENT
Naim Darghouth, Lawrence Berkeley National Lab; R. Wiser, G. Barbose & A. Mills

D8.6 DISTRIBUTED STATE ESTIMATION FOR SMART GRIDS
Awais Riaz, Graduate Student, Georgia Institute of Technology; A P Meliopoulos

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Wednesday | February 3 | 1PM - 3PM

E1. CONTROL TECHNOLOGIES

E1.1 BEST PRACTICES FOR HANDLING SODIUM SORBENTS
Sponsor & Co-chair - Cornelia Cretiu-Vasiliu, SOLVAir Natural Solu.; Atwell, Wood & Riccio

E1.2 REMOTE MONITORING USING HYPERSPECTRAL IMAGING
Dr. Robert Kester, CTO, Rebellion Photonics; Dr. Robert Kester & Nathan Hagan, PhD

E1.3 AUTODR SOLUTIONS FOR COMMERCIAL, INDUSTRIAL & INSTITUTIONAL PROPERTIES
Laurie Wiegand-Jackson, Senior Vice President, IPKeys Power Partners

E1.4 IT MEETS OT
Phil Carroll, Vice President, Finley Engineering Company, Inc.

E1.5 THE HEART OF THE MATTER - PULVERIZER OPTOMIZATION
Co-chair - Paul Garnham, VP LES - USA, Loesche Energy Systems; Dr. Simon Mutzenich

Submit Abstract

Wednesday | February 3 | 3:30PM - 5:30PM

E2. ESP & PM

E2.1 IMPACTS OF REAGENT INJECTION ON FLY ASH RESISTIVITY AND ESP PERFORMANCE
Robert Mastropietro, Vice President of Technology, Nol-Tec Systems

E2.2 HIGH FREQUENCY ENERGIZATION IN INTERNITTENT ENERGIZATION MODE
Hardik Shah, Engineer, SEI; M. Chambers, SEI; G. Grieco, ACA; D. Boll & N. Pelech, Ameren

E2.3 OPTIMIZING CONTINUOUS WATER WASHING IN WET ESPS WITH PILOT PLANT TESTING
Anthony Silva, Advisory Engineer, Babcock & Wilcox; Al Moretti & Chung-Yi Liu

E2.4 FGD WASTE WATER HANDLING WITH A FOCUS ON MERCURY AND SELENIUM
Dave Murphy, Business Development – Waste Water, STEAG SCR-Tech Inc.

E2.5 WIND BARRIER TYPE DUST CONTROL FOR OPEN STORAGE PILES
David Gilroy, Sales Manager, Dust Solutions Inc.

E2.6 EMC CASE STUDIES - REDUCTION OF PM´S BY THE USE OF THE UNIQUE EM
Andreas Gangl, Regional Sales Manager, Scheuch GmbH; Holger Reinhold

Thursday | February 4 | 7:30AM - 9:30AM

E3. SO2, SO3 & ADDITIVES - DSI

E3.1 FULL-SCALE DEMONSTRATION OF SORBMIX® TO IMPROVE DSI PERFORMANCE
Guisu Liu, Director of Technology, Mobotec; Craig Paquette, Baiyun Gong & Mike Klump

E3.2 IMPROVED SO2 CAPTURE WITH HYDRATED LIME DSI
Co-chair - Pat Mongoven, Business Development Manager, Mississippi Lime; Curt Biehn

E3.3 ADVANCES IN AMMONIA BASED DESULFURIZATION
Stein Carlsen, Sr. Sales Manager, Jiangnan Environmental Technology, Inc.; Peter Lu

E3.4 DRY SCRUBBER OPERATING COST REDUCTION STRATEGY & PRACTICE
Stewart Nicholson, President, Primex Process Specialists, Inc; Rodrigo Camargos

E3.5 DRY SORBENT HANDLING AND MIXING PROCESS MODULES TO SUPPORT TECHNOLOGIES FOR STACK GAS TREATMENTS INCLUDING FGD; HG; AND NOX
Charles Alack, Semi-Bulk Systems, Inc

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TRACK | E | CONTROL TECHNOLOGIES

Thursday | February 4 | 10AM - 12PM

E4. SO2, SO3 & ADDITIVES - WFGD

E4.1 EFFICIENT WFGD OXIDATION USING SULFITE CONTROL
Raymond Gansley, Product Engineering Manager - WFGD & SWFGD; Alstom

E4.2 HORIZONTAL WET SCRUBBING OF SO2, HF & PARTICULATES FROM FLUE GAS EXHAUSTS
Rajat Ghosh, Sr. Manager, Alcoa Inc.; John Smith, Angelique Adams & Patrick Godbout,

E4.3 MAKING A COAL-FIRED BOILER WITH A LIME-BASED CDS SYSTEM CCS-READY
Co-chair - Shiaw Tseng, Marketing & Technical Manager, GRAYMONT

E4.4 COAL COMBUSTION CATALYSTS - PERFORMANCE REVIEW
Co-chair - John Aronson, President/CEO, AATA International, Inc.

E4.5 PREPARING POWER PLANT DUCTS & CHIMNEYS FOR LOW TEMPERATURE OPERATION
Gary Gerba, Hadek

E4.6 ADVANTAGES OF FIBER REINFORCED PLASTIC IN WET FGD AND POLLUTION
Kevin Lambrych, Business Manager, Ashland; Michael Stevens & Julie Santinelli

Thursday | February 4 | 1PM - 3PM

E5. NOX CONTROL

E5.1 VERY LOW FOOTPRINT NOX-SOX SCRUBBING
Co-chair - Robert Richardson, CEO, Know-NOx LLC

E5.2 NOX CONTROL OPTIONS UTILITY BOILERS THROUGH CSAPR & REGIONAL HAZE RULES
Guisu Liu, Director, Mobotec; Mike Klump & Pat Crotty, Mobotec; Blake Stapper, AECOM

E5.3 DECONOX: HOW TO REDUCE VOC & NOX USING ONE, INNOVATIVE TECHNOLOGY
Holger Reinhold, Process Engineer Industrial Minerals, Scheuch GmbH; Andreas Gangl

E5.4 THE LATEST DEVELOPMENT OF DENOX SYSTEMS
Christian Helmreich, Managing Director, M.A.L. Umwelttechnik GmbH; Mr. Xavier D´hubert

E5.5 INTRODUCING THE NEW ULTRA LOW NOX CORNER FIRED M-PM BURNER
Nathan Hart, Product Manager, Mitsubishi Hitachi Power Systems Americas

E5.6 REMOVING NOX WITH CATALYTIC CERAMIC FILTERS
Rod Gravley, Technology Director, Tri-Mer Corporation

Thursday | February 4 | 3:30PM - 5:30PM

E6. SCR

E6.1 SCR HIGH-PERFORMANCE MIXING & FIELD EXPERIENCE W/ COAL-FIRED BOILER
Co-chair - Paulo Oliveira, Marketing Manager, Alstom Power; Piaggi, Spagnolo & Czarnecki

E6.2 APPLYING COLD-SIDE SCR ON BIOMASS FIRED CFB BOILER
Stewart Bible, Sr. Catalyst Technologies Manager, Fuel Tech, Inc.; Reid Thomas

E6.3 DESIGN & CONSTRUCTION CHALLENGES OF CONEMAUGH SCR RETROFIT PROJECT
Krunal Patel, Project Associate 1, Sargent & Lundy; Charles Nelson & Michelle M. Atto

E6.4 KEEPING THE SCR FIT
Peter Harrison, Sales Manager, STEAG SCR-Tech Inc.

E6.5 EXHAUST GAS PURIFICATION SCR CONTROL SYSTEMS-ULTRA LOW EMISSIONS
David Bonner, Sr Project Engineer - Stationary Applications, Hug Engineering Inc.

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TRACK | E | CONTROL TECHNOLOGIES

Friday | February 5 | 7:30AM - 9:30AM

E7. REMEDIATION

E7.1 PATHWAY FROM DIRTY ENERGY REMEDIATION TO THE ULTIMATE ENERGY SOURCE
Ann McIver, Director - Environmental Stewardship, Citizens Energy Group; Peter Schubert

E7.2 E.CARBON NANOFIBERS W/ SURFACE ATTACHED ZEROVALENT IRON NANOPARTICLES
Nikhil Reddy Mucha, Graduate RA, NC A&T St. U.; R. Ravella, M. Reddy & L. Zhang

E7.3 NANOMECHANICS OF NON-BIOLOGICAL MODEL SYS.-CELL INJURY BY NANOPARTICLES
Tooba Shoaib, Graduate Student, University of Illinois; He, Chen, Nalam & Espinosa-Marzal

E7.4 PUSH-PULL METHOD REMEDIATION OF PETRO. CONTAMINATED SOIL & GROUNDWATER
Co-chair - George Ivey, President & Senior Remediation Specialist, Ivey International Inc.

E7.5 INDUSTRY IMPACT OF THE 2015 EPA UNDERGROUND STORAGE TANK REGULATIONS
Timothy Ericsen, Executive Vice President, Tait Environmental Services, Inc.

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Friday | February 5 | 10AM - 12PM

E8. COMPLIANCE TECHNOLOGIES & STRATEGIES

E8.1 COMPLIANCE WITH NEW REGULATIONS FOR COAL COMBUSTION RESIDUALS
Travis Smith, Senior Chemical Engineer, Hull & Associates, Inc.

E8.2 REGULATORY CHANGE MANAGEMENT
Co-chair - Bobby O'Neal, Director, EHS / Energy & Utilities, 360factors, Inc.

E8.3 WORD MASTER CLASS
David Cornwell, CEO, PleaseTech Ltd; Barry Lyne

E8.4 REGULATION & USE OF UNMANNED AERIAL SYSTEMS (DRONES) IN UTILITY INDUSTRY
Kelly Daly, Partner, Stinson Leonard Street

E8.5 GROWING YOUR BUSINESS IN WITH NEW AVIATION TECHNOLOGY AND DRONES
Co-chair - Jonathan Rupprecht, Attorney/Aviation Expert, Rupprecht Law

E8.6 ROBOTICS PROCESS AUTOMATION WTIHIN UTILITY PROCESSES
Charming Shah, Global BPO Practice, Capgemini

TRACK | F | RENEWABLE ENERGY

Wednesday | February 3 | 1PM - 3PM

F1. RENEWABLE ENERGY MARKETS

F1.1 WESTINGHOUSE PLASMA GASIFICATION FOR POWER, FUELS AND CHEMICALS
Co-chair - Richard Fish, President, Westinghouse Plasma Corp.

F1.2 PREDICTING RENEWABLES TARGET PERFORMANCE IN EMERGING MARKET
Thaddeus Huetteman, O.R. Analyst, U.S. EIA Michelle Bowman

F1.4 GENERATING CLEAN POWER AND PROFITS
Willem Lange, Director - Utility Marketing, WaterFurnace International, Inc.

F1.5 CAN HAWAII ACHIEVE ITS RPS?
Co-chair - Fred Mayes, Senior Energy Analyst, U.S. Energy Information Administration

F1.6 INTELLECTUAL PROPERTY'S ROLE IN THE CLEANTECH REVOLUTION
Susan Betcher, Partner, Perkins Coie & Co-Chair Cleantechnology Industry Group

Submit Abstract

Wednesday | February 3 | 3:30PM - 5:30PM

F2. WASTE TO ENERGY

F2.1 AN UPDATE ON RENEWABLE ENERGY FROM MUNICIPAL WASTES
Paul Hauck, Sr. Environmental Engineer, CDM Smith

F2.2 WASTE PLASTIC TO LIQUID HYDROCARBON FUEL
Co-chair - Dr. Moinuddin Sarker, PhD, MRSC, CEO and CTO, Waste Technologies LLC

F2.3 MICROALGAE: GHG CO2 & NOX MITIGATION - CCS ECONOMIC DRIVER
Ed Weinberg, President, ESSRE Consulting, Inc.; Robert Mroz, HYTEK-Bio, LLC

F2.4 CLIMATE-FRIENDLY WASTE SYSTEMS: BEYOND "WASTE-TO-ENERGY" INCINERATION AND TRADITIONAL LANDFILLS
Mike Ewall, Esq., Founder & Director, Energy Justice Network

F2.5 RENEWABLE ENERGY GENERATION ON MARGINALIZED LANDS
Thierry Spiess, PhD and Research Assistant, Ryerson University

F2.6 WHY BIOMASS? STATUS, CHALLENGES & OPPORTUNITIES IN SMUD REGION
Valentino Tiangco, Biomass Program Manager, SMUD

Thursday | February 4 | 7:30AM - 9:30AM

F3. RENEWABLE DEVELOPMENT ANALYSIS

F3.1 TRANSFORMATION IN THE US GENERATING FLEET: MORE THAN MEETS THE EYE
Daniel Mussatti, Sr. Env. Economist, US Nuclear Regulatory Commission; Andrew Kugler

F3.2 CALIFORNIA GREENHOUSE GAS REDUCTION AND RENEWABLE DEVELOPMENT
Co-chair - Shawn Bailey, Manager Market & Regulatory Analysis, Sempra US Gas & Power

F3.3 ENERGY ASSESSMENTS/ ENERGY MANAGEMENT SYSTEMS
Daniel Drott, Director of Business Development for Energy, Intertek

F3.4 REPLACING FOSSIL FUELS WITH SOLAR ENERGY FROM SPACE
Keith Henson, Founder, L5 Society

F3.5 RENEWABLE ENERGY MARKET: HYDROGEN TRANSPORTATION FUEL FROM WIND + SUN
Co-chair - Bill Leighty, Director, The Leighty Foundation

F3.6 BARRIERS TO RENEWABLE ENERGY DEVELOPMENT ON BROWNFIELDS
Thierry Spiess, PhD and Research Assistant, Ryerson University

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Thursday | February 4 | 10AM - 12PM

F4. RENEWABLE PROJECT DEVELOPMENT

F4.1 THE POTENTIAL FOR LONGER TENURE FINANCING FOR SOLAR POWER PROJECTS
Edwin Feo, Chief Operating Officer/Founder, Coronal Group LLC

F4.2 INTEGRATING RENEWABLE ENERGIES WATER, SOLAR. WIND, & BIOFUELS WITH PHEV
Catherine(JJ) Demauro, Environmentalist, Efficient Drivetrains Inc.; Andrew Frank

F4.3 A COLLABORATIVE APPROACH TO UTILITY SITING USING GIS
Jason Thoene, GIS Manager, ICF International

F4.4 BE PREPARED FOR THE EVER CHANGING MARKET LANDSCAPE
Clay Jensen, Principal, Energy & Renewables, Forum Equity Partners

F4.5 THE ROLE OF THE INDEPENDENT ENGINEER IN RENEWABLE PROJECT DEVELOPMENT
Co-chair - William Stark, Vice President - Environmental Services, Leidos

F4.6 REDUCE PROJECT IMPLEMENTATION RISK-CAPITAL NERVE CENTER FOR RENEWABLES
Co-chair - Neil Gerber, Director of Strategy, Energy & Environment, IBM; Biren Gandhi

Thursday | February 4 | 1PM - 3PM

F5. SOLAR & WIND

F5.1 OVERCOMING OFFSHORE WIND CHALLENGES
Co-chair - Michael Ernst, Director - Federal Regulatory Affairs, Tetra Tech; Jennifer Daniels

F5.2 STORAGE & ENERGY MGMT SOLUTIONS AS THE NEW WAVE IN DISTRIBUTED GENERATION
Co-chair - Edwin Feo, Chief Operating Officer/Founder, Coronal Group LLC

F5.3 FEASIBILITY OF USING WIND & SOLAR ENERGY ON COLLEGE & UNIVERSITY CAMPUSES
Andrew LaFavers PhD, Student/Professor, University of Texas & Dallas Baptist University

F5.4 NUSCALE POWER DIVERSE ENERGY PLATFORM (NUDEP)
Chris Colbert, Chief Strategy Officer, NuScale Power

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Thursday | February 4 | 3:30PM - 5:30PM

F6. SOLAR & PV

F6.1 A SUNNY FUTURE FOR UTILITY-SCALE SOLAR
Co-chair - John Finnigan, Lead Council, Environmental Defense Fund

F6.2 LIFECYCLE & ECONOMIC PERFORMANCE OF COMMERCIAL-SCALE SOLAR PV SYS.
Co-chair - Vivian Xiaowei Liu, Postdoctoral Fellow, DRI; Hoekman, Robbins & Ross

F6.3 UTILITY-SCALE SOLAR PROJECT COST, PERFORMANCE, & PRICING TRENDS IN THE US
Joachim Seel, Sr. Research Asso., Lawrence Berkeley National Laboratory; Mark Bolinger

F6.4 INTEGRATION LIMITS OF INVERTER BASED PV UNITS IN MICROGRID & DISTRIBUTION SYS
Ric Austria, Executive Consultant, Pterra Consulting; Ketut Dartawan & Amin Najafabadi

F6.5 FUGITIVE DUST MITIGATION AND MONITORING FOR PV SOLAR PLANTS IN THE DESERT
Andres Quijano, Systems Engineer, American Ecotech LLC; Joe Palumbo

F6.6 STRATEGIES FOR SOLAR INDUSTRY TO PENETRATE COMMERCIAL REAL ESTATE SPACE
Michael Manuel, Principal, Goldberg Kohn Ltd.

TRACK | F | RENEWABLE ENERGY

Friday | February 5 | 7:30AM - 9:30AM

F7. COMMUNITY SOLAR

F7.1 THE BENEFITS OF COMMUNITY SOLAR FOR UTILITIES
Co-chair - Eric Steinhofer, VP- Business Dev., Clean Energy Collective; Bart Rupert

F7.2 EVOLUTION OF COMMUNITY SOLAR...MAXIMIZING THE BENEFITS
Becky Campbell, Community Solar Market Development, First Solar; Rex Stepp

King Abdul Aziz University

F7.3 IMPLEMENTATION OF SOLAR ENERGY IN HOT, HUMID, & DUSTY CONTEXT
Hisham Mortada, Professor, King Abdul Aziz University; Mohammed Kurdi

Go Global Environmental

F7.4 ROOFTOP SOLAR IN HAWAII - A MICROCOSM OF THE FUTURE
Greg Odegard, Principal, GO Global Environmental

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Friday | February 5 | 10AM - 12PM

F8. RENEWABLE ENERGY & GEOTHERMAL

F8.1 FINANCIAL SUSTAINABILITY THROUGH ZERO NET ENERGY
Co-chair - Meghan Walsh, Senior Architect, USDA; Anton Sibrin, Berkeley Research Group

F8.2 USING SUPERCRITICAL CO2 FOR CLOSED-LOOP GEOTHERMAL POWER
Brian Higgins, CTO, GreenFire Energy

F8.3 GEOTHERMAL SUSTAINABILITY
Co-chair - Masoud Fathizadeh, Professor, Purdue University Calumet; Dr. G. A. Mansoori

F8.5 PREP OF CHEAP NIFE@C NANOPARTICLES FOR DSSC COUNTER-ELECTRODES
H. Paul Wang, Professor, National Cheng Kung U.; L.Chang, J. Wang, C.Jou & Y.Wei

F8.5 OPTIMUM PENETRATION OF GRID-CONNECTED RENEWABLE ENERGY GENERATION
Jin Jo, Assistant Professor, Illinois State University; Matt Aldeman

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Wednesday | February 3 | 1PM - 3PM

G1. DECOMMISSIONING OF POWER PLANTS

G1.1 DECOMMISSIONING, DEMOLITION & DECONTAMINATION (DDD) PROCESS
Co-chair - Jeffery Pope, Decommissioning & Demolition Services Mgr., Burns & McDonnell

G1.2 HOW TO MAXIMIZE SCRAP VALUES AS PART OF DECOMMISSIONING PROCESS
Greg Menen, Director - Demolition Scrap Management, Rocky Mountain Recycling

G1.3 NUCLEAR WASTE STORAGE OPPORTUNITIES FOR DECOMMISSIONED POWER PLANTS
Emily Lewis, AAAS Fellow, U.S. DOE, Office of Energy Policy & Sys. Analysis; Lara Pierpoint

G1.4 DECOMMISSIONING SCALABILITY
Richard Cheatham, Scientist 5, CB&I; Daniel Davis, Ken Beard & Andrew Schaaf

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Wednesday | February 3 | 3:30PM - 5:30PM

G2. COMPLIANCE STRATEGIES & PLANT CONVERSIONS

G2.1 FORMER MANUFACTURED GAS PLANTS (MGP): LEGACIES FROM LAST TWO CENTURIES
Kevin White, Environmental Engineer, Burns & McDonnell Engineering Company, Inc.

G2.2 BIOCONVERSION OF COAL & GAS FIRED POWER STATIONS
Preben Messerschmidt, Project Director, Ramboll Environ

G2.3 REPURPOSING POWER PLANT CHIMNEYS FOR CLEAN RENEWABLE ENERGY
Thomas Farber, Division Manager, Commonwealth Dynamics, Inc.; Jose Franco

G2.4 ENVIRONMENTAL MANAGEMENT SYSTEMS & ISO-14001 CERT. FOR SMALL UTILITIES
Erik Haas, Principal, HMH Consulting LLC; Tom Chappel

G2.5 CCR & ELG: DEVELOPING A SIMULTANEOUS COMPLIANCE STRATEGY
Jonathan Shimko, Director, Power & Water Solutions, Tetra Tech, Inc.

G2.6 EASE OF COMPLIANCE THROUGH DOCUMENT MANAGEMENT
Mark Buckley, President & CEO, Requordit Inc.

Thursday | February 4 | 7:30AM - 9:30AM

G3. POWER PLANT & BOILER OPTIMIZATION

G3.1 POWER PLANT FUEL TREATMENT TECHNOLOGIES
Co-chair - Chris Wedig, Senior Technology Specialist - AQCS, CB&I

G3.2 ENGINEERING ANALYSIS PATENTED MULTISTAGE EVAPORATIVE COOLING SYSTEM
Co-chair - Dr. Darrell Richardson, CEO, R4 Ventures LLC; Mike Reytblat

G3.3 OPTIMISING FUEL FLOW IN PULVERISED COAL & BIOMASS-FIRED BOILERS
Malgorzata (Maggie) Wiatros-Motyka, Analyst & Author, IEA Clean Coal Centre

G3.4 NEW SIDE STREAM FILTRATION TECHNOLOGY WILL REVOLUTIONIZE THE INDUSTRY
George Wagner II, Partner, ElectroCell Systems; Paul McLaine & Dan Wheatley, ElectroCell Systems; Loraine Huchler, MarTech Systems, Inc.

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TRACK | G | OPERATIONS & MANAGEMENT

Thursday | February 4 | 10AM - 12PM

G4. EHS & EMIS

G4.1 "FIXING" HUMAN ERROR
Co-chair - Peter Bridle, Executive Director, Pegasus Risk Management

G4.2 INTEGRATING DAS WITH EMIS - KEY CONCEPTS AND CONSIDERATIONS
Greg Gasperecz, Sr VP, EHS, Enviance, Inc.; Philip Black, Wood Group Mustang, Inc.

G4.3 MOBILE-ENABLED ENV. HEALTH & SAFETY MANAGEMENT INFORMATION SYSTEM
Co-chair - Anne Heinrich, Client Manager, E2 ManageTech; Ian Cohen, NextEra

G4.4 INTEGRATING ENMS & EHS MGMT SYSTEM TO ACHIEVE A COHERENT SYSTEM
Nitin Shahani, Green Services Associate Program Manager, Intertek

G4.5 COMBINING COMPLIANCE & ENV. MGMT. FOR A 360° VIEW OF EHS PERFORMANCE
James Miller, Account Executive, Dakota Software; Jeff Cross

G4.6 THE ART OF EVERGREENING COMPLIANCE MANAGEMENT SYSTEMS
Margery Moore, Director, Bloomberg BNA; David Kleen, regAction

Thursday | February 4 | 1PM - 3PM

G5. EHS & RISK MANAGEMENT

G5.1 ARC FLASH RISK ASSESSMENT – WHAT DOES IT MEAN?
Dennis Neitzel, Director Emeritus, AVO Training Institute, Inc.

G5.2 DRIVING OPERATIONAL EXCELLENCE BY AUTOMATING RISK MANAGEMENT
Co-chair - Doug Hatler, VP, EHS, Energy & Utilities, 360factors, Inc.

G5.3 5 REASONS WHY MOBILE APPS ARE CHANGING HOW EHS WORKS
John Niemoller, President, Perillon Software Inc.

G5.4 OFFICE OF ENV. HEALTH & HAZARD ASSESSMENT GUIDELINES & CHALLENGES
Everest Yan, PCR Services Corporation; Heidi Rous & Alan Sako

G5.5 EHS OF AUTOMATED BIRD CONTROL TECHNOLOGY FOR THE UTILITY INDUSTRY
Jim Beaumont, National Account Manager, BirdBuffer, LLC; Walt Beals & Gary Crawford

G5.6 UTILITY CEMS AND EMISSION INVENTORY DATA IN THE CLOUD
Don Ahearn, Director of Sales, xOverTime Inc.; David Gloski

Thursday | February 4 | 3:30PM - 5:30PM

G6. OPERATIONS & OPTIMIZATION

G6.1 SAFETY MANAGEMENT LEADERSHIP: YOUR ROLE IN ACHIEVING SAFETY EXCELLENCE
Dr. Wes Scott, Director, Consulting Services, National Safety Council

G6.2 PUMPING SYSTEMS EVOLUTION
Co-chair - Jessica Morrison, Business Development Manager, Grundfos; Stephen Putnam

G6.3 CONTINUOUS PERFORMANCE ASSURANCE AT BUDGET CONSTRAINED POWER PLANTS
Rodrigo Camargos, Process Optimization Engineer, Primex Process Specialists; S. Nicholson

G6.4 AN INTERNATIONAL APPROACH TO SUSTAINABILITY
Steven Driver Ph.D., Global Energy Program Manager, SanofiGenzyme

G6.5 CAP AND TRADE POSITION MANAGEMENT WITH COMPLIANCE
David Gloski, President, xOverTime Inc.; Don Ahearn

G6.6 VIGILANCE: BUILDING A CULTURE OF HIGH RELIABILITY
Co-chair - Bob Newhouse, President, Newhouse Consultants

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TRACK | G | OPERATIONS & MANAGEMENT

Friday | February 5 | 7:30AM - 9:30AM

G7. OPERATIONS & MANAGEMENT

G7.1 INTERNET OF FACILITIES - SMART CAMPUS INITIATIVE AT ARGONNE NATIONAL LAB
Dejan Ristic, Energy/Pressure Systems Engineer, Gr. Leader, Argonne National Laboratory

G7.2 CHANGE CULTURE & ACHIEVE ENERGY MANAGEMENT SUCCESS IN HEALTHCARE
Kim Hughes, Senior Initiative Manager, Northwest Energy Effciency Alliance

G7.3 UNCERTAIN FUTURE OF UTILITIES: SCENARIOS TO INNOVATE IN AGE OF DISRUPTION
Co-chair - Dave Herman, CEO, Anthros Consulting; Rob Snyder

G7.4 INTERNET OF THINGS: CONVERGENCE OF BIG DATA
Co-chair - Phil Carroll, Vice President, Finley Engineering Company, Inc.

G7.5 PORTFOLIO O&M: ONE PLANT, FLEET BENEFITS
Douglas Machon, Director - Business Development, NAES Corporation

G7.6 NEXRAD PRODUCTS AND NOAA'S BIG DATA PARTNERSHIP
Amy Gaskins, Big Data Project Director, NOAA; Ed Kearns

Friday | February 5 | 10AM - 12PM

G8. O&M

G8.1 CULTIVATING THE UTILITY WORKING ENVIRONMENT
Kevin Smith, Senior Consultant, Ephektiv

G8.2 SITUATION AWARENESS & HIGH PERFORMANCE HMI CONCEPTS IN POWER SYSTEMS
Ricardo Olsen, Electronics Engineer, CEEE-GT

G8.3 ELECTRIC UTILITY RATE STUDIES WITH PUBLIC INVOLVEMENT
Chris Deffenbaugh, Public Involvement Specialist, Burns & McDonnell; Ted Kelly

G8.4 POSITIVE ENERGY: ACQUIRING & RETAINING CUSTOMERS THE RIGHT WAY
Co-chair - Derek Dressler, Senior Vice President of Sales, Virtual Incentives

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TRACK | H | CLIMATE, ELG & CCS

Wednesday | February 3 | 1PM - 3PM

H1. CLIMATE CHANGE & GHG

H1.1 ADDRESSING CLIMATE CHANGE UNDER THE NEW CEQ GUIDELINES
Co-chair - Bruce Macdonald, Principal Scientist, SLR International Corporation

H1.2 BIRDS, CLIMATE CHANGE AND POWERLINES
David Lee, Senior Biologist, Davey Resource Group

H1.3 FUNDING AFRICAN POWER INFRASTRUCTURE, CLIMATE CHANGE & US CARBON TAX
Co-chair - Stephen Sewalk, Assistant Professor, Burns School of Real Estate & Construction

H1.4 ELECTRIC POWER GENERATION GHG MEASUREMENT PROTOCOL REVISION
Colin High, Co-Founder and Principle Consultant, RSG

H1.5 ENERGY, ENVIRONMENT, AND COMMUNITIES: LOCAL V. GLOBAL CLIMATE GOALS
Deidre Sanders, Environmental Justice Manager, Pacifc Gas & Electric Company

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Wednesday | February 3 | 3:30PM - 5:30PM

H2. POST COP21 & INVENTORIES

H2.1 SUSTAINABLE PATENT STRATEGIES
Co-chair - Michael Messinger, Director, Sterne Kessler

H2.2 CARBON EMISSIONS REPORTING: IMPACTE FOLLOWING CPP & COP21
Co-chair - Hari Gupta, Director, Coriolis Enterprises, Inc.

H2.3 TBD
Dirk Forrester, President & CEO, IETA

H2.4 PRIVATE SECTOR OPPORTUNITIES & PARTICIPATION UNDER THE PARIS AGREEMENT
Douglas Marett, Head of Energy & Environment, Grue + Hornstrup

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Thursday | February 4 | 7:30AM - 9:30AM

H3. ELG - UTILITY PERSPECTIVE

H3.1 ELG COMPLIANCE STRATEGIES FOR UTILITIES
Patricia Scroggin, Sr. Water/Wastewater Treatment Consultant , Burns & McDonnell

H3.2 IMPLEMENTATION OF THE ELG RULE
Jared Morrison, Manager - Water & Wastewater Programs, Westar Energy

H3.3 COMPLIANCE ISSUES ASSOCIATED WITH IMPLEMENTATION OF THE ELG RULE
Gerald Butcher, Sr. Environmental Coordinator , Western Farmers Electric Cooperative

H3.4 ELG & OTHER RULES EFFECT ON THE GENERATION FLEET
Block Andrews, Director of Strategic Environmental Solutions, Burns & McDonnell

H3.5 COMPLIANCE ISSUES ASSOCIATED WITH IMPLEMENTATION OF THE ELG RULE
Jerry Purvis, Environmental Affairs Manager, East Kentucky Power Cooperative

H3.6 COMPLIANCE ISSUES ASSOCIATED WITH IMPLEMENTATION OF THE ELG RULE
Maggie Skelton, Chemical Engineer Boswell Station, Minnesota Power

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Thursday | February 4 | 10AM - 12PM

H4. CCR & ELG COMPLIANCE MGMT.

H4.1 CCR COMPLIANCE – ALTERNATIVE CLOSURE SCHEDULES?
Jason Eichenberger, Sr. Civil Engineer, Burns & McDonnell; Block Andrews; Jay Holloway

H4.2 ASH CONTAINMENT STRUCTURES: ENG. TO COMPLY WITH U.S. EPA'S NEW CCR RULE
David Lutz, Vice President, NTH Consultants, Ltd.; Brad Venman

H4.3 U.S. EPA'S FINAL CCR RULE EXISTING ASH PONDS CLOSE IN PLACE OR CLEAN CLOSURE
Douglas Dahlberg, Project Engineer, Sargent & Lundy; James Perry

H4.4 CCR RULE COMPLIANCE & COMPLIANCE STRATEGY CONSIDERATIONS
Paul Caprio, VP, EA Engineering, Science, and Technology, Inc., PBC; Richard Waterman

H4.5 CRR AND ELG COMPLIANCE STRATEGIES
Michael Preston, Chemical Engineering Section Leader, Black & Veatch

H4.6 GROUNDWATER MONITORING REQUIREMENTS UNDER THE NEW CCR REGULATIONS
Co-chair - John Hesemann, Department Manager, Burns & McDonnell; Jeffery Pope

Thursday | February 4 | 1PM - 3PM

H5. CCR & ELG

H5.1 LIFE CYCLE ANALYSIS OF CO-FORMED COAL/HYDROCHAR BRIQUETTES
S. Kent Hoekman, Research Professor, DRI; X. Liu, DRI; L. Felix & W. Farthing, GTI

H5.2 COMPLIANCE COSTS FOR THE FEDERALLY PROMULGATED CCR AND ELG
Patricia Scroggin, Section Manager - Process, Burns & McDonnell Engineering Company

H5.3 CCR LANDFILL CONSTRUCTION & OPERATION UNDER SUBTITLE D
Co-chair - Thomas Gredell, President, GREDELL Engineering Resources, Inc.

H5.4 KLEENWATER-ADVANCED I-PRO FOR ELG COMP., POND CLOSURES & WATER RE-USE
Mark Pastore, VP Technology, EES, Inc.; David Martin, ProChem, Inc.

H5.5 "BRAVE NEW WORLD": CCR RULE COMPLIANCE STRATEGIES FOR ELECTRIC UTILITIES
Co-chair - Steven Putrich, VP Engineering, Haley & Aldrich; Putrich, McDaniels, Pokorny

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Thursday | February 4 | 3:30PM - 5:30PM

H6. COAL ASH & FGD

H6.1 COAL ASH MANAGEMENT: LEGAL, REGULATORY AND INDUSTRY UPDATE
Mike McLaughlin, Senior Vice President, SCS Engineers; May Wall, Winston & Strawn LLP

H6.2 GEOTECHNICAL & ENV. STABILIZATION OF PONDED FLY ASH USING CAO
Co-chair - Michael Schantz, Director - NBD, Lhoist North America; Nancy Cardona, UNC Charlotte

H6.3 DENSE SLURRY ASH MGMT: PROCESS EFFICIENCY & ENV. PERFORMANCE
Co-chair - Dale Timmons, Program Manager - Business Development, NAES Corporation

H6.4 CEMENT PRODUCTS FOR SOLIDIFICATION/STABILZATION OF CONTAMINATED SOIL
Paul Ruehl, Solidifc ation/Sta bilization Spe cialist, Lafarge North America

H6.5 METALS ANALYSIS FOR FGD WASTEWATERS AND COAL COMBUSTION RESIDUALS
Richard Burrows, Corporate Technical Director, TestAmerica Inc.

H6.6 EXPEREINCE WITH FLUE GAS DESULFURIZATION, ZERO LIQUID DISCHARGE (FGD-ZLD)
Patrick Randall, Sales Director, Aquatech; J. Michael Marlett

TRACK | H | CLIMATE, ELG & CCS

Friday | February 5 | 7:30AM - 9:30AM

H7. CCS: CARBON CAPTURE & STORAGE

H7.1 FTIR PROVIDES TIGHTER CONTROL ON EMISSIONS FROM CARBON CAPTURE PROCESS
Jim Cornish, Sales & Support Manager, Gasmet Technologies

H7.2 EARLY CCS OPPORTUNITIES: COAL TO LIQUIDS VIA FISCHER-TROPSCH SYNTHESIS
Co-chair - Thomas Tarka, NETL/U.S. DOE; Summers, NETL/DOE; Turner, ESPA; White, Noblis

H7.3 W.A. PARISH POST-COMBUSTION CO2 CAPTURE AND SEQUESTRATION PROJECT
Co-chair - Ted McMahon, Project Mgr., U.S. DOE; Tony Ampriester & Petra Nova

H7.4 CURRENT STATUS OF CO2 CAPTURE TECHNOLOGY DEVELOPMENT IN KEPCO
Jeom-In Baek, Sr. Researcher, KEPCO; Eom, Lee, Jo, Jegarl & Shim, KEPCO; Yi & Ryu, KIER

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Friday | February 5 | 10AM - 12PM

H8. CCS II

H8.1 CO2 ABSORPTION KINETICS STUDY IN PHYSICAL SOLVENTS AND MIXTURE
Co-Chair - Fan Shi, Sr. Materials Scientist, NETL/AECOM; Nicholas Siefert & David Hopkinson

H8.2 ON-LINE AEROSOL MEASUREMENTS FROM COAL FIRED FLUE GAS IN PILOT SCALE POST-COMBUSTION CO2 CAPTURE
Co-Chair - Chiranjib Saha, Adv. Eng., Southern Research National Carbon Capture Center; J. Irvin

H8.3 FIELD-SCALE MODELING OF LOCAL CAPILLARY TRAPPING DURING CO2 INJECTION INTO A SALINE AQUIFER
Bo Ren, Research Assistant, The University of Texas at Austin; Larry W. Lake, University of Texas at Austin; Steven L. Bryant, University of Calgary

H8.4 CO2 HYDRATE FORMATION AND LCC ANALYSIS FOR COOLING APPLICATION
Shol Kim, Graduate Student, Korea University; Yong Tae Kang

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Friday | February 5 | 1PM - 3PM

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Wednesday | February 3 | 1PM - 3PM

I1. WASTEWATER MANAGEMENT

I1.1 REACTOR VESSELS TO MANAGE & TREAT WASTEWATER AT ASH PONDS & LANDFILLS
Mark Kropilak, CEO, Liberty Hydro, Inc.

I1.2 ENERGY NEUTRALITY IN WASTEWATER TREATMENT
Tom Stanley, CTO, GE Water & Process Technologies, GE Power & Water

I1.3 MINIMIZING WATER FOOTPRINT BY IMPLEMENTING SEMI-BATCH REVERSE OSMOSIS
Session Sponsor & Co-chair - Dr. Rick Stover, EVP, Desalitech

I1.4 ELG COMPLIANCE AT COAL FIRED POWER STATIONS
Session Sponsor & Co-chair - Michael Preston, Section Leader, Black & Veatch

I1.5 NATIONAL NUTRIENT REDUCTION STRATEGY UPDATE
Diane Martini, Senior Water/Wastewater Consultant, Burns & McDonnell; Sarah Gilstrap

I1.6 AN UPDATE ON THE WATER RESEARCH CENTER
Tyler Cromey, Research Engineer, Southern Company Services, Inc.

Wednesday | February 3 | 3:30PM - 5:30PM

I2. WATER & ELECTRIC UTILITIES

I2.1 MODELING ELECTRICITY SECTOR VULNERABILITIES RELATED TO WATER TEMPERATURES
Jordan Macknick, NREL; Macknick, Brinkman, Ibanez, Tomberlin, Hunsberger, Kandt & Miara

I2.2 THE LATEST TECHNOLOGICAL UPDATES IN OIL SPILL CONTAINMENT SYSTEMS
Bill Gannon, President, Solidification Products International, Inc.; John Panaro

I2.3 ENERGY SAVINGS THROUGH PIPE SELECTION
Rosemary Smud, Sales Engineer, American Cast Iron Pipe; Maury Gaston

I2.4 ENHANCE COORDINATION BETWEEN ELECTRIC AND WATER UTILITIES
Nushat Thomas, Team Leader, U.S. Environmental Protection Agency; Lauren Wisniewski

I2.5 BR RISK MGMT; PREDICTIVE MODEL DEVELOPMENT FOR DISINFECTION BYPRODUCTS
Co-chair - Brian Mastin, Senior Consultant, Parsons

I2.6 SCE STORM WATER MGMT & FLOOD PREPAREDNESS IMPROVEMENT INITIATIVE
Co-chair - Denise Yaffe, Mgr., Southern California Edison; Lakes, Barr, Akunyili & Johnson

Thursday | February 4 | 7:30AM - 9:30AM

I3. 316(B)

I3.1 EPA'S 316B RULE: HOW TO ACHIEVE COMPLIANCE
Greg Seegert, Chief Ichthyologist, EA Engineering, Science & Technology

I3.2 IMPACTS OF EPA 316(B) ON POWER PLANT COOLING WATER INTAKES
Roman Carter, National Account Manager, Intralox / Hydrolox; Tim Woodrow

I3.3 CLEAN WATER ACT RULE: EXPANDING RISK & LIABILITY FOR PROJECT PROPONENTS
Kerry McGrath, AssociateDeidre G. Duncan, Partner, Hunton & Williams

I3.4 316(B) IMPINGEMENT COMPLIANCE: UNDERSTANDING DE MINIMIS
Co-chair - Radhika de Silva, Sr. Project Manager, HDR Engineering; Mark Bailey

I3.5 316(B) - OVERVIEW OF TECHNICAL FEASIBILITY AND COST EVALUATION STUDY
Joy Rooney, Senior Associate, Sargent & Lundy LLC; Ken Snell & Mehrdad Salehi

I3.6 IMPLEMENTING U.S EPA'S 316(B) RULE
Sean Ramach, Environmental Scientist, U.S. Environmental Protection Agency

Thursday | February 4 | 10AM - 12PM

I4. FGD WASTEWATER - ZLD

I4.1 ZLD APPROACH BY APPLYING SPRAY DRYER EVAPORATOR (SDE™) TECHNOLOGY
Co-chair - Paulo Oliveira, Product Marketing Manager, Alstom Power, Inc.; Phil Rader

I4.2 THERMAL ZLD SYSTEM USING A SDE IN A WASTE TO ENERGY PLANT
Robert Van Durme, P.E., Key Account Manager, Lechler Inc.; Ashwin Patni

I4.3 FGD ZLD PROCESS IMPACT ON HEAT RATE & OTHER PLANT PARAMETERS
Benjamin Laurent, Senior Process Engineer, Heartland Technology Partners

I4.4 PROCESSING POWER PLANT WASTE TO HIGH MARKETABLE COMMODITIES
Robert Bobeck, Technical Sales, Dustex LLC; Patrick Paul

I4.5 UPDATE ON B&W ZLD ACTIVITIES
Steven Feeney, Product Line Manager, Babcock & Wilcox; Steve Feeney & Mike Klidas

I4.6 FORWARD OSMOSIS BASED HIGH WATER RECOVERY SOLUTIONS
Co-chair - Mary Theresa Pendergast, Director - Solutions R&D, Oasys Water; John Tracy

Thursday | February 4 | 1PM - 3PM

I5. FGD WASTEWATER

I5.1 PRE-FABRICATED PROCESS EQUIPMENT SOLUTION TO MEET ELG & CCR STANDARDS
Co-chair - James Peterson, President, Frontier Water Systems

I5.2 EFFECTS OF MERCURY CONTROL TECHNOLOGIES ON FGD WASTEWATER QUALITY
Mandi Richardson, Sr. Chemist, AECOM; Blythe, AECOM; Dene, EPRI; Acharya, Southern Co.

I5.3 ELG AND CCR COMPLIANCE - THE DOLLARS ARE IN THE DETAILS
Dennis Fink, Senior Project Manager, CH2M; Dr. Thomas E. Higgins

I5.4 ELG COMPLIANCE SOLUTIONS – AN IN-DEPTH LOOK AT FGD FLOWRATE IMPACTS
Jeromy Jones, AQCS Manager, Burns & McDonnell

I5.5 RECENT ADVANCES IN WASTEWATER MEASUREMENTS OF HG, AS AND SE USING AFS
Co-chair - Warren Corns, R&D Manager, P S Analytical; Cornelius Brombach

I5.6 EFFECT OF OPERATING CONDITIONS OF FGD UNIT ON FORM OF SELENIUM IN LIQUOR
Hiroyuki Akiho, Reseach Scientist, CRIEPI; Naoki Noda, Hiromi Shirai & Shigeo Ito

Thursday | February 4 | 3:30PM - 5:50PM

I6. 316(B), ELG, WASTEWATER

I6.1 APPROACHES TO ELG COMPLIANCE FOR FGD WASTE WATERS
Kristen Bell, Senior Associate, Sargent & Lundy

I6.2 GREEN ALTERNATIVES FOR WATER SUPPLY DEVELOPMENT
Henry Hunt, Sr. Project Manager, Layne - Ranney Collector Wells

I6.3 CONTROL OF DREISSENID MUSSELS WITH A MORE RATIONAL USE OF COPPER
David Hammond, Ph.D., Senior Scientist, Earth Science Labs, Inc.

I6.4 COMPLIANCE WITH BOTH 316(B) AND THE ENDANGERED SPECIES ACT
Harriet Nash, NOAA's National Marine Fisheries Service; Ashfeld, U.S. Fish & Wildlife Svc.

I6.5 316(B) STRATEGIES FOR ADVANCED INTAKE SCREEN RETROFITS
Co-chair - Mark Bell, Sales Manager, Bilfinger Water Technologies GmbH

I6.6 316(B) OVERVIEW OF IMPINGEMENT TECHNOLOGY SELECTION PROCEDURE
Co-chair - Mehrdad Salehi, Sr. Associate, Sargent & Lundy LLC; Ken Snell & Joy Rooney

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TRACK | I | WATER & 316(B)

Friday | February 5 | 7:30AM - 9:30AM

I7. WATER SUSTAINABILITY

I7.1 THE ENERGY-WATER NEXUS: RESILIENT, SUSTAINABLE COMMUNITIES AND CHP
Co-chair - Scott Hutchins, Stakeholder Engagement, U. S. Department of Energy

I7.2 WATER BALANCE ANALYSIS, MONITORING, & MGMT. TOOL FOR POWER PLANTS
Charlie He, Assoc. VP, Carollo Engineers; E. McLeskey, G. Carpenter, J. Dresang & C. Chiu

I7.3 SUPPORTING THE HEART OF THE WATER - ENERGY - FOOD NEXUS
Maury Gaston, Manager of Marketing Services, American Cast Iron pipe

I7.4 MONETIZING WATER EFFICIENCY - THE RESNET WATER EFFICIENCY RATING INDEX
Steve Baden, Executive Director, RESNET

I7.5 PREVENTIVE SAFETY MEASURE FROM POLLUTED SURFACE WATER LEAKAGE IN BLDNGS
Nasser Alhemiddi, Professor, King Saud U.; A. Alhemiddi, M. Arch. & A. Alhemiddi, B. Arch

I7.6 WATER REUSE FOLLOWING GROUNDWATER EXTRACTION & TREATMENT
Christina Rain, P.E., Project Engineer, Langan Treadwell Rollo; Graber, Glenn & Shipman

Friday | February 5 | 10AM - 12PM

I8. WATER SUPPLY & SECURITY

I8.1 A SOLUTION TO OUR WATER SUPPLY PROBLEM
John Wilson, Territory Manager, American Cast Iron Pipe, Maury Gaston

I8.2 DREDGING YOUR RESERVOIR: ENHANCING THE RESILIENCY OF YOUR WATER SUPPLY
Sarah Howard, Sr. Environmental Scientist, Black & Veatch; Elizabeth Quinlan

I8.3 AN INNOVATIVE SOLUTION TO PREDICTIVE WATER MODELING FOR UTILITIES SECTOR
Kenn Cygan, Director, Nalco, an Ecolab Company; April YeYoung Yi

I8.4 WEANING OURSELVES FROM OUR WASTEFUL WATER WAYS
Ned Daugherty, Principal Architect, H2O Futures

I8.5 ENGAGING A UNIVERSITY ON WATER CONSERVATION
Co-chair - Kyle Mann, Energy Efficiency Program Specialist, CA State University Fullerton

I8.6 GIS-FORECASTED SURFACE HYDROLOGY FOR REDUCING RISKS OF FOOD PRODUCTION
Abdrabelnabi Abdelhady, Professor, Damanhour Univ; Aggag, Abdelaty & Bahnassy

TRACK | J | FLEET, BATTERY & STORAGE

Wednesday | February 3 | 1PM - 3PM

J1. FLEET

J1.1 A CLIMATE-STABILIZING CALIFORNIA FLEET, VERSUS AIR RESOURCE BOARD GOALS
Michael Bullock, Transportation Committee Chair & Retired Satellite Sys.Eng., Sierra Club

J1.2 COMPARING PEV CONSUMER INCOMES TO NEW-CAR BUYERS
Co-chair - Brett Williams, Mgr. - EV Initiatives; Center for Sustainable Energy; Jessica Jinn

J1.3 HOW CITY FLEETS CAN BECOME A CATALYST FOR A NATIONAL EV TRANSIT
Amy Lopez, Director of Corporate Engagement, Electrification Coalition

J1.4 MAKING FLEET TELEMATICS DATA ACTIONABLE AND MATTER
Co-chair - Norma Havens, Co-National Sales Manager, USA Fleet Solutions; Bob Belknap

J1.5 COMING CHALLENGE TO US SUBURBIA, GROWING CHINESE CAR FLEET
Alexandra Malazdrewicz, Student, Burns School of Management; Stephen Sewalk

Submit Abstract

Wednesday | February 3 | 3:30PM - 5:30PM

J2. EV, PHEV & CHARGING

J2.1 INTELLIGENT ELECTRIC VEHICLE CHARGING SYSTEM
Prateek Saxena, Director, Tech Mahindra

J2.2 COMPREHENSIVE EV FAST CHARGING SOLUTIONS FOR 21ST CENTURY UTILITIES
Co-chair - Paul Glenney, Director, Products & Services, NRG EVgo; Michael Krauthamer

J2.3 ZERO-EMISSION VEHICLE MARKETS: DISADVANTAGED COMMUNITIES & CALIFORNIA
Brett Williams, Sr. Project Manager, EV Initiatives, CSE; John Anderson & Ria Langheim, CSE

J2.4 VEHICLE-GRID INTEGRATION USING ISO/IEC 15118 GLOBAL INTEROPERABILITY STANDARD
Stephen Davis, CEO, KnGrid; Mike Ferry & Michelle Bogen, Center for Sustainable Energy

J2.5 USING THE FLEET OF PHEVS FOR ENERGY STORAGE OF BOTH SOLAR AND WIND
Co-chair - Andrew Frank, CTO, Efficient Drivetrains Inc.; Andrew A Frank & JJ DeMauro

J2.6 INFORMATION CHANNELS FOR REACHING PLUG-IN ELECTRIC VEHICLE CONSUMERS
Clair Johnson,Transparency Specialist,Center for Sustainable Energy; Brett Williams

Thursday | February 4 | 7:30AM - 9:30AM

J3. BATTERY & STORAGE SYSTEMS

J3.1 ACTIA EV SOLUTIONS
Greg Fritz, EV Program Manager, ACTIA Corp

J3.2 ENERGY STORAGE + EV CHARGING - DRIVING ELECTRIC VEHICLE ADOPTION
Vic Shao, CEO, Green Charge Networks

J3.3 BUSTING MYTHS & BREAKING GROUND: VEHICLE TO GRID STORAGE FRONTIER
Co-chair - Scott Fisher, Director of EV to Grid, NRG EVgo

J3.4 INPROVE FUEL CONSUMPTION WITH ENVIROMNEMENTAL FRIENDLY DLCAP
Toshihiko Furukawa, Senior Manager/Engineer, United Chemi-Con

Submit Abstract

Submit Abstract

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TRACK | J | FLEET, BATTERY & STORAGE

Thursday | February 4 | 10AM - 12PM

J4. BATTERY & STORAGE

J4.1 GRID-SCALE ENERGY STORAGE PROVIDING COST-EFFECTIVE PEAKING CAPACITY
Co-chair - Kiran Kumaraswamy, Director, AES Energy Storage; Kate McGinnis

J4.2 ENERGY STORAGE USED FOR FREQUENCY REGULATION & GRID FIRMING
Co-chair - Paul B. Scott, VP Tech., Transpower; David Rosewater, Sandia Corporation

J4.3 LEGAL ISSUES AND OPPORTUNITIES FOR ENERGY STORAGE SYSTEM PROJECTS
Chris Locke and Brennan Bentley, Farella Braun + Martel; Steven Branoff, Ramboll Environ

J4.4 AN ADVANCED LEAD-ACID BATTERY FOR INTEGRATION WITH RENEWABLE ENERGY
Collin Mui, Lead Nanofabrication Engineer, Gridtential Energy, Inc., Daniel Moomaw, Steve Hinojosa & Christiaan Beekhuis

J4.5 HIGHER LEVELS OF RENEWABLES W/ GRID-SCALE COMPRESSED AIR ENERGY STORAGE
Lincoln Bleveans, Pwr. Resources Mgr., Burbank Water & Power; R. Schulte, Schulte & Asso.

Submit Abstract

Thursday | February 4 | 1PM - 3PM

J5. BACK-UP PWR & THERMAL ENERGY STORAGE

J5.1 THERMAL ENERGY STORAGE - "VIRTUAL BATTERIES"
Guy Frankenfeld, Manager - TES & Biofuels, DN Tanks

J5.2 BACK-UP POWER: ADVANCED FUEL CELL TECH. PROTECTING 21ST CENTURY APPLICATIONS
Co-chair - Vito Coletto, Director of Sales, Altergy Systems

J5.3 HYDROGEN AS ENERGY STORAGE & FUEL FOR STEAM INJECTED GAS TURBINE PLANT
Joshua Partheepan, Research Assistant, West Texas A&M University; William Jim Rogers, West Texas A&M University; Edward Hinders, Paramount Energy West

ANODE MATERIAL USING HIERARCHICAL MICRO-LAMELLA 3D POROUS COPPER CURRENT
Hyeji Park, Student, Kookmin U; Um & Sung, Seoul National U; Choi & Choe, Kookmin U

Submit Abstract

Submit Abstract

Thursday | February 4 | 3:30PM - 5:30PM

J6. UPS, FLOW & LI-ION BATTERIES

J6.1 DEVELOPMENT OF LITHIUM ION BATTERY MATERIALS FOR GRID APPLICATIONS
Co-chair - Dee Strand, Chief Scientific Officer, Wildcat Discovery TechnologiesYe Zhu

J6.2 FIRE SAFETY AWARENESS OF LITHIUM ION BATTERIES
Matt Dunn, Principal, AECOM

J6.3 COST REDUCTIONS FOR LITHIUM ION BATTERIES THROUGH TECHNOLOGY
Co-chair - Dr. Rajshekar DasGupta, Vice President Technology, Electrovaya

J6.4 BEYOND BATTERY MGMT: ENABLING ESS INTEGRATION IN GRID ECOSYSTEMS
Michael Worry, President and CEO, Nuvation Engineering

J6.5 SEAWATER FLOW BATTERY FOR CLEAN COLD-IRONING & FLEET VEHICLE FUELING
Peter Schubert, Professor, Indiana University-Purdue University Indianapolis

J6.6 SGIM ADVANCED BATTERIES
Pavel Bulai, CEO, SGiM; Boksha, Tompa, Ziegenbalg, Jewell, Chow, Foster, Hogan, Progler, Salagaj, Ryjov, Zavorotnyi, Saeed, AlDamer, Molchanov, Strukov, Golubeva & Pitlik

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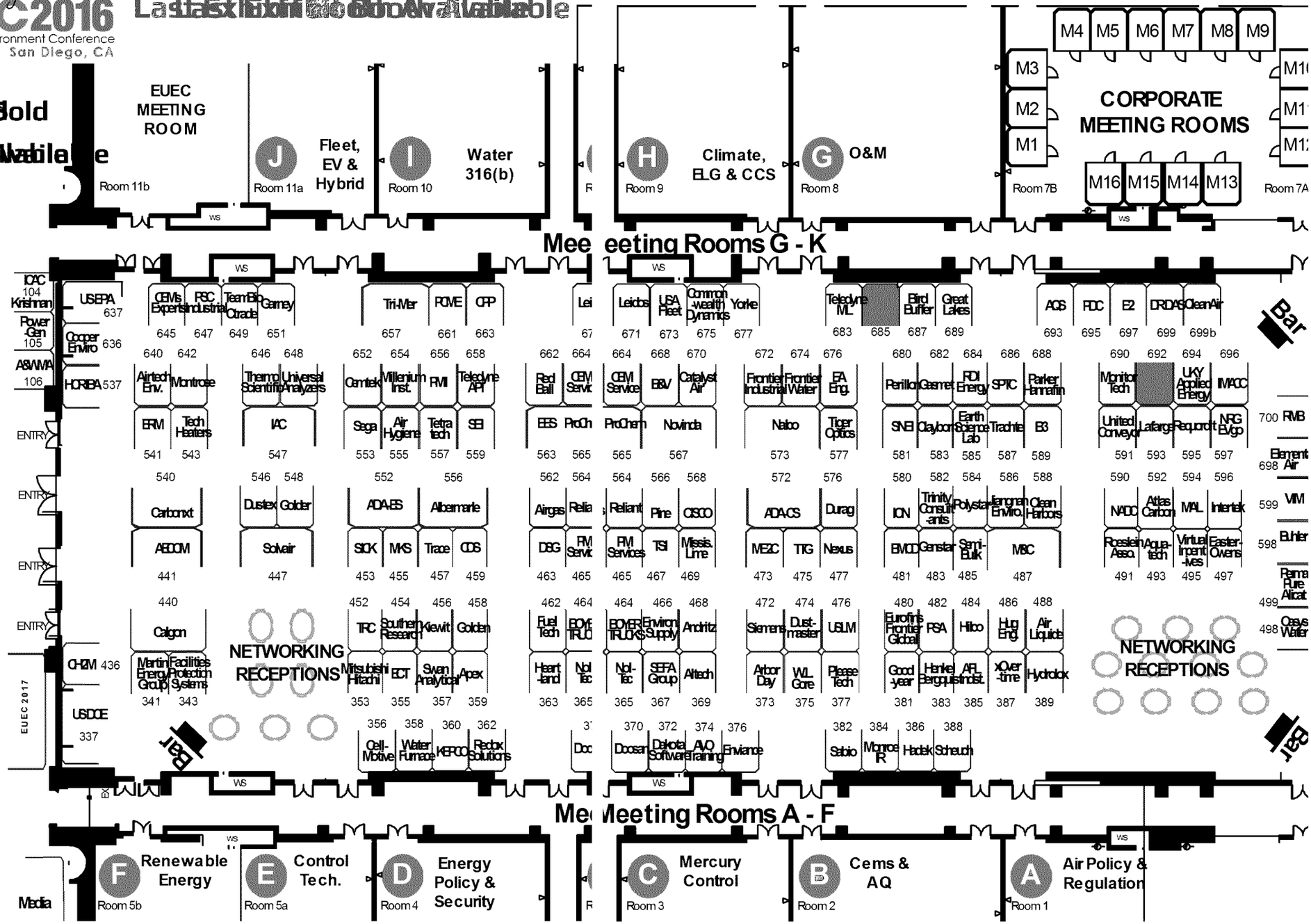

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6. Exhibitor Advertisement in program, web, and newsletter
7. Ten (10) free EUEC client passes* (value $495/each)

EXHIBIT SHOW HOURS

Tue. Setup	1 pm to 6 pm
Wed. Feb 3	7 am to 7 pm
Thur. Feb 4	7 am to 7 pm
Friday Feb 5	7 am to 12 pm
Breakdown	12 pm to 4 pm

NETWORK RECEPTIONS
located in Exhibit Hall

AM Breaks	9:30 am to 10 am
Lunches	12 pm to 1 pm
PM Breaks	3 pm to 3:30 pm
Receptions	5 pm to 7 pm

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572 ADA Carbon Solutions
552 ADA-ES, Inc.
441 AECOM, Inc.
358 AFL Industries
555 Air Hygiene
488 Air Liquide America
693 Air Quality Services
562 Airgas
640 Airtech Environmental
556 Albemarle
499 Alicat
369 Altech
468 Andritz Inc.
359 Apex Instruments, Inc.
493 Aquatech International
373 Arbor Day Foundation
592 Atlas Carbon, LLC
374 AVO Training Institute
106 AWMA
589 B3 Systems, Inc.
383 Bergquist Co., a Henkle Co.
687 BirdBuffer, LLC
668 Black & Veatch
464 Boyer Trucks
598 Buhler Technologies
481 Burns & McDonnell
440 Calgon Carbon
540 Carbonxt, Inc.
670 Catalyst Air Mgmt.
459 CDS Engineering
356 Cellmotive Co., Ltd.
664 CEM Service Group, Inc.
645 CEMS Experts
652 Cemtek Environmental, Inc.
436 CH2M
689 Chemtura - Great Lakes
583 Clayborn Labs
588 Clean Harbors
699 CleanAir Engineering
675 Commonwealth Dynamics
636 Cooper Environmental Svc.
663 CPP Wind & AQ Consultants
649 CTrade
568 CiSCO
372 Dakota Software
370 Doosan HF Controls Corp.
699 DR DAS LTD
463 DSG Solutions, LLC
576 Durag, Inc.
546 Dustex Corporation
474 Dustmaster Enviro Systems
697 E2 Managetech
676 EA Engineering, Sci. & Tech.
585 Earth Science Labs, Inc.
497 Easter-Owens
698 Elemental Air
376 Enviance
355 Environ. Consulting & Tech
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672 Frontier Industrial Corp.
674 Frontier Water Systems,
462 Fuel Tech, Inc.
651 Garney Construction
682 Gasmet
483 Genstar Tech. (GENTEC)
458 Golden Specialty
548 Golder Associates. Inc.
381 Goodyear Tire & Rubber
386 Hadek
363 Heartland Technology Partners
484 Hilliard Company - Hilco
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389 Hydrolox
104 ICAC
696 IMACC, LLC
596 Intertek
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384 KEPCO
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104 Krishnan & Associates
593 Lafarge
671 Leidos
487 M & C Tech Group NA
594 MALEnvironmental Technology
341 Martin Energy Group
102 McIlvaine Company
473 Midwest Energy Emissions
654 Millennium Instruments
469 Mississippi Lime Company
353 Mitsubishi Hitachi Power
455 MKS Instruments, Inc.
690 MonitorTech, Corp
384 Monroe IR
642 Montrose Environmental
573 Nalco Air Protection Tech.
477 Nexus Solutions, Inc.
365 Nol-Tec Systems
590 North American Dismantling
567 Novinda
597 NRG EVgo
498 Oasys Water
482 P S Analytical
688 Parker Hannifin Corp.
661 PCME
695 PDC Environmental
680 Perillon
499 Perma Pure
566 Pine
465 Plant Maintenence Svcs.
377 PleaseTech Ltd.
584 Polystar Containment
103 Power
105 Power-Gen
656 Precesion Monitors Inc.
565 ProChem, Inc.
647 PSC Industrial Outsourcing LP
684 RDI Energy
662 Red Ball Technical Gas
362 Redox Solutions
564 Reliant CEM Services
595 RequordIt
700 RMB Consulting &Research
491 Roeslein & Associates, Inc.
382 Sabio Air Quality Inst.
388 Scheuch GmbH
367 SEFA Group, Inc, The
553 Sega, Inc.
453 SICK
472 Siemens Industry, Inc.
581 SNEI Biological
447 SOLVAir Natural Solutions
559 Southern Environmental
454 Southern Research
686 SPTC USA Corp.
357 Swan Analytical
649 Team Biogas
543 Technical Heaters, Inc.
658 TeledyneAPI
683 Teledyne Monitor Labs
557 Tetra Tech, Inc.
646 Thermo Scientific
577 Tiger Optics, LLC.
457 Trace Environmental Sys.
587 Trachte, LLC
452 TRC Environmental Corp.
657 Tri-Mer Corporation
582 Trinity Consultants
467 TSI, Inc.
475 TTG, Inc.
591 United Conveyor Corp.
694 UKY Applied Energy Research
637 US EPA Water Security Division
476 US Lime & Mineral
673 USA Fleet Solutions
648 Universal Analyzers, Inc.
337 US DOE, Office Clean Coal
599 VIM Technologies, Inc.
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Newmont Nevada Energy Investment
NextEra Energy
NiSource
Northern Indiana Public Service Co.(NIPSCO)
Northern Star Generation
NorthWestern Energy
Nova Scotia Power
NRECA
NRG Energy
NV Energy
ODEC
Oklahoma Gas & Electric Company
Old Dominion Electric Cooperative
Omaha Public Power District
Orange Grove Energy
Pacific Gas & Electric
PCPS Energy
Portland General Electric
PPL EnergyPlus LLC
PPL Montana LLC
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Raven Power
Rochester Public Utilities
Rodan Energy Solutions Inc.
Rural Electric
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Salt River Project
SAN DIEGO GAS AND ELECTRIC
Santee Cooper
SCANA
Schneider Electric
Sempra US Gas and Power
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STEP 2. ENTER CHOICE OF BOOTH NUMBER FROM FLOOR PLAN	1st	2nd	3rd

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	Full Name	Email
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(Free Speaker):		
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STEP 4. CONTACT INFORMATION:

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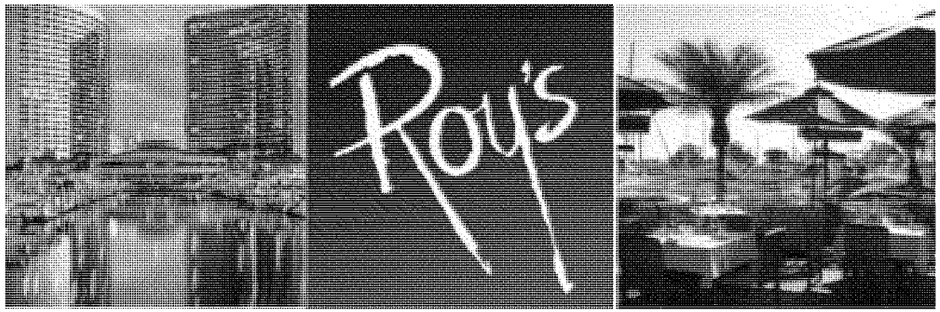
Tuesday, February 2nd, 2016 : 5 pm to 7 pm
Network with EUEC colleagues, clients & guests
RSVP for complimentary hors d'oeuvres and beverage tickets



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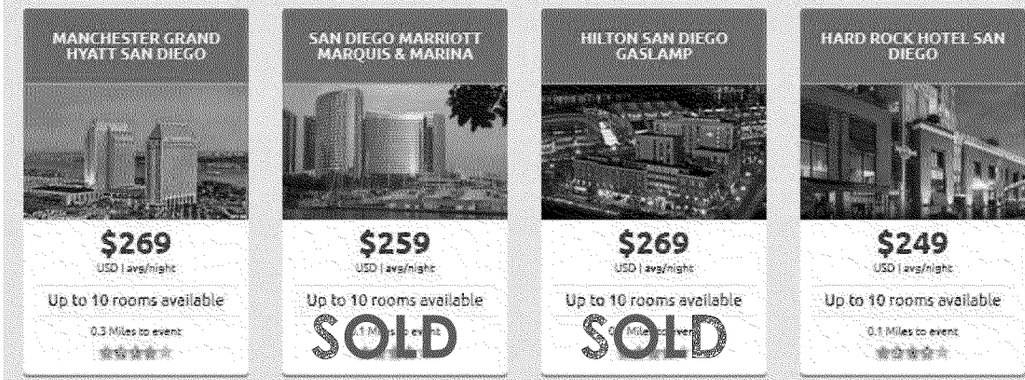

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From: Meiburg, Stan
Location: DCRoomARN3530CFTB/DC-Ariel-Rios-AO
Importance: Normal
Subject: FY 2015 End-of-Year Deputy Administrator Goal Performance Progress Review – Goal 1: Addressing Climate Change and Improving Air Quality
Start Date/Time: Tue 12/15/2015 4:00:00 PM
End Date/Time: Tue 12/15/2015 5:00:00 PM
Draft Final Goal 1 EOY Presentation for OCFO 12 10 15 .pptx
Goal 1 Performance Table.pptx

SCt: Natalie Johnson 202/564-4196
Ct: Leila Lackey 202/564-5957; Debbie Rutherford 202/564-1913

Call In # **Conference Code**

EPA Staff For All 5 Goal Meetings (Required):
David Bloom, DCFO
Howard Osborne, ACFO
Kathy O'Brien, OPAA, OCFO
Phil Metzger, Advisor to CFO
Ben Scaggs, Acting ADA
Malena Brookshire, OPAA, OCFO
Debbie Rutherford, OPAA, OCFO
Christopher Gollan, OPAA, OCFO
Leila Lackey, OPAA, OCFO
Dominic Nelson, OPAA, OCFO

Goal 1 Meeting:
Janet McCabe, Acting AA OAR
Betsy Shaw, DAA OAR
Deb Thomas, DRA R8
Carl Daly, R8
Eric Wortman, R8
Margaret Walters, OAR
Daniel Hopkins, OAR
Marc Vincent, OAR
Zach Church, OPAA, OCFO
Shaun McGrath
Darcy O'Conner
Stephanie Vuong
Joel Scheraga
Deborah Jordan
Lori Stewart
Jim DeMocker
Omayra Salgado
Mike Koerber

Jeff Whitlow
Ben Hengst
Mike Haley
Sarah Dunham
Pamela Bullard
Mike Flynn
Shelley Costa

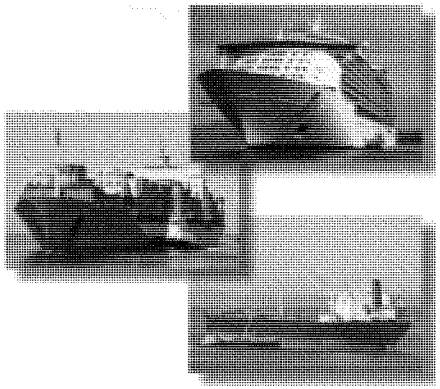
Purpose: To discuss OAR's overall FY 2015 performance and progress towards achieving the Agency's annual goals and long term goals in the Strategic Plan.

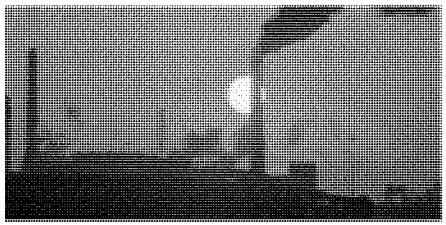
Role of the Deputy Administrator: The DA will provide direction and feedback on program performance to program and lead region senior managers (AA/RA/DAA/DRA).

Background: The DA holds these meetings twice a year with the program and lead region senior managers for each goal to review performance and progress towards the agencies strategic plan goals and objectives. The FY 2015 end-of-year discussions will focus on FY 2015 performance and progress achieved this year towards long term objectives, which includes a review of overall end-of-year performance highlights, accomplishments, challenges, and other exceptional EOY results. NPMs and Lead Regions for each strategic goal will discuss their most significant performance issues, including Agency priority Goals, providing an opportunity for senior leadership to assess Agency progress to date in advancing mission results under the goals, and looking ahead, to identify critical issues and actions for achieving results in FY 2016 and sustaining progress longer-term.

Teleconference Required?: yes

Video Conference Required?: yes

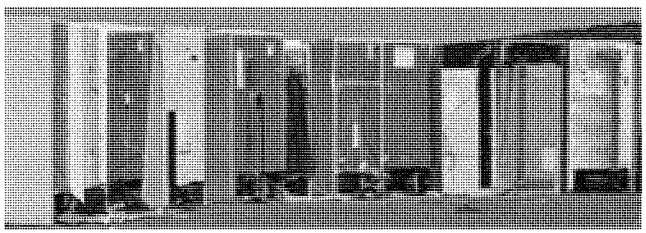
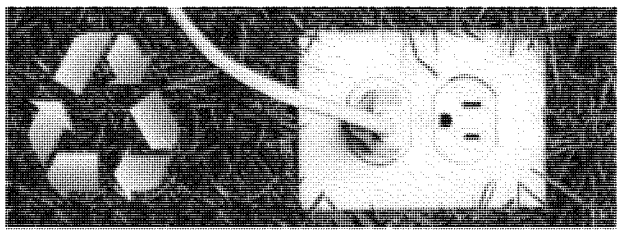




Goal 1

End of Year Performance Review

December 15, 2015

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AGENDA

FY 2015 Performance Summary and Accomplishment Highlights

- ***The President's Climate Action Plan***
  - Addressing Climate Change
  - Stratospheric Ozone
- ***Improve Air Quality***
  - Outdoor Air Quality
  - Indoor Air
- ***Radiation***

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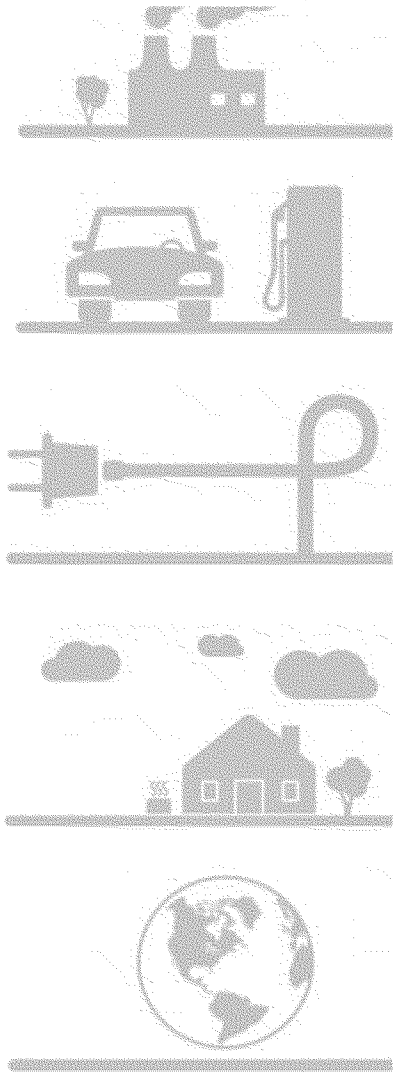
President's Climate Action Plan

KEY COMPONENTS

- Reducing carbon pollution from power plants
- Building a 21st century transportation sector
- Cutting energy waste in homes, businesses, and factories
- Reducing methane and HFCs
- Identifying vulnerabilities of key sectors to climate change
- Collaborating across the federal government, with state and local governments, and reporting entities
- Leading international efforts to address global climate change
- Protecting our country from the impacts of climate change



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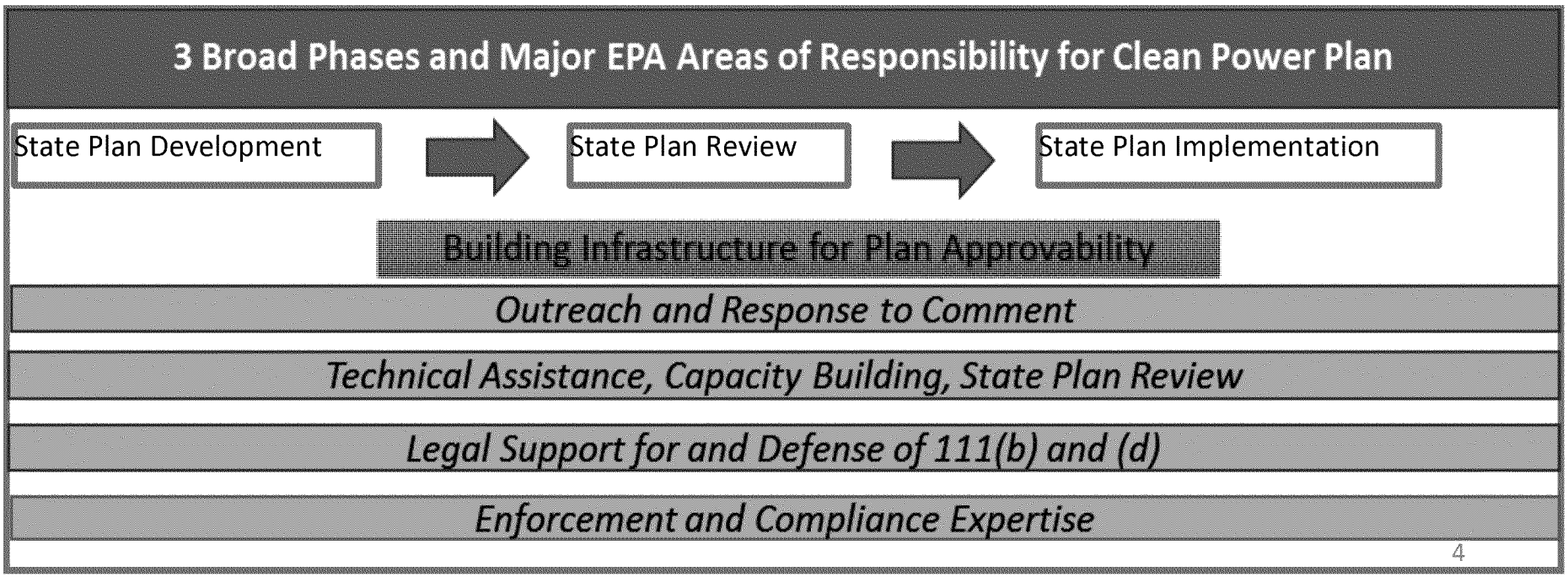
ADDRESS CLIMATE CHANGE

CLEAN POWER PLAN IMPLEMENTATION

- Key Accomplishments
  - Issued Clean Power Plan standards August 2015
  - Proposed Federal Implementation Plan
  - Issued proposal to address carbon pollution in Indian country and U.S. territories.



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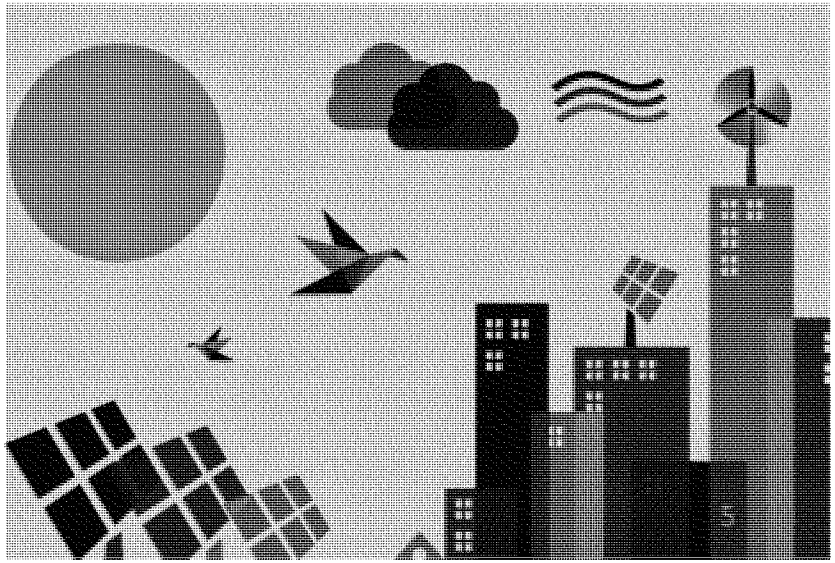
ADDRESS CLIMATE CHANGE

REGIONAL CLEAN POWER PLAN IMPLEMENTATION

- Clean Power Plan Implementation Activities
  - Unprecedented outreach through state calls, training calls and webinars, meetings with various stakeholders, and community outreach events.
    - Regions have participated in over a hundred stakeholder meetings.
    - Regions convening community meetings prior to the end of the Federal Plan comment period with a wide variety of stakeholders, including local elected officials, health and faith-based organizations, and EJ advocacy groups.
    - Regions and HQ are undertaking extensive internal coordination to ensure consistency among states and working across regional offices in anticipation of possible multi-state plans.
- Stakeholder Activities
  - States conducting outreach and public listening sessions.
    - Community engagement and input.
  - Third party organizations bringing industry and states together.
    - Facilitating collaboration between states on multi-state plans.



ADDRESS CLIMATE CHANGE

GREENHOUSE GASES IN TRANSPORTATION PROGRAMS

- Key Accomplishments
  - *Light-Duty Cars and Trucks:* Continued implementation of the GHG standards.
  - *Heavy-Duty trucks:* Implementing phase one of first-ever GHG standards for trucks, which required significant new compliance structures; proposed Phase 2 in June 2015.
  - *Aircraft*: Issued proposed endangerment finding and ANPRM in June 2015.
  - *Agency Priority Goal*: Met all milestones and overall goal. Now implementing FY 2016-2017 APG.
  - Renewable Fuel Standard: Proposed 2014-2016 RFS RVO Rule (finalized on 11/30/15).

- Performance and Trends
  - For second consecutive year, auto industry outperformed the GHG standard by a substantial margin.
    - Most manufacturers outperformed their individual 2013 standard.
    - All large manufacturers are in compliance with the 2012 and 2013 GHG standards.
    - Manufacturers continue to use a wide variety of compliance flexibilities that were designed into the program.

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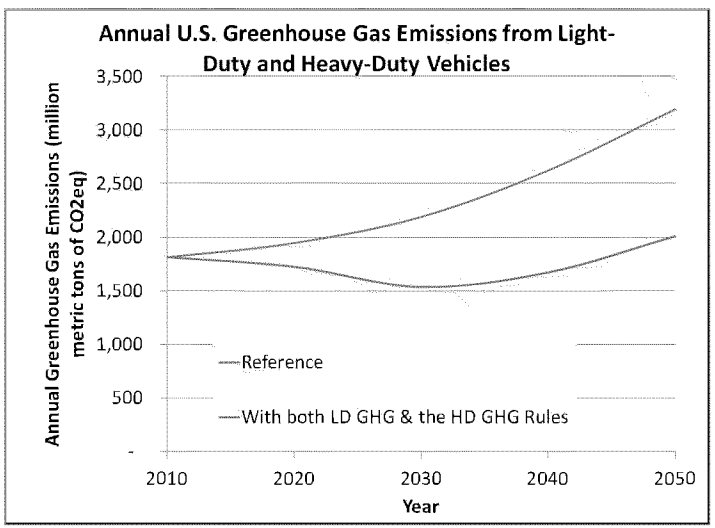
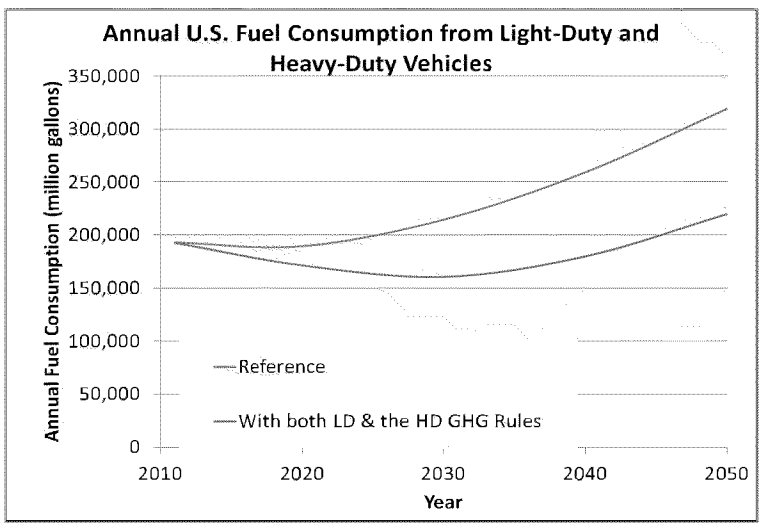
ADDRESS CLIMATE CHANGE

GREENHOUSE GASES IN TRANSPORTATION PROGRAMS: FY 2014- 2015 APG RESULTS

Reduce greenhouse gas emissions from cars and trucks							
Take Action on Climate Change and Improving Air Quality							
Performance Indicators		**TARGETS**		**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**
		FY 2014	**FY 2015**	**Actual**	**Actual**	**Actual**	**Actual**
Confirmatory Tests	LD	80-100	80-100	105	144	177	154
	HD	2	2				
Certificates Issued	LD	None	None	526	639	843	863
	HD	None	None				
Coastdown Surveillance Testing of Vehicles at Test Track	LD	15-20	15-20	36	20	20	15





ADDRESS CLIMATE CHANGE

CLIMATE PROTECTION PARTNERSHIP PROGRAMS

Partnership Programs are uniquely positioned to support:

- Climate Action Plan:
  - Establishing and maintaining voluntary standards for superior energy performance for products, homes, buildings and industrial processes.
  - Providing tools, information resources, and services to organizations and individuals interested in reducing GHG emissions.
- Clean Power Plan:
  - Providing technical and market expertise in support of EE/RE and EPA regulations.

More than 19,000 organizations and millions of Americans partner with EPA's climate partnership programs, preventing more than 420 MMTCO$_2$

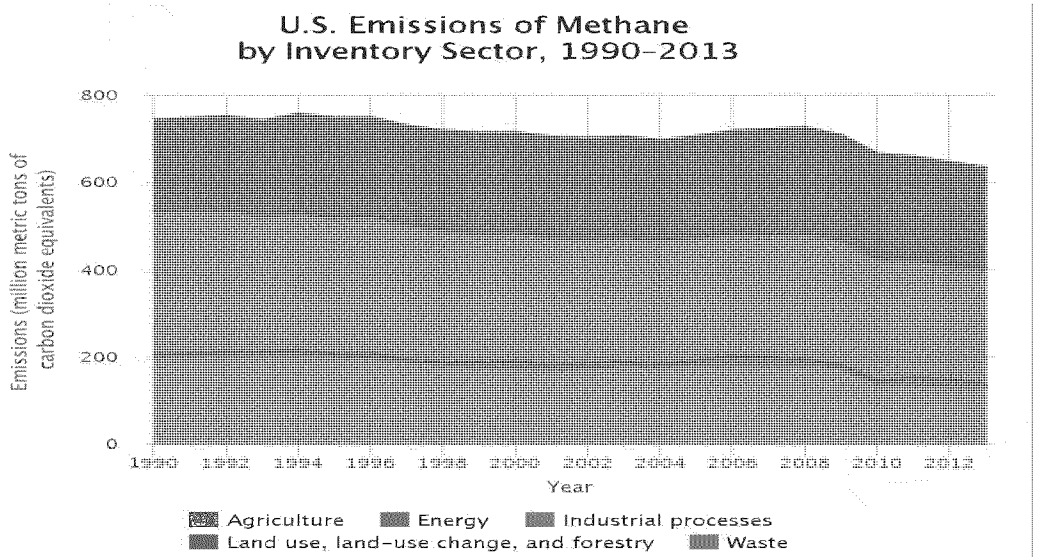
- ENERGY STAR Accomplishments:
  - Over 320 million ENERGY STAR certified products sold in 2014 across 70 product categories.
  - Nearly 1.6 million new homes, more than 25,000 existing commercial buildings and 130 industrial plants have earned the ENERGY STAR label.
  - More than 1,500 partners committed to using 35 billion kilowatt-hours of green power each year.
  - More than 480 partners have installed nearly 6,200 megawatts of new combined heat and power.
- Cross-Partnership Program Accomplishments:
  - Combined efforts of EPA programs have helped partners reduce emissions by 16.6 MMTCO2e.
  - EPA's methane and high-GWP program partners use EPA tools and resources to prevent emissions equal to the annual electricity use from more than 12 million homes.
  - Issued 2015 edition of the Energy and Environment Guide to Action: State Policies and Best Practices for Advancing Energy Efficiency, Renewable Energy, and Combined Heat and Power that states are using to meet their energy, environmental, and economic objectives.

ADDRESS CLIMATE CHANGE

REDUCING METHANE

- Key Accomplishments
  - Proposed standards for oil and natural gas industry
  - Proposed new standards to reduce methane emissions for new and existing landfills.
  - Proposed a new voluntary program – Natural Gas STAR Methane Challenge.
  - Finalized the *Biogas Roadmap.*

- Performance and Trends
  - Methane emissions in the U.S. decreased by almost 15% between 1990 and 2013.
  - However, methane emissions are projected to increase by approximately 4% between 2015 and 2020 and by approximately 8% between 2015 and 2030 absent EPA actions.



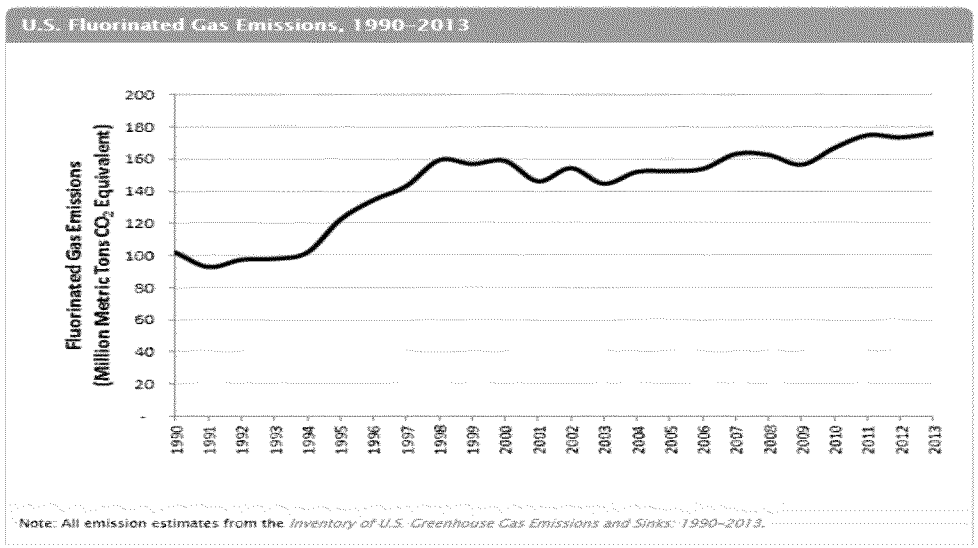
Source: U.S. EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2013.
http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html

ADDRESS CLIMATE CHANGE

REDUCING EMISSIONS OF HYDROFLUOROCARBONS

- Key Accomplishments
  - Progress under the Significant New Alternatives Policy (SNAP) program.
  - Mobilized public/private stakeholders to make robust, voluntary HFC commitments.
  - Developed proposed rule to improve HFC refrigerant management practices and reduce emissions.
  - Supported federal leadership in procurement of low-GWP HFC substitutes/ equipment.

- Performance and Trends
  - HFC emissions increased by 250% since 1990 - widely used as a substitute for ozone-depleting substances.
  - Without robust regulatory action, U.S. HFC emissions would nearly triple by 2030, and double from current lev



ADDRESS CLIMATE CHANGE

KEY SUPPORTING ACTIVITIES

- Key Accomplishments

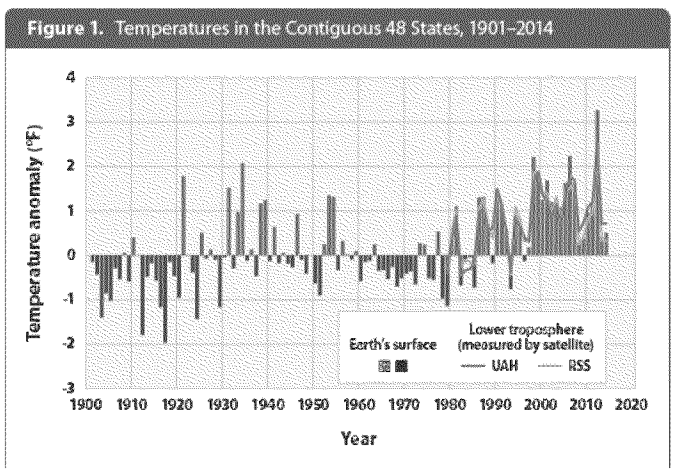
  Providing data and information to drive polices and programs

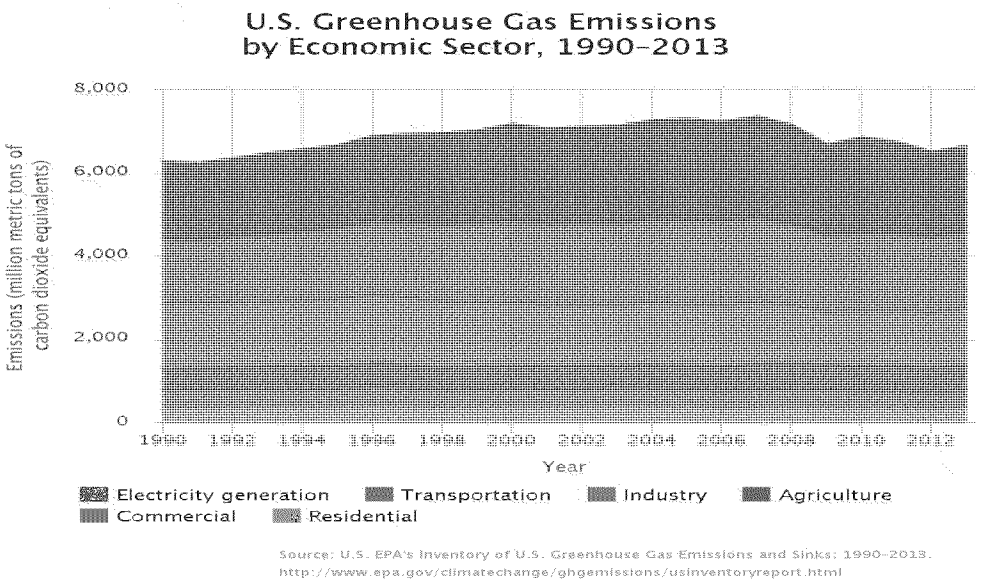
  - Successful implementation of the 5th year of electronic reporting of detailed GHG supply and emissions data from over 8,500 facilities across 41 industrial source categories.
  - Successful development and submission of the *US GHG Inventory of Emissions and Sinks* to the UNFCCC

  Advancing our understanding of climate science and impacts

  - Released a new analysis, Climate Change in the United States: Benefits of Global Action, (Climate Change Impacts and Risks Analysis project) and updates to the Climate Change Indicators Report
  - Proposed endangerment finding for GHG emissions from aircraft under section 231(a) of the CAA.
  - Worked closely with USGCRP to coordinate the development of the draft assessment of the Impacts of Climate Change on Human Health in the U.S.

- Performance and Trends



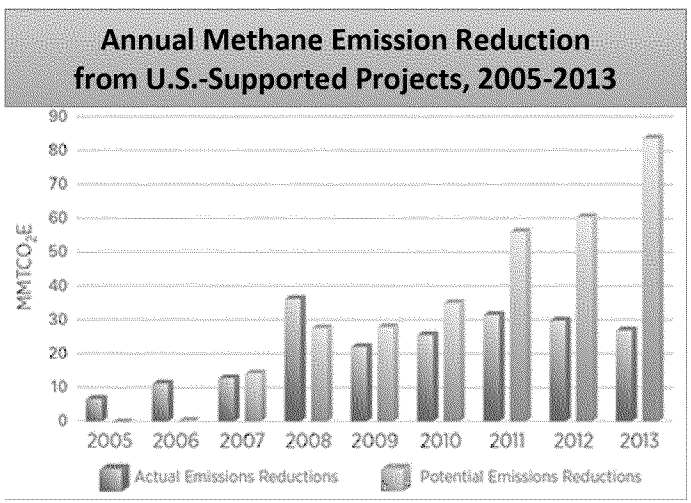


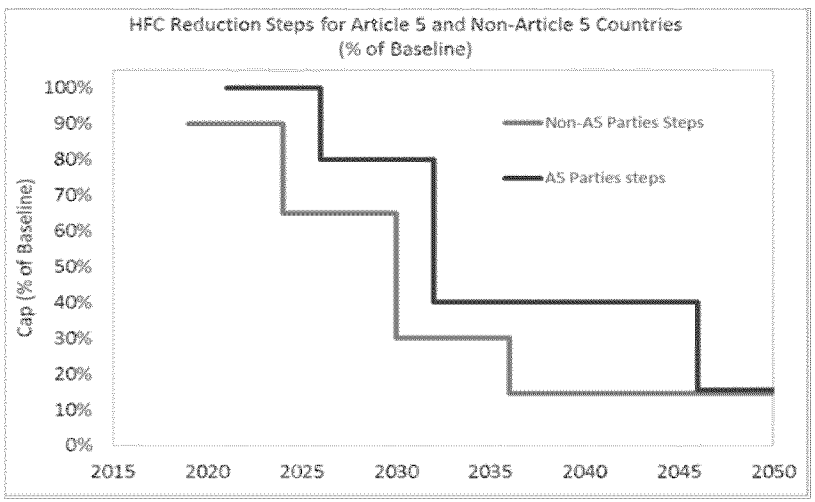
ADDRESS CLIMATE CHANGE

INTERNATIONAL ACTIVITIES

- Key Accomplishments
  - Supported UNFCCC negotiations in key technical areas.
  - Made major strides toward a global agreement to reduce HFCs under the Montreal Protocol.
  - Supported Arctic Council through research on arctic climate impacts and participation on AC expert group on black carbon and methane.
  - Provided technical and analytical support to the development of the US Biennial Report.
  - Enhanced global efforts to reduce methane emissions through the Global Methane Initiative and the Climate and Clean Air Coalition.
  - Enhanced bilateral cooperation with key countries.
  - Provided ad-hoc international technical assistance for transportation and stationary source sectors.

- Performance and Trends





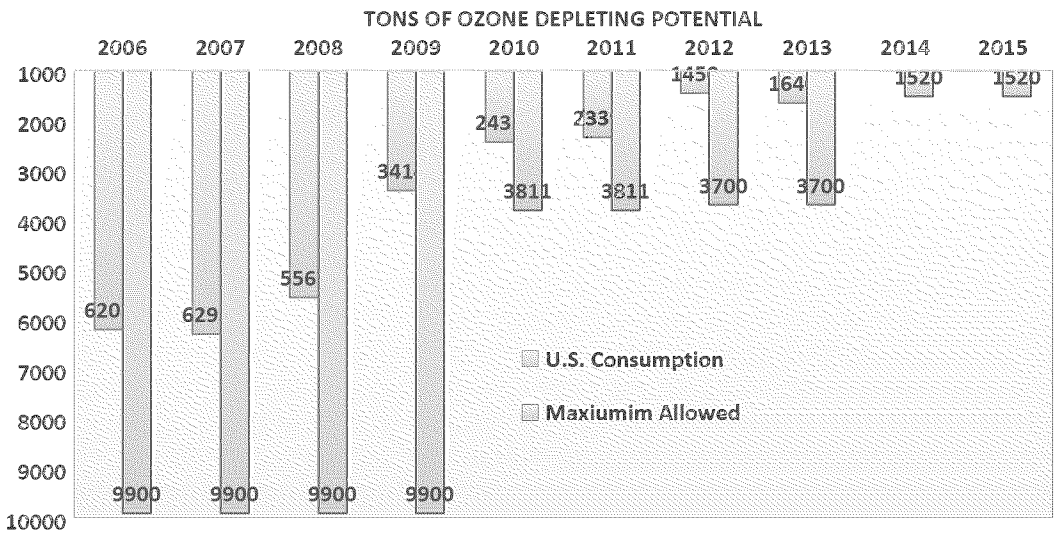
RESTORE AND PROTECT THE OZONE LAYER

- Key Accomplishments
  - In 2014, U.S. continued to outperform its obligations under the Montreal Protocol, holding HCFC consumption at more than 60% below required levels.
  - In 2015, EPA's HCFC allocation rule cut U.S. consumption by nearly 60% relative to 2014.
  - SNAP Program continues to list ozone- and climate-friendly alternatives.
  - Continued progress to support a worldwide transition from ODS through international leadership in the Montreal Protocol's Multilateral Fund.

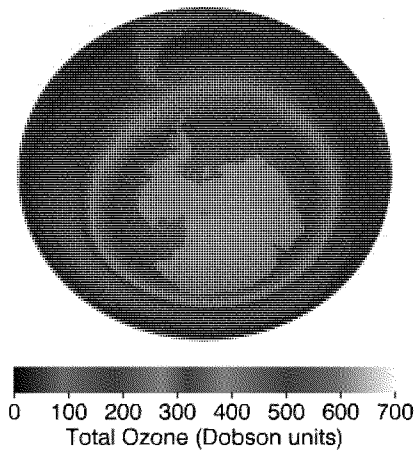
- Performance and Trends

Budget Measure: Remaining US consumption of HCFCs, chemicals that deplete the Earths protective ozone layer, measured in tons of Ozone Depleting Potential is less than the maximum allowed.

Scientists project ozone layer recovery by mid-century, assuming continued world-wide compliance.



As of October 2015



ADDRESS CLIMATE CHANGE

CLIMATE ADAPTATION

- Key Accomplishments – Consistent with the President's Climate Action Plan and Executive Order 13653 ("Preparing the United States for the Impacts of Climate Change"):
  - Building the adaptive capacity of EPA staff: EPA launched an intranet "Adaptation Resource Center" (ARC) that provides access for all EPA staff to training, tools, technical assistance, data, and communications materials related to climate adaptation. To date, there have been over 9,000 pages in the ARC visited by EPA staff.
  - Training: EPA produced a Climate Adaptation Training Module for Local Governments to help communities prepare for the impacts of climate change. To date, nearly 6,000 people across the U.S. have taken the training.
  - Tools: EPA produced a Storm Surge Inundation and Hurricane Strike Frequency Mapping Tool that enables coastal communities to prepare for and adapt to more frequent and intense hurricanes and storm surges.
  - Financial incentives: The new Great Lakes Restoration Initiative *Action Plan II*, released by EPA Administrator Gina McCarthy, commits federal agencies to develop and incorporate climate resiliency criteria in project selection processes.

- Performance and Trends:
  - Building the adaptive capacity of communities: In FY 16, EPA will launch a public "Adaptation Resource Center" for local government officials and community leaders. The Center will be a "one-stop shop" through which communities can access training, tool, technical assistance, case studies, information about EPA financial resources, and other information to support their efforts to adapt to a changing climate.
  - Training: EPA will release to the public a Climate Adaptation Training Module for Water Resource Managers to help them prepare for the impacts of climate change.
  - Enforcement: EPA will develop a new draft policy for addressing climate risks in Clean Water Act enforcement remedies.

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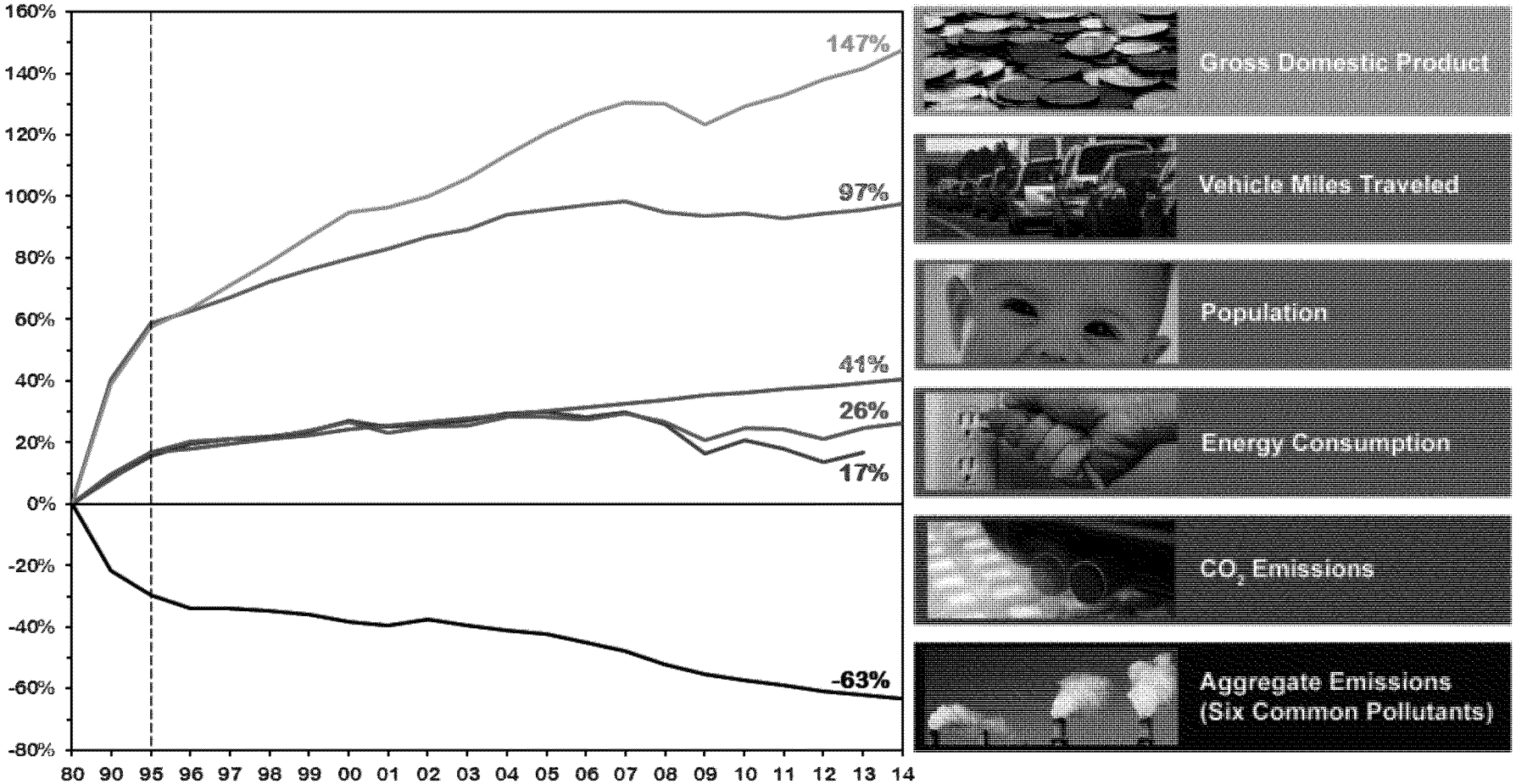
PROGRESS TOWARD CLEAN AIR 1980-2014

POLLUTION DOWN WHILE GROWTH CONTINUES

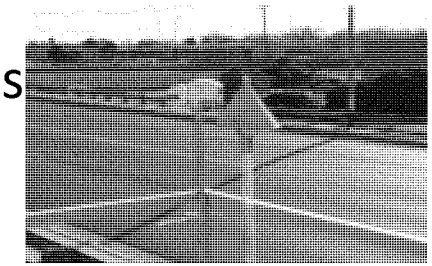
Comparison of Growth Areas and Emissions, 1980-2014



IMPROVE AIR QUALITY

OUTDOOR AIR QUALITY PROGRAMS

- Strengthening environmental protection
  - Finalized revisions to ozone NAAQS
  - Issued updated NESHAPs for 12 source categories, including refineries
  - Issued final NSPS for wood heaters
  - Continued deployment of near-roadway monitors



- Enhancing and modernizing tools
  - Proposed revisions to Modeling Guidelines and Cost Manual
  - Launched eSIP submittal system
- Implementing air quality and emission standards
  - Phase 1 of CSAPR effective Jan 2015 (Phase 2 begins in 2017)
  - Addressing interstate transport for 2008 ozone NAAQS
  - Issuing designations for revised NAAQS, including PM2.5 and SO2

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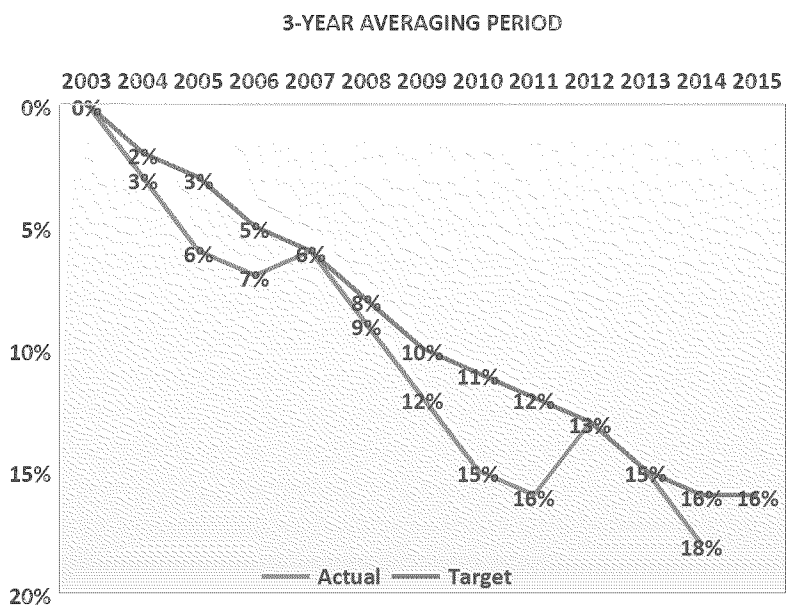
IMPROVE AIR QUALITY

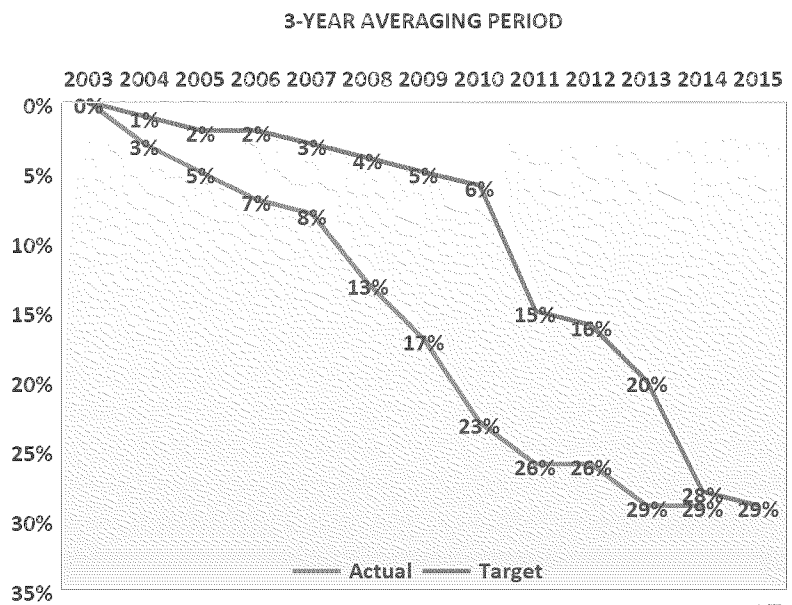
OUTDOOR AIR QUALITY PROGRAMS: PROGRESS ON OZONE AND PM

- Performance and Trends
  - FY 2014 data shows improved ambient ozone and PM2.5 concentrations compared to FY 2013 levels.

KPI Ozone: Cumulative percentage reduction in population-weighted ambient concentration of ozone in monitored counties from 2003 baseline.

KPI PM 2.5: Cumulative percentage reduction in population-weighted ambient concentration of PM2.5 in monitored counties from 2003 baseline.

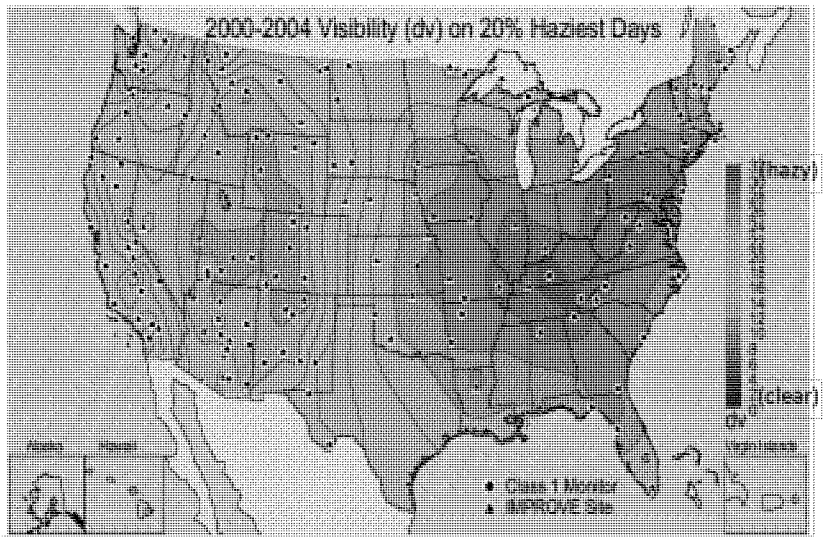


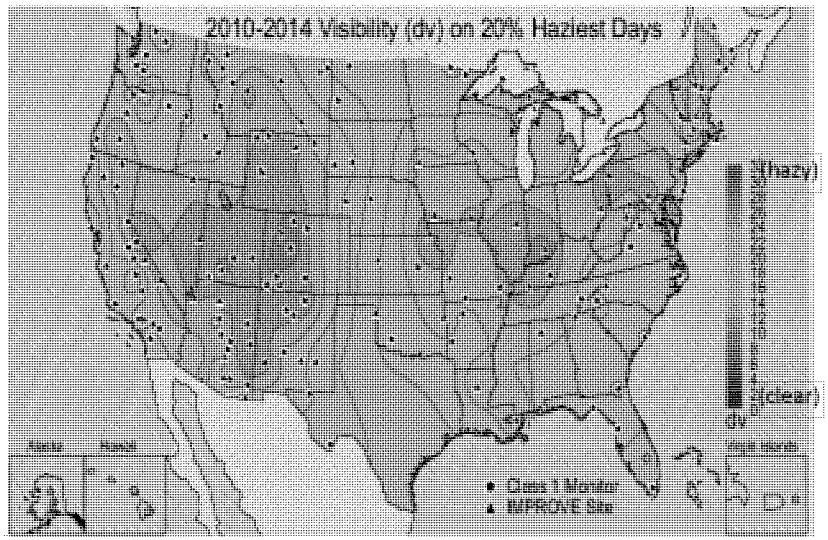


IMPROVE AIR QUALITY

OUTDOOR AIR QUALITY PROGRAMS: IMPROVEMENTS IN REGIONAL HAZE

- Performance and Trends
  - Based on visibility data through 2014, considerable visibility improvements (4 – 7 deciviews) have been made in eastern Class I areas on the 20% haziest days.
  - Some western Class I areas have also experienced visibility improvements on the 20% haziest days (1 to 4 deciviews).

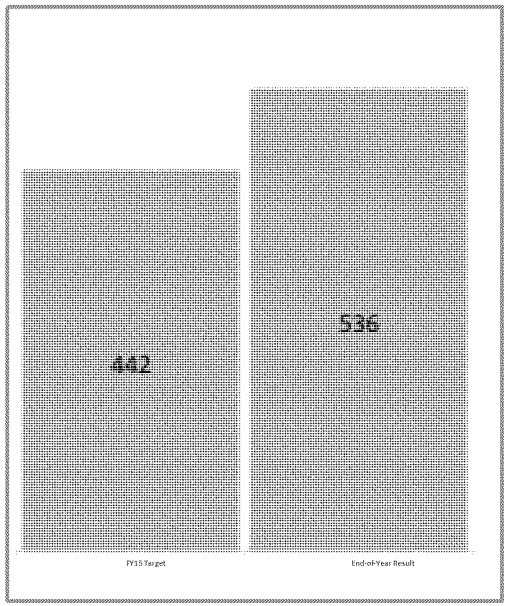


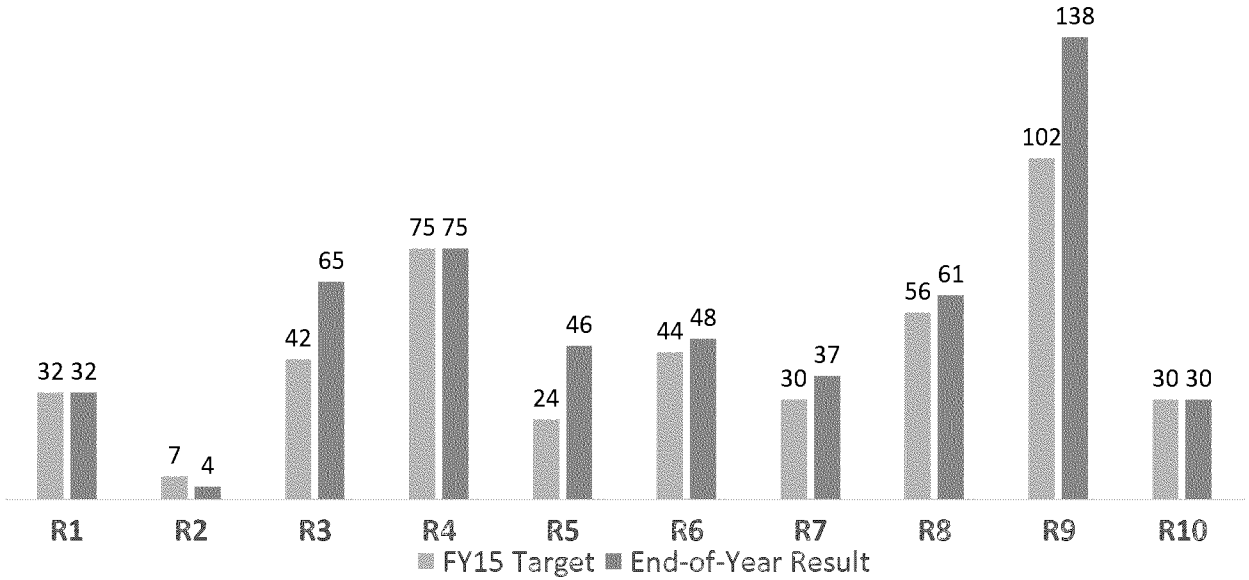


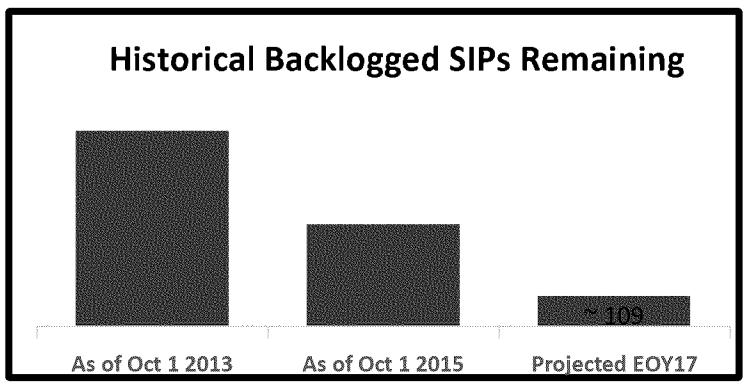
IMPROVE AIR QUALITY

OUTDOOR AIR QUALITY PROGRAM – STATE IMPLEMENTATION PLANS

KPI Current and Backlogged SIP Actions: The total number of SIP revisions acted on by a Region from October 1, 2014 to September 30, 2015, including withdrawn SIPs.





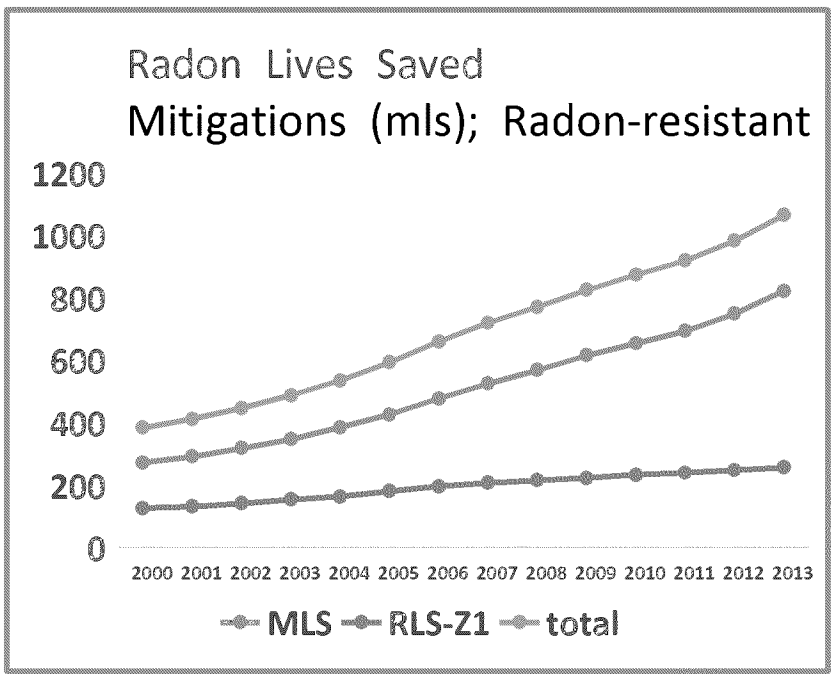


IMPROVE AIR QUALITY

INDOOR AIR QUALITY PROGRAMS

- Key Accomplishments
  - Launched new National Radon Action Plan (NRAP) with NGOs, states, private sector, HHS and HUD.
  - Federal Action Plan to Reduce Asthma Disparities:
  - Completed suite of guidance for integrating healthy IAQ practices in energy-efficiency building upgrades.

- Performance and Trends
  - On track to meet radon FY 18 strategic goal of 1,056 annual lives saved by 2018.
  - On track to meet FY 18 strategic goal of 9 million people taking all essential actions to reduce exposure to indoor environmental asthma triggers in homes and schools.



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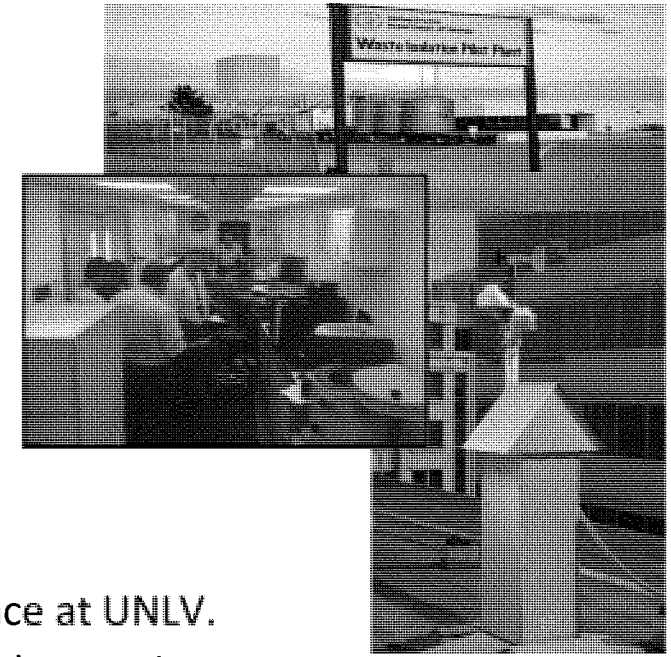
MINIMIZE EXPOSURE TO RADIATION



- Key Accomplishments
  - Proposed Uranium and Thorium Mill Tailings Rule.
  - Published Medical X-Ray Guidance for Federal Facilities.
  - Provided oversight of DOE's accident recovery efforts at the WIPP.
  - Played significant role in "Southern Exposure" exercise.
  - Delivered additional state lab capacity.
  - Made significant progress on decommissioning EPA space at UNLV.
  - Have begun conversation with Regions on sustaining rad expertise.

- Performance and Trends
  - ▲ Radiation emergency response and recovery readiness.
  - ▲ RadNet quality assured data availability during a radiological emergency.
  - ▲ WIPP - time to approve site changes affecting waste characterization at DOE waste generator sites.

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OBJECTIVE 1.1 - ADRESS CLIMATE CHANGE									
PERFORMANCE MEASURE	FY 2014				FY 2015				FY 2016
	TARGET	RESULT	STATUS		TARGET	RESULT	STATUS		TARGET
(PM G02) GHG reductions building sector. (MMT)	196.2	Avail. Dec, 2015	UNAVAIL	!	188	Avail. Dec, 2016	UNAVAIL	!	201.1
(PM G06) GHG reductions transp. sector. (MMT)	61	61.7	MET	✓	70	72.8	MET	✓	76
(PM G16) GHG reductions industry sector. (MMT)	461.8	Avail. Dec, 2015	UNAVAIL	!	540.3	Avail. Dec, 2016	UNAVAIL	!	676
(PM G18) GHG reports verified before public. (%)	95	98	MET	✓	95	Avail. Dec, 2015	UNAVAIL	!	95
(PM AD1) EPA models & tools integrating climate science data. (Number)	5	7	MET	✓	7		UNAVAIL	!	
(PM AD3) EPA programs integrating climate data into projects. (Number)	3	7	MET	✓	3		UNAVAIL	!	
(PM AD4) Partners integrating climate data & tools into planning processes. (Number)									50
(PM AD5) Parnters integrating climate adaptation into programs. (Number)									50
(PM AD6) EPA training programs integrating climate adaptation planing. (Number)									3

OBJECTIVE 1.2 - IMPROVE AIR QUALITY								
PERFORMANCE MEASURE	FY 2014				FY 2015			FY 2016
	TARGET	RESULT	STATUS		TARGET	RESULT	STATUS	TARGET
(PM M9) Ambient ozone reduction. (%)	16	18	MET	✓	16	Avail. Dec, 2016	UNAVAIL	17
(PM MM9) Reduction in ozone exceedances. (%)	50	67	MET	✓	50	Avail. Dec, 2016	UNAVAIL	68
(PM M91) Ambient PM-2.5 reduction. (%)	28	29	MET	✓	29	Avail. Dec, 2016	UNAVAIL	31
(PM P34) PM-2.5 reduc. mobile sources. (Tons)	171,407	171,407	MET	✓	183,651	183,651	MET	195,895
(PM A01) SO2 emissions power sources. (Tons)	6,000,000	3,122,921	MET	✓	6,000,000	Avail. Dec, 2015	UNAVAIL	6,000,000
(PM O34) NOx reduc. mobile sources. (Mil. Tons)	4.74	4.74	MET	✓	5.08	5.08	MET	5.42
(PM M92) Reduction in days with AQI>100. (%)	80	79	NOT MET	✗	80	Avail. Dec, 2016	UNAVAIL	80
(PM M94) NSR permits issued within 1 year. (%)	78	Avail. Dec, 2015	UNAVAIL	!	78	Avail. Dec, 2016	UNAVAIL	78
(PM M95) Title V permit rev. within 18 mo. (%)	88	Avail. Dec, 2015	UNAVAIL	!	88	Avail. Dec, 2016	UNAVAIL	88
(PM M96) New Title V permits within 18 mo. (%)	75	Avail. Dec, 2015	UNAVAIL	!	75	Avail. Dec, 2016	UNAVAIL	75
(PM MM7) SIPs removed from backlog. (%)	10	38.6	MET	✓	10	Avail. Jan, 2016	UNAVAIL	
(PM N35) CO increase mobile sources. (Mil. Tons)	2.36	2.36	MET	✓	2.53	2.53	MET	2.7
(PM O33) VOCs reduc. mobile sources. (Mil. Tons)	2.4	2.4	MET	✓	2.57	2.57	MET	2.74
(PM 001) Air toxics reduc. (cancer risk). (%)	42	Avail. 2017	UNAVAIL	!	42	Avail. 2017	UNAVAIL	41
(PM 002) Air toxics reduc. (non-cancer risk). (%)	59	Avail. 2017	UNAVAIL	!	58	Avail. 2017	UNAVAIL	57
(PM R50) Exist. homes with radon mitigation. (%)	13.9	Avail. Dec, 2015	UNAVAIL	!	14.9	Avail. Dec, 2016	UNAVAIL	14.9
(PM R51) New homes with radon reduction. (%)	37.5	Avail. Dec, 2015	UNAVAIL	!	40.5	Avail. Jan, 2016	UNAVAIL	40.5
(PM R10) Parents aware of asthma campaign. (%)	>30	37	MET	✓	>30	Data Not Avail.	UNAVAIL	>30
(PM R17) Health professionals trained on environmental asthma triggers. (Number)	3,000	4679	MET	✓	1,000	Avail. Dec, 2015	UNAVAIL	
(PM R19) Programs supporting asthma interventions. (Number)								300

OBJECTIVE 1.3: RESTORE AND PROTECT THE OZONE LAYER							
PERFORMANCE MEASURE	FY 2014			FY 2015			FY 2016
	TARGET	RESULT	STATUS	TARGET	RESULT	STATUS	TARGET
(PM S01) Consumption of HCFCs. (Tons)	<3,700	Avail. Dec, 2015	UNAVAIL !	<1,520	Avail. Dec, 2016	UNAVAIL !	<1,520

OBJECTIVE 1.4 - MINIMIZE EXPOSURE TO RADIATION							
PERFORMANCE MEASURE	FY 2014			FY 2015			FY 2016
	TARGET	RESULT	STATUS	TARGET	RESULT	STATUS	TARGET
(PM R35) Readiness of radiation program. (%)	93	94	MET ✓	93	93	MET ✓	93
(PM R36) Time before availability of radiation air monitoring data. (Days)	0.5	0.3	MET ✓	0.3	0.3	MET ✓	0.3
(PM R37) Time to approve changes WIPP. (Days)	70	66	MET ✓	70	67	MET ✓	70

From: Atkinson, Emily
Location: WJC-N 5400 + Video with RTP + Conference Code Participant Code: Conference Code
Conference Code
Importance: Normal
Subject: Meet with Bob Hickmott, The Smith-Free Group re: methane (Confirmed)
Categories: Blue Category
Start Date/Time: Tue 12/1/2015 6:30:00 PM
End Date/Time: Tue 12/1/2015 7:30:00 PM
RE: December Meeting Request
Confirmed 12/1 at 1:30pm: December Meeting Request
RE: Confirmed 12/1 at 1:30pm: December Meeting Request
FW: EPA meeting attendees for Anadarko
EPA HQ Leave Behind Final Dec 1 2015 .docx

To: McCabe, Janet; Goffman, Joe; Tsirigotis, Peter; Cozzie, David; Dunham, Sarah; Gunning, Paul; Stewart, Lori; Walter, Suzanne; DeFigueiredo, Mark; Beeler, Cindy; Card, Joan; Vetter, Cheryl, Rao, Raj; Koerber, Mike
Outside Attendees:

- Julia Jones, Legal Counsel, Energy & Production, Anadarko
- Angela Zivkovich, Senior Health, Safety & Environment, Anadarko
- Mark Hanley, Govt. Relations Director, Anadarko
- Mike Long
- Bob Hickmott, Consultant

OVERVIEW OF COMMENTS ON EPA'S PROPOSED AIR RULES (2015)
Anadarko Petroleum Corporation – An Industry Leader
December 1, 2015

Anadarko Petroleum Corporation is one of the nation's leading producers of clean-burning natural gas. We are among the world's largest independent oil and natural gas exploration and production companies operating approximately 25,000 wells in the United States. Anadarko's onshore U.S. operations are located in the Rocky Mountain areas, the southern U.S., the Appalachian basin and Alaska. We are proud that our company's voluntary actions and collaborative approach with regulators and other stakeholders are resulting in cleaner air, fewer emissions and more of our product reaching our customers.

Our company has played a transformative role in how energy resources are bring produced, which includes implementing emission-reduction technologies and best practices across our operating areas. We also focus on improving the science around methane emissions through studies with respected academic institutions and the Environmental Defense Fund. We demonstrated our support for the collaborative, constructive and state-led approach that resulted in Colorado's revision of Regulation No. 7 on air quality.

These constructive and collaborative efforts are reducing emissions and ensuring natural gas remains abundant and affordable as it continues to be the most reliable and scalable option available for achieving U.S. carbon-reduction targets. We encourage the Environmental Protection Agency (EPA) to continue to enhance the opportunities to provide companies incentives for early action, including by providing states the maximum flexibility in developing their programs.

Source Determination: Proposed Rule *Determination for Certain Emission Units in the Oil and Natural Gas Sector*, 40 C.F.R. Parts 49, 51, 52, 70, 71

Federal and state emission control requirements for upstream oil and natural gas facilities are based on the type of equipment installed. The type of equipment on-site will not change based on the aggregation of locations. The proposal will simply change the complexity of permitting with negligible air quality improvements.

This proposed rule will overwhelm permitting agencies with permit applications and permit modification applications; permits will not be issued in a predictable timeframe causing delays for oil and natural gas development and great regulatory uncertainty.

Anadarko agrees clarification will help both the regulators and regulated community, but that clarification should comport with the CAA language and case law. Anadarko is proposing the following alternative language to provide the balance:

> "Contiguous or adjacent properties" mean surface areas with an affixed building, structure, facility or installation including permanently graded or cleared areas for such building, structure, facility or installation, that share an edge/boundary, physically touch, and are adjoining or physically abutting.

As proposed, the rule suffers from a number of legal flaws that will subject the rule to legal challenge and possibly more uncertainty. We believe this is the not the objective of EPA, nor the desire of the regulated community. EPA should ensure the rule is addressing the legal concerns raised in comments, and work directly with the oil and natural gas sector to develop the appropriate guidance.

This rulemaking: (1) offers minimal to no environmental benefit; (2) fails to evaluate the economic impacts required under the Clean Air Act (CAA); and (3) significantly increases administrative burden, costs, delays and inefficiencies to permitting programs nationwide.

New Source Performance Standard (NSPS) Subpart OOOOa: Proposed Rule *Standards of Performance for New Stationary Sources: Oil and Natural Gas Production and Natural Gas Transmission and Distribution*

We share the concerns of our industry that EPA's one-size-fits-all proposed methane regulations would significantly and unnecessarily increase costs. Such an approach will also carry the unintended consequence of curbing further emission reductions by discouraging voluntary, collaborative and state-based solutions that have proven successful in encouraging innovation and improving our industry's environmental performance.

We support EPA's stated objectives to achieve the most reductions with the least regulatory burden. However, the proposed rulemaking deviates from this stated goal on a number of levels. Among the most notable, is the proposal by EPA to impose a leak detection and repair (LDAR) program on states that already have legally and practicably enforceable programs. The rule should provide states the ability to develop a state-specific LDAR program. The federal rulemaking can provide general principles for a program, without prescriptive requirements dictating the components of a state program. The rule should further affirm that a state with an existing LDAR program that meets the general principles, also meets the requirements of the federal rule.

Federal Implementation Plan (FIP) for Managing Air Emissions from True Minor Sources Engaged in Oil and Natural Gas Production in Indian Country

As written, this particular rule has limited utility since it can only be utilized in attainment areas and for true minor sources. The FIP should be modified to:

- Include a plan for areas transitioning from attainment to nonattainment;
- Provide a streamlined mechanism for synthetic minors; and
- Allow for a pre-construction registration and post-production emission calculations.

Natural Gas STAR Methane Challenge

This voluntary program comes on top of the ongoing aforementioned rule makings and other regulations for the oil and natural gas industry, which include: lowered Ozone National Ambient Air Quality Standard, expanded greenhouse gas (GHG) reporting rule, Bureau of Land Management fracking rule, GHG regulation of new and existing utilities, Refinery Sector Rule, Council on Environmental Quality guidance on addressing climate change under the National Environmental Policy Act, and Waters of the US.

With all the other regulatory activities, at this time, it will be difficult for industry to find incentives or the resources to pursue voluntary measures as reflected in the Methane Challenge. To date, EPA has not adequately created synergy between its voluntary program and numerous other regulatory initiatives. Program participation could be increased if EPA takes a more holistic view of the burdens it is imposing on industry and develops a program that provides a business justification. We encourage EPA to collaborate with industry around voluntary programs that maximize methane reductions without the burden of formal regulatory initiatives that are limited in focus and effectiveness.

From: Atkinson, Emily
Location: WJC-N 5400
Importance: Normal
Subject: BNA Outlook Interview (Confirmed)
Categories: Blue Category
Start Date/Time: Wed 12/16/2015 3:30:00 PM
End Date/Time: Wed 12/16/2015 4:00:00 PM
FW: BNA ANNUAL OUTLOOK: Janet McCabe interview; DDL: before Thanksgiving
FW: Janet bna
FW: BNA ANNUAL OUTLOOK: Janet McCabe interview; DDL: before Thanksgiving
FW: Janet bna

10:30 - 11:00am Interview
To: McCabe, Janet; Dennis, Allison; Drinkard, Andrea; Millett, John; Stewart, Lori; Jones, Enesta
Outside Attendees (by phone): Andrew Childers and Patrick Ambrosio

To: McCabe, Janet[McCabe.Janet@epa.gov]
Cc: Atkinson, Emily[Atkinson.Emily@epa.gov]; Drinkard, Andrea[Drinkard.Andrea@epa.gov]; Millett, John[Millett.John@epa.gov]; Stewart, Lori[Stewart.Lori@epa.gov]
From: Dennis, Allison
Sent: Thur 11/12/2015 6:05:10 PM
Subject: FW: BNA ANNUAL OUTLOOK: Janet McCabe interview; DDL: before Thanksgiving

Hi Janet,

It's that time of year again…BNA is asking for some time with you for their annual outlook article. Last year we gave them (Andrew Childers and Patrick Ambrosio together) 30 mins by phone. You gave an an air program overview and then they launched into follow-up/specific questions. We will ask for specific questions in advance again.

I'd like to see if you are interested in granting this interview and, if so, preferred timing. Their ask this year is a bit early (we usually do these interviews in late Dec./early Jan) . I might suggest fitting this in during the week of December 14th , either Thursday or Friday (as we have many big rollouts, Paris, etc happening before then!). Eager to hear your feedback.

Best,

Allison

From: Jones, Enesta
Sent: Thursday, November 12, 2015 10:48 AM
To: Dennis, Allison <Dennis.Allison@epa.gov>; Drinkard, Andrea <Drinkard.Andrea@epa.gov>; Millett, John <Millett.John@epa.gov>; McMichael, Nate <McMichael.Nate@epa.gov>
Cc: Jones, Enesta <Jones.Enesta@epa.gov>
Subject: RE: BNA ANNUAL OUTLOOK: Janet McCabe interview; DDL: before Thanksgiving

From reporter:

Sure. Would early that week be doable (the 14th or 15th)? Our filing deadline is Dec. 11, but we have a little bit of leeway if we need it to make sure we get EPA in the story.

From: Dennis, Allison
Sent: Thursday, November 12, 2015 10:38 AM
To: Jones, Enesta; Drinkard, Andrea; Millett, John; McMichael, Nate
Subject: RE: BNA ANNUAL OUTLOOK: Janet McCabe interview; DDL: before Thanksgiving

Can we schedule this for the week of Dec. 14th?

From: Jones, Enesta
Sent: Tuesday, November 10, 2015 8:50 AM
To: Drinkard, Andrea <Drinkard.Andrea@epa.gov>; Dennis, Allison <Dennis.Allison@epa.gov>; Millett, John <Millett.John@epa.gov>; McMichael, Nate <McMichael.Nate@epa.gov>
Subject: Re: BNA ANNUAL OUTLOOK: Janet McCabe interview; DDL: before Thanksgiving

Do we know when this can be sked?

Enesta Jones

U.S. EPA, Office of Media Relations

Desk: 202.564.7873

Cell: Personal Privacy

On Oct 30, 2015, at 12:02 PM, Jones, Enesta <Jones.Enesta@epa.gov> wrote:

> It would Andrew Childers and Patrick Ambrosio together. Last year we gave them 30 mins by phone. Janet gave an overview and then they launched into follow-up/specific questions. Thanks.
>
> Hi Enesta,
>
> Just circling back around on Patrick's email earlier on interviewing Janet McCabe for our Outlook. We'd love to get something set up before Thanksgiving, if that works for her schedule. We'll be interested in talking to her about Clean Power Plan implementation and lawsuits, the aircraft endangerment finding ozone implementation and the MATS remand just off the top of my head.

Thanks.

From: Atkinson, Emily
Location: WJC-N 5400 + Conference Code Participant Code: Conference Code
Importance: Normal
Subject: R8 Meeting re: Helicopter Flyover with IR Camera of Uinta Basin (Confirmed)
Start Date/Time: Tue 11/17/2015 7:00:00 PM
End Date/Time: Tue 11/17/2015 7:30:00 PM
RE: Conference Call with Shaun McGrath, R8 RA
RE: Conference Call with Shaun McGrath, R8 RA
Flyover_Shaun_McCabe_TPs110215_r1.docx

Materials attached - Word document
To: McCabe, Janet; Goffman, Joe; Jordan, Debbie; Page, Steve; Koerber, Mike; Dunham, Sarah; Gunning, Paul; Daly, Carl; McGrath, Shaun; Giles, Cynthia; Card, Joan; Beeler, Cindy; Brooks, Phil; Chapman, Apple; Cozzie, Dave; Tsirigotis, Peter

BRIEFING: Helicopter Flyover with IR Camera Project Proposal in the Uinta Basin – NEPA
Shaun visit with Janet McCabe week of 11/2/15

PURPOSE

- Provide update on NEPA intersection with air quality challenges in the Uinta Basin.
- Obtain approval to offer a project proposal idea to BLM – Helicopter flyover with InfraRed (IR) camera to find "super-emitters" and fix them.

STATUS – NEPA in the UINTA BASIN

- Currently ~10,000 active, producing oil & gas wells in the Uinta Basin
  - Production on the Uintah & Ouray Indian Reservation (U&O) accounts for ~75% of Uinta Basin production.
  - ~7,500 oil & gas wells on the U&O existed before Aug 2011 (pre-date NSPS OOOO) so are uncontrolled.
- Five NEPA projects already approved, with signed Records of Decision (RODs) or FONSIs, included Adaptive Management Strategies (AMS) committing to enhanced mitigation if ozone exceedance measured or ozone modeling showed exceedance – both triggers have occurred and progress on enhanced mitigation is overdue.
  - Two AMSs to be triggered for each project: (1) a BLM Basin-wide AMS Ozone Action Plan, and (2) project proponent-specific AMS which included "enhanced directed inspection & maintenance" as AMS option.
- Three projects in the pipeline for EPA cooperating-agency review
  - Newfield's Monument Buttes Final EIS: + 5,750 wells
  - EOG Resources' Greater Chapita Wells Draft EIS: + ~2,800 wells
  - Crescent Point's project (not to scoping stage yet): + ~3,000-5,000 wells
- For Newfield's Monument Buttes EIS, EPA and BLM to enter facilitated session <u>week of 11/9/15</u> to reach agreement on how to ensure that mitigation is adequate to provide reasonable assurance that the project can proceed without causing or contributing to exceedances of the ozone NAAQS to resolve the issue before the pending Final FEIS is published.
- If EPA and BLM cannot agree on adequate mitigation, we plan to elevate the issue under the Air Quality MOU dispute resolution procedures.

AIR QUALITY CHALLENGES in the UINTA BASIN

- Uinta Basin currently experiences high winter ozone values that exceed NAAQS.
- EPA R8 is working on a U&O reservation-specific FIP to implement emission reductions on existing sources to ensure that the public within the U&O Indian Reservation receive equivalent air quality protections as the public outside the Reservation.
  - U&O FIP will minimize the discrepancy between the control requirements on the U&O Indian Reservation and those required by Utah Department of Environmental Quality Division of Air Quality (UDAQ).

  - Timing of roll-out to follow national NSPS OOOO/Tribal FIP rulemaking. Emission reductions would take effect in late-2017 and 2018.
- Multi-stakeholder Uinta Basin Emission Inventory workgroup in place and first phase of inventory underway – will be eventual baseline for anticipated future SIP/FIP demonstration efforts when basin designated nonattainment. Critical in identifying pragmatic, effective policy to reduce emissions.
- Oil & gas air emission research showing two phenomena:
  - Researchers in the Uinta Basin have shown discrepancy between top-down and bottom-up emission estimates[1]. There appear to be significant emissions of VOC and methane that are not represented in the emissions inventory used as input for the ozone models.
  - Researchers across the U.S. have observed skewed emission distributions, fat tail, "super-emitters" where a small % of sources account for a large % of emissions[2]. It is a challenge to identify the impacts of super-emitters because these maintenance-related emission sources are not fixed in time or space.

NEPA Enhanced Mitigation Project Proposal - Helicopter Flyover with IR Camera to Find & Fix Super-Emitters

- Meets NEPA needs:
  - A part of the BLM-committed AMS for a Basin-wide Ozone Plan for 5 already-approved EISs/EAs.
  - One component of enhanced mitigation in the 3 NEPA actions under review.
- Informs emission inventory work – currently no accounting for super-emitters in Uinta Basin emission inventory.
- Learn about root causes of super-emitters to prevent in future through maintenance practices.
- Fills time-gap in obtaining emission reductions – "Find & Fix" could occur in 2016 before EPA U&O-specific FIP requirements come into effect in late-2017/2018.
- EPA R8 has developed detailed project plan which could be proposed *by* BLM to 3 operators with NEPA projects under review and to 5 operators who had AMS triggers in already-approved NEPA projects.
  - $105k total estimate to be cost-shared amongst the 8 operators.
  - Covers ~50% of oil & gas wells representative of operator, age, production volume, well type (incl. abandoned) and >50% of compressor stations and gas plants.
- Precedence – Helicopter Flyovers with IR Camera in Oil & Gas Fields
  - TCEQ – 16 campaigns – started as "Find & Fix", now moving into enforcement.
  - EPA R6 – 5 campaigns.
  - TCEQ and R6 found that ~10% of facilities flown-over had IR-observed emissions from air.
  - Researchers – 7 campaigns (to be published).
  - Industry directly contracts for flyover of operations (e.g. gas gathering pipeline systems).

APPROVAL SOUGHT

- EPA R8 to propose Helicopter Flyover project to BLM at 11/12/15 facilitated EPA/BLM session.
  - If BLM interested, then EPA to obtain okay from Utah and the Ute Tribe for flyover.
  - Then BLM, as NEPA Lead Agency, would propose to the 8 operators described above for them to

implement and cost share.

- Discussion with, and support of, OGC with R8's ORC in review of proposal.

---

[1] Airborne measurements ~8.9% of gas produced to atmosphere compared to GHGRP-W ~ 1.0%.
Karion, A., et al. (2013), *Methane emissions estimate from airborne measurements over a western United States natural gas field*, Geophys. Res. Lett., 40, 4393–4397, doi:10.1002/grl.50811.
Ozone modeling shows low negative bias for VOCs and methane by factor of 1.8 and 4.8 respectively.
Ahmadov, R., et al. (2015), *Understanding high wintertime ozone pollution events in an oil and natural gas producing region of the western U.S.* Atmospheric Chemistry and Physics

[2] Wellpads [86 natural gas wellsites … ~5% sites → ~60% of emissions] – Rella, C., et al (2015), *Measuring emissions from oil and natural gas producing well pads in the Barnett Shale region using the novel mobile flux plane technique.* Environ. Sci. Technol. 2015, 49, 4742– 4748, DOI: 10.1021/acs.est.5b00099
Midstream Compressor Stations [114 CSs … 30% sites → ~80% of emissions] - Mitchell, A., et al. (2015), *Measurements of Methane Emissions from Natural Gas Gathering Facilities and Processing Plants: Measurement Results.* Environmental Science & Technology.
Gas Plants [16 gas processing plants … 45% sites → ~80% of emissions] - Mitchell, A., et al. (2015), *Measurements of Methane Emissions from Natural Gas Gathering Facilities and Processing Plants: Measurement Results.* Environmental Science & Technology.
Transmission Compressor Stations [45 CSs … 10% sites → ~ 50% of emissions] – Subramanian, R., et al. (2015), *Methane Emissions from Natural Gas Compressor Stations in the Transmission and Storage Sector: Measurements and Comparisons with the EPA Greenhouse Gas Reporting Program Protocol.* Environmental Science & Technology.
Abandoned Wells [19 abandoned wells… 3 of the 19 wells had CH4 flow rates three orders of magnitude larger than the median flow rate] – Kang, M., et al. (2014), *Direct measurements of methane emissions from abandoned oil and gas wells in Pennsylvania.* PNAS.
Well Liquid Unloading [107 wells with liquid unloadings … w/o plunger lift: 20% wells → 83% of emissions; w/ plunger lift and manual: 20% wells → 65% of emissions; w/ plunger lift and automatic: 20% wells → 72% of emissions – Allen, D., et al. (2014) *Methane Emissions from Process Equipment at Natural Gas Production Sites: Liquid Unloadings*. Environmental Science & Technology.
Pneumatic Controllers [377 controllers … 20% devices → 96% of emissions] - Allen, D., et al. (2014), *Methane Emissions from Process Equipment at Natural Gas Production Sites in the United States: Pneumatic Controllers.* Environmental Science & Technology.

From: Rupp, Mark
Location: Alm Room
Importance: Normal
Subject: Governors' Offices w/ EPA Leadership
Start Date/Time: Fri 11/20/2015 3:30:00 PM
End Date/Time: Fri 11/20/2015 4:15:00 PM
DRAFT Agenda Governors' Offices and EPA, 11-20-15.docx

DRAFT AGENDA

Governors' Offices and EPA Officials

November 20, 2015
10:30am(ET) – 12:00pm(ET)
USEPA Headquarters, 1200 Pennsylvania Avenue, NW
William Jefferson Clinton Building, Alm Room
(866) 299-3188, PIN: 1974795

10:30am – 10:45am (15)	**Welcome and Introductions** GINA MCCARTHY, Administrator • General Overview • Montreal Protocol on Substances that Deplete the Ozone Layer
10:45am – 11:10am (25)	**Office of Air and Radiation** JANET MCCABE, Acting Assistant Administrator • Clean Power Plan • Ozone • Oil and Natural Gas • COP21 ALL: Discussion
11:10am – 11:20am (10)	**Office of Enforcement and Compliance Assurance** CYNTHIA GILES, Assistant Administrator • EJ2020 • NextGen Compliance • NPDES E-Reporting ALL: Discussion
11:20am – 11:35pm (15)	**Office of Water** JOEL BEAUVAIS, Acting Deputy Assistant Administrator • Clean Water Rule • Water Finance and Resiliency Center • Water Quality Trading ALL: Discussion
11:35am – 11:45am (10)	**Office of Chemical Safety and Pollution Prevention** JIM JONES, Assistant Administrator • Worker Protection Standards • Safer Choice ALL: Discussion
11:45am – 11:55am (10)	**Office of Policy, Office of Sustainable Communities** LAURA VAUGHT, Acting Associate Administrator MATT DALBEY, Director, Office of Sustainable Communities • Making a Visible Difference in Communities ALL: Discussion
11:55am – 12:00pm (5)	**Next Steps and Wrap-Up** MARK RUPP, Deputy Associate Administrator

From: Atkinson, Emily
Location: WJC-N 5400 + Video with RTP + Conference Code; Participant Code: Conference Code
Conference Code
Importance: Normal
Subject: Prebrief for China-EPA Joint Commission on Environmental Cooperation (JCEC)
Start Date/Time: Fri 11/13/2015 6:00:00 PM
End Date/Time: Fri 11/13/2015 7:00:00 PM
2015 JCEC Annex 1 Air FINAL 20151113.pptx
JCEC Annex 1 Workplan FINAL 20151113.docx
Annex 1 TP's for McCabe v 4.docx
Agenda Meeting of the Joint Committee for Environmental Cooperation Nov ....docx
JCEC 5 Joint Statement-EPA Final Nov 4.doc

Materials Attached
Re: Prepare Janet to participate in JCEC meeting on Nov 19
To: Janet McCabe, William Niebling, LeFranc, Jim Blubaugh, Jeremy Schreifels, Dale Evarts, Erika Sasser, Jackie Krieger, John Shoaff, Rebecca Schultz, Luis Troche; Steve Wolfson; Allison Dennis
Cc: Steve Page, Sarah Dunham, Chris Grundler

RESPONSE TO ANNEX 1 (AIR) PRESENTATION

Context: Reports on accomplishments and plans will be made by each Annex team following the opening remarks by Administrator McCarthy and Minister Chen. Annex 1 (Air) is the first and is scheduled for 15 minutes total (9:35—9: 50 am).

Setup: Minister Chen will ask your counterpart from MEP (Director ZHAO Yingmin) to present the accomplishments and plans. When he finishes the presentation, Minister Chen will turn to Gina to respond, and Gina will call on you.

Talking Points (~3-4 min):

- Thank Director ZHAO (pronounced JOW) for his leadership and thank the Air Annex teams in China and the US for their hard work and collaboration over the last 2 years reflected in the accomplishments.
- Trust and confidence gained from our work together has enabled us to be very productive in this last period.
- Both EPA and MEP can take pride in some significant air quality related milestones such as the revision of the ozone National Ambient Air Quality Standard in the U.S. and revisions to the Air Pollution Control Law in China.
- As for plans moving forward, I think that this next period provides us with some excellent opportunities to strengthen the impact of our air program cooperation.

Regional Air quality management:

- The Jiangsu (pronounced JEE-AHNG-SOO) Province model air quality plan combines the best of US practices on air quality planning with China's action plan system.
- The workshop scheduled for early March in Jiangsu will present this plan and the lessons learned in its development. Chinese national and provincial environmental officials and U.S. officials will participate. It will also feature environmental technologies that have been developed to respond to air pollution control policies and plans.
- We hope that this workshop can serve as a springboard for further advances in air quality planning across the country.
- I look forward to participating in this workshop and to the discussions about air quality issues and challenges that we all face. It will give me my first chance to travel to China and to enjoy first-hand the hospitality and culture (and food!) that I have heard so much about.

Transportation

- With MEP's new enforcement/recall authority included in China's amended Air Law we look forward to sharing our technical expertise and experience in how USEPA has implemented our own transportation compliance and enforcement programs.
- The recent Sino-U.S. Mobile Source Emission Control Workshop on vehicle and engine

emissions compliance just last month in Beijing is a great example of how our two programs work together.

Power Sector:

- We've learned that complete and accurate emission data are essential for assessing compliance and measuring progress toward goals. Building on past EPA-MEP cooperation on emission measurement, we look forward to advancing our technical exchanges on emission data evaluation and management.
    - [Optional: mention that a member of your team (Jeremy Schreifels) will present on air markets program data system in the afternoon "big data" session.]
- New US and Chinese emission limits for the power sector provide additional opportunities for our organizations to share experiences with advanced pollution controls, including controls that address multiple pollutants.

Air Permitting Programs

- We are also looking forward to working with MEP on air permitting programs called for in the revisions to the air law.
- In the U.S., our air permit programs promote the use of best control technologies. They help maintain clean air where it's clean and reduce pollution in areas that don't attain our standards. They also serve as very effective compliance and enforcement tools for industrial sources.
- This will provide us an opportunity to work across our legal, compliance and air program offices (Annex 1, 5, and 6) and share lessons learned. We look forward to the exchanges and learning from China's experience as it moves forward to enhance its own permitting system.

Closing

- Look forward to another period of valuable and productive collaboration with MEP on these important air program issues and to continuing to engage in ways that benefit China, U.S. and global air quality.

[return the floor to Gina]

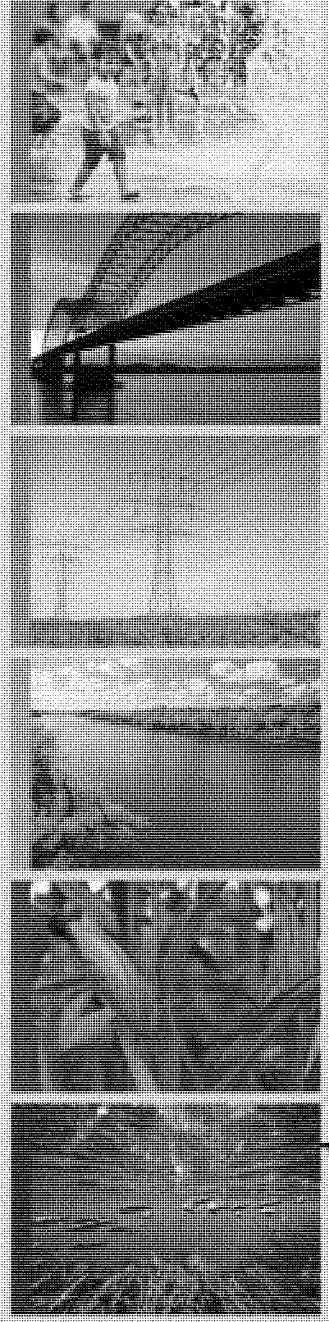
From: Kime, Robin
Location: The seminar will be held in 3530 WJCN - Conference (Conference Code
Conference Code
Importance: Normal
Subject: OP's Economic Brownbag Seminar: "Estimating the Physical and Economic Benefits to the U.S. of Global Climate Action" - Conference Code (material attached)
Start Date/Time: Tue 10/20/2015 4:00:00 PM
End Date/Time: Tue 10/20/2015 5:00:00 PM
OP Brownbag - CIRA 10-20-15.pdf

Subject: OP's Economic Brownbag Seminar: "Estimating the Physical and Economic Benefits to the U.S. of Global Climate Action" - Call in: (Conference Code

Notes:

This month's Economic Brownbag seminar will address "Estimating the physical and economic benefits to the U.S. of global climate action" presented by Jeremy Martinich (OAR). A recent EPA report (www.epa.gov/cira), estimates the risks of inaction on climate change and the benefits to the U.S. of global greenhouse gas mitigation. Analyses underlying the report are the product of the Climate Change Impacts and Risk Analysis (CIRA) project, an EPA-led collaborative modeling effort among a number of teams. The report covers 20 specific impacts categorized into six broad sectors: health, infrastructure, electricity, water resources, agriculture and forestry, and ecosystems.

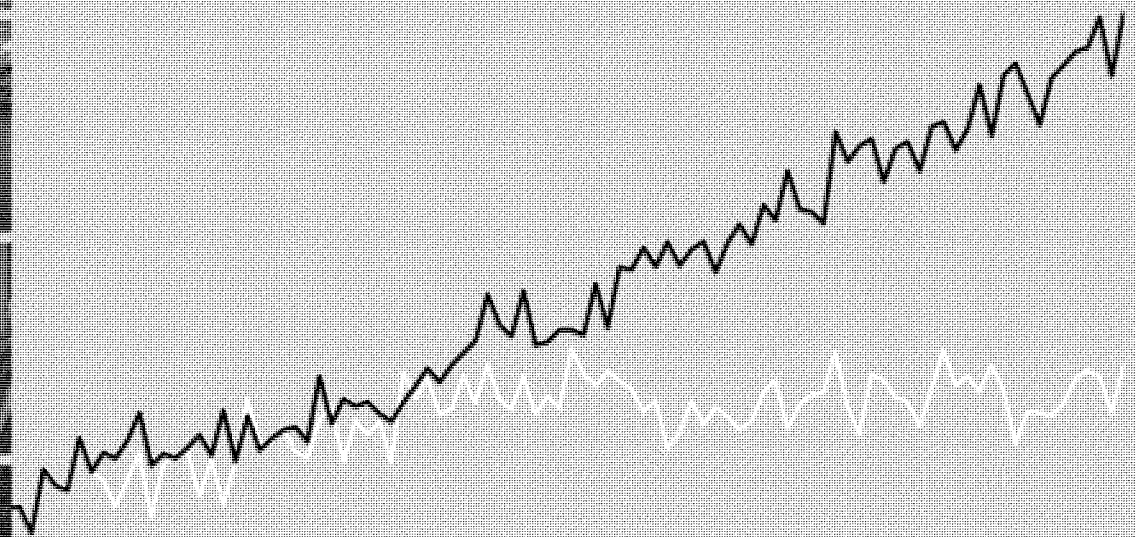
The seminar will be held in 3530 WJCN. We will provide the presentation through Adobe Connect but audio will still be through the teleconference line. After you dial in the teleconference (Call in: Conference Code please join us at: Conference Code
Conference Code Please contact Robin (kime.robin@epa.gov or 202.564.6587) with any questions. We look forward to seeing you there.



EPA United States Environmental Protection Agency

Climate Change in the United States

Benefits of Global Action



A Summary Report of
EPA's Climate Change Impacts and Risk Analysis (CIRA) Project

Jeremy Martinich
Climate Change Division

ED_000738_00005097-00001

About CIRA and the Summary Report

- EPA has released a report describing risks of inaction on climate change and the benefits (avoided damages) to the U.S. of global action to reduce GHGs.
- The report summarizes results from EPA's Climate Change Impacts and Risk Analysis (CIRA) project, a collaborative effort with multiple modeling teams.
  - Illustrative, global GHG emission scenarios are used (report focuses on one Reference and one Mitigation), and do not represent any particular U.S. or global policy.
  - Consistent socioeconomic, emissions, and climate data used to quantify impacts under each scenario.
  - Examines physical and economic impacts in the U.S. across multiple sectors (e.g., human health, infrastructure, water resources).
  - Evaluates levels of certainty in results, particularly those related to projecting future changes in climate.
  - Does not assess the costs or co-benefits of GHG mitigation.

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About CIRA and the Summary Report (cont.)

- The report's findings are consistent with those from the NCA.
- Because CIRA only estimates some of the impacts of climate change, the report does not capture all benefits of GHG mitigation.
- Peer review and transparency:
  - CIRA analyses have been peer-reviewed and published (with open access) in the scientific literature over the past several years. This documentation of methods and results, including a special issue of *Climatic Change*, spans across more than 35 papers.
  - The report in turn underwent an independent, external peer review to ensure that the findings of the underlying literature were appropriately summarized and communicated.
  - Data from all figures in the report are available for download on the report's website.
- CIRA and the Social Cost of Carbon: both efforts use model-based approaches to estimate mitigation benefits, but their approaches differ in important ways.

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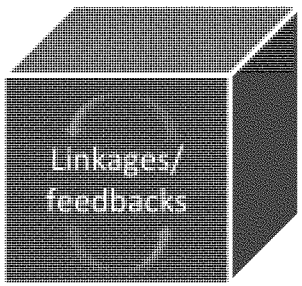
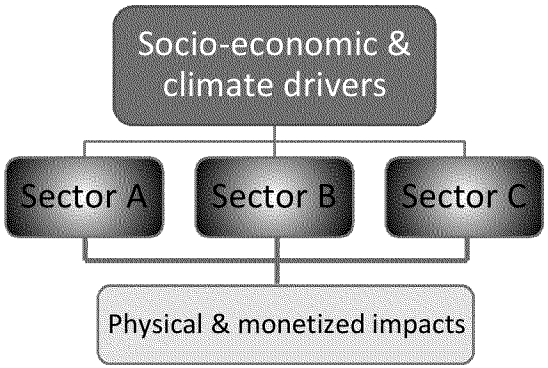
Where CIRA Sits Relative to Other Approaches

Detail, richness, and comprehensiveness of climate and impacts information

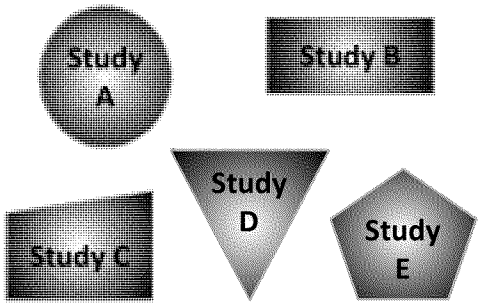
Integrated Assessment



CIRA



Assessment literature



Consistency along causal chain, interaction among sectors

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Approach

STEP 1 | DEVELOP GHG EMISSION SCENARIOS

Two scenarios are used in this report:

- Business as usual or "**Reference**" scenario.
- Global emissions reductions or the "**Mitigation**" scenario.

STEP 2 | PROJECT FUTURE CLIMATE

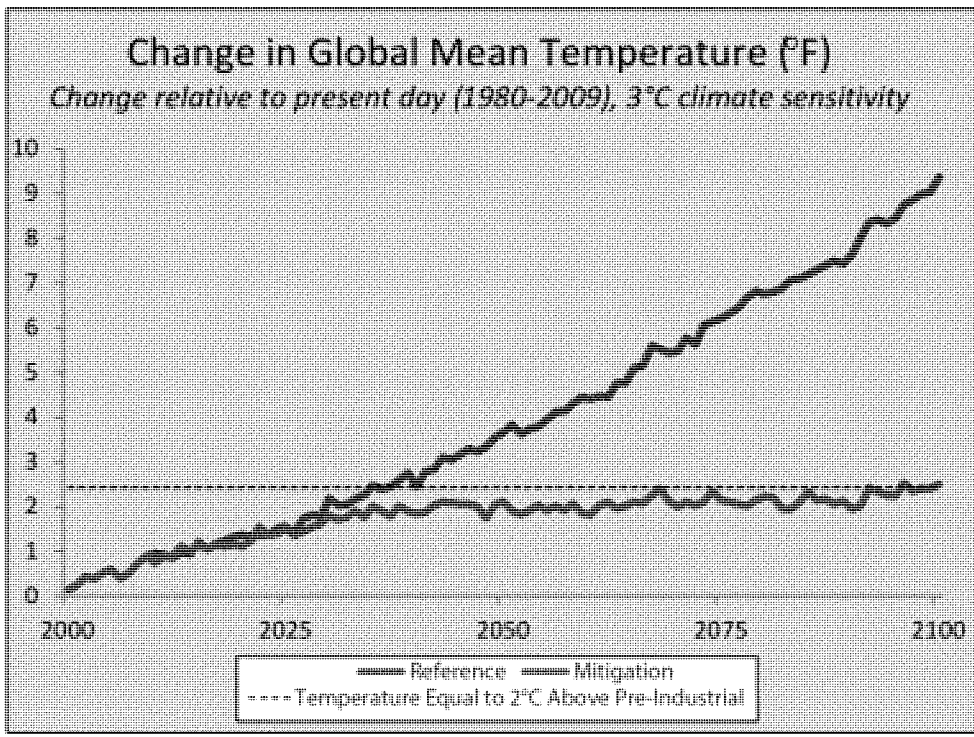
Model changes in a large number of climate variables (e.g., CO_2, temp, precip, sea level).

Evaluate the influence of variability across climate model projections.

STEP 3 | ANALYZE SECTORAL IMPACTS

Estimate physical impacts and economic damages using >20 detailed models covering six broad sectors.

HEALTH | INFRASTRUCTURE | ELECTRICITY
WATER | AG / FORESTRY | ECOSYSTEMS



The illustrative Mitigation scenario simulates a future with significant global action on climate change, where global warming has been limited to about 2°C (3.6°F) above preindustrial times.

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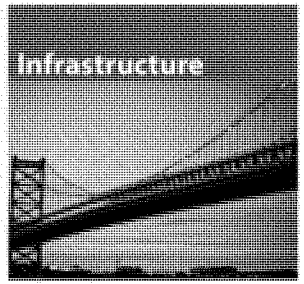
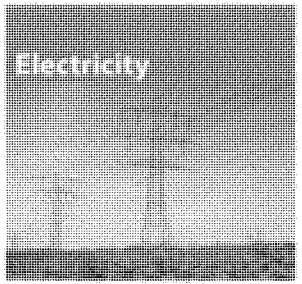
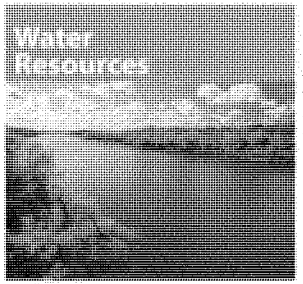
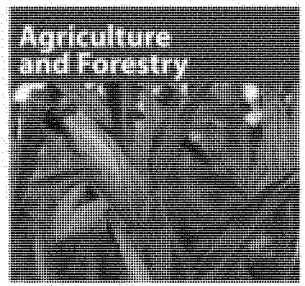
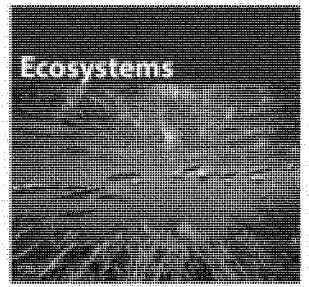
Sectoral Impacts Covered in the Report











Air Quality

Extreme Temperature

Labor

Water Quality

Bridges

Roads

Urban Drainage

Coastal Property

Electricity Demand

Electricity Supply

Inland Flooding

Drought

Water Supply and Demand

Crop and Forest Yields

Market Impacts

Coral Reefs

Shellfish

Freshwater Fish

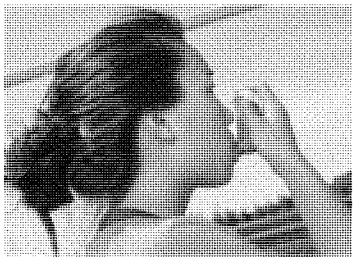
Wildfire

Carbon Storage

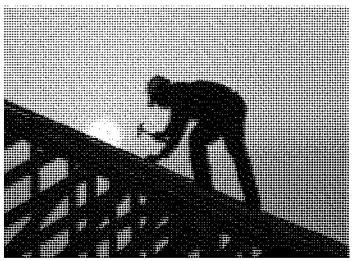
There are many important impacts (physical effects and economic damages) of climate change that are not included in this report. Therefore, the report estimates just a portion of the total benefits of reducing GHGs.

Key Findings of the Report

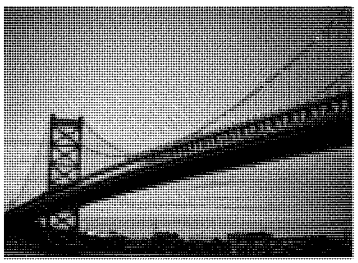
Global action on climate change avoids costly damages in the U.S. Across sectors, global GHG mitigation is projected to prevent or substantially reduce adverse impacts in the U.S. this century compared to a future without emission reductions.



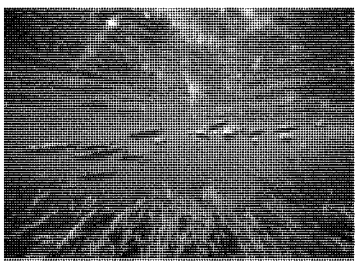
Global action on climate change reduces the frequency of extreme weather events and associated impacts. Global GHG reductions are projected to substantially reduce how often extreme temperature and precipitation events occur by the end of the century.



Global action now leads to greater benefits over time. For a majority of sectors, the benefits to the U.S. of GHG mitigation are projected to be even greater by the end of the century compared to the next few decades.



Adaptation can reduce damages and overall costs in certain sectors. Though actions to prepare for climate change incur costs, they can be very effective in reducing certain impacts, and will be necessary in addition to GHG mitigation.



Impacts are not equally distributed. Some regions are more vulnerable than others and therefore will experience greater impacts.

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CIRA Outreach and Next Steps

- The response following the report's release has been quite positive and surprisingly broad.
  - We're looking to build on that, including outreach leading up to UNFCCC COP-21 in December.
- Analytic next steps:
  - Complete sectoral analyses in progress, e.g., hydropower, thermo electric cooling, Alaska infrastructure.
  - Develop sector-specific damage (reduced-form) functions using the broader set of results.
- Given the feedback we've received, we're also exploring broader interagency collaboration.

Highlights by Sector

See the entire report at:
www.epa.gov/cira

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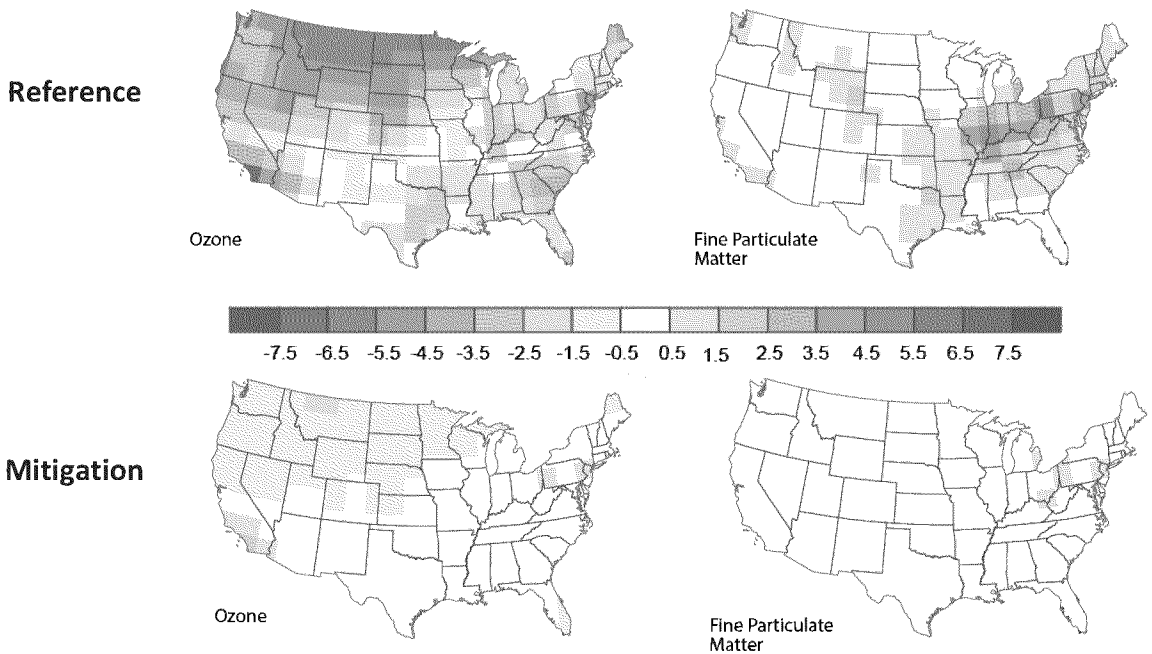
Air Quality

- Holding emissions of traditional air pollutants constant, unmitigated climate change is projected to worsen air quality across the large regions of the U.S., especially in the East, Midwest, and South.
  - Impacts on ozone are projected to be substantial for densely populated areas.
  - Although there is less certainty in PM2.5 response, results indicate large changes in densely populated areas (results do not include wildfire emissions → follow-up analysis).
- Global GHG Mitigation provides significant health benefits in the U.S., such as avoiding 13,000 premature deaths/yr by 2050 and 57,000 by 2100. Annual economic benefits of these avoided deaths are estimated at $160B in 2050, and $930B in 2100.

Projected Impacts on Air Pollution in 2100



Estimated change in annual-average, ground-level hourly concentrations (ppb for O_3 and μgm^{-3} for PM2.5) from 2000-2100

See Garcia-Menendez et al. (2015)

www.epa.gov/cira

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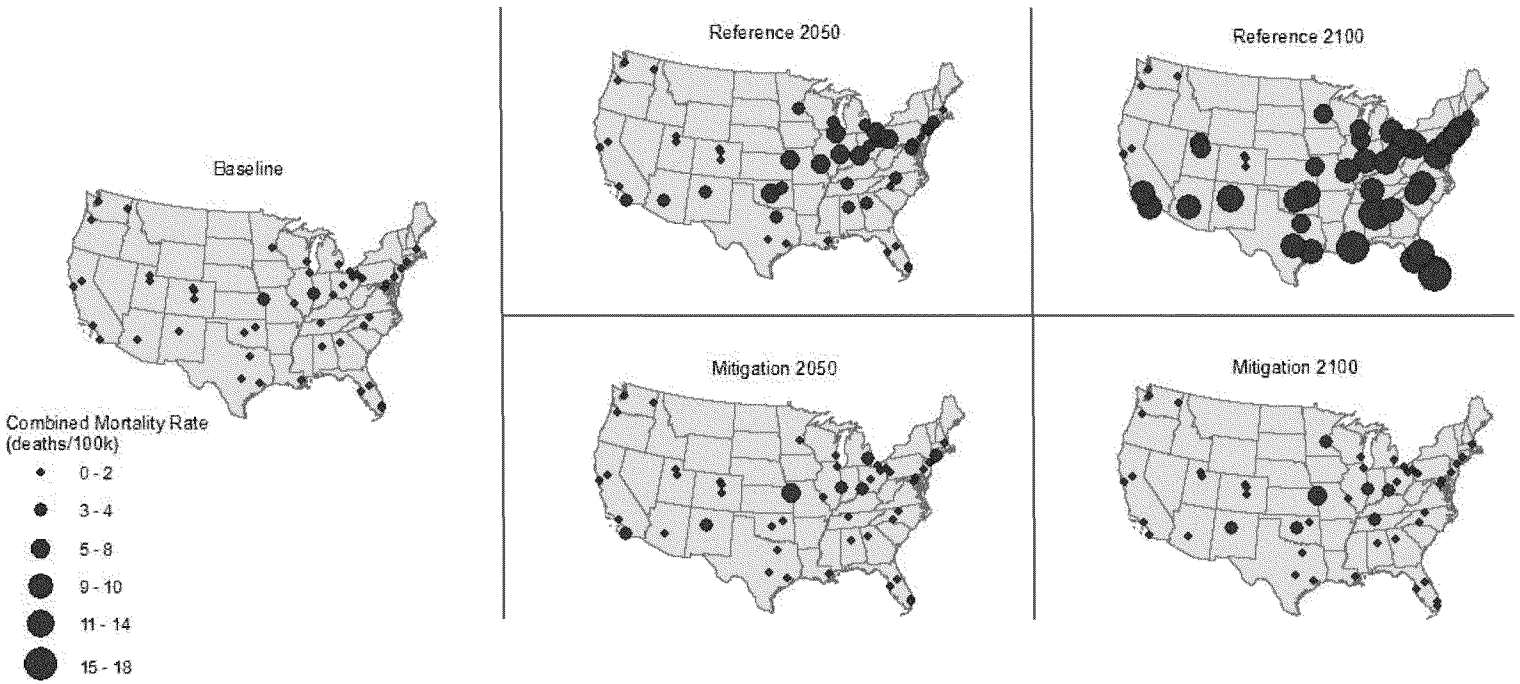
Extreme Temperature Mortality

- Without global GHG mitigation, a dramatic increase in extreme heat mortality is projected for the 49 cities modeled; mortality from extreme cold continues to diminish.
- Results suggest a considerable annual reduction in mortality in the 49 cities that grows over time with global GHG reductions.
  - Global GHG mitigation is projected to save ~1,700 lives each year in 2050, and ~12,000 in 2100.
  - Inclusion of other cities would increase these benefits substantially.
- Acclimatization sensitivity: even with an optimistic assumption regarding human response to extreme temperature, a large increase in net mortality is projected without mitigation.



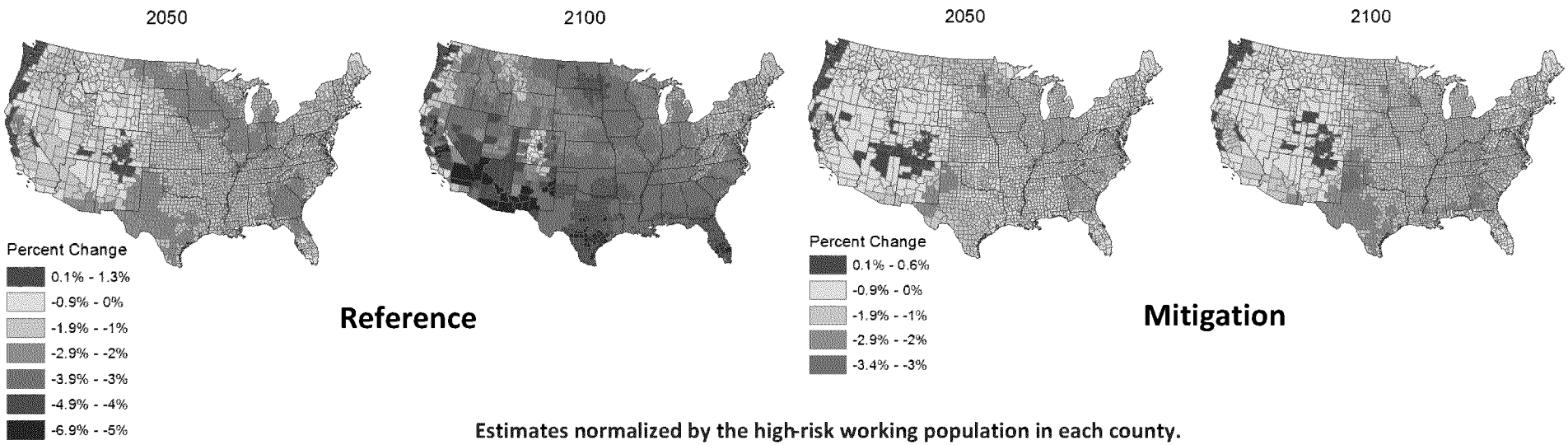
* Only 49 cities analyzed, cities without a dot would experience changes that are not estimated here.

See Mills et al. (2014a)

Labor

- Without global GHG mitigation, labor hours in the U.S. are projected to decrease due to increases in extreme temperatures. By 2100, over 1.8 billion labor hours are estimated to be lost each year, costing an estimated $170 billion annually in lost wages.
- By the end of the century, global GHG mitigation is estimated to benefit the contiguous U.S. by saving an annual 1.2 billion labor hours and $110 billion in wages that would otherwise be lost due to unmitigated climate change.
- Counties in the Southwest, Texas, and Florida that are estimated to lose more than 5% of high-risk labor hours under the Reference do not experience such losses under the Mitigation scenario.

Estimated Percent Change in High-Risk Labor Hours in 2050 and 2100



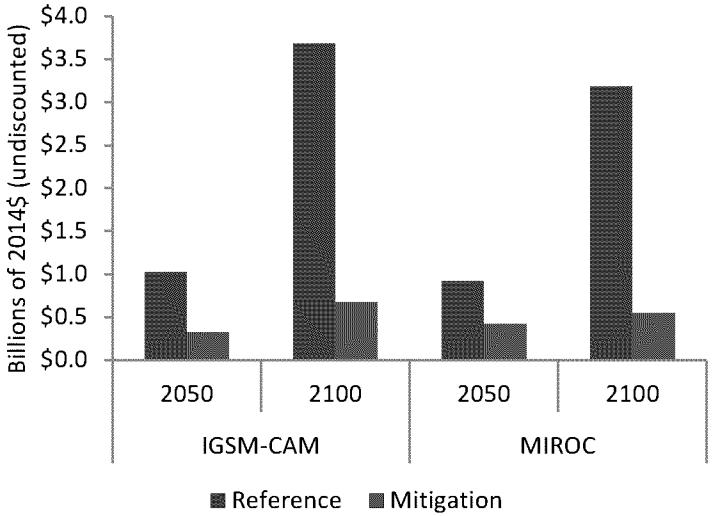
Estimates normalized by the high-risk working population in each county.

See Graff Zivin and Neidell (2014)

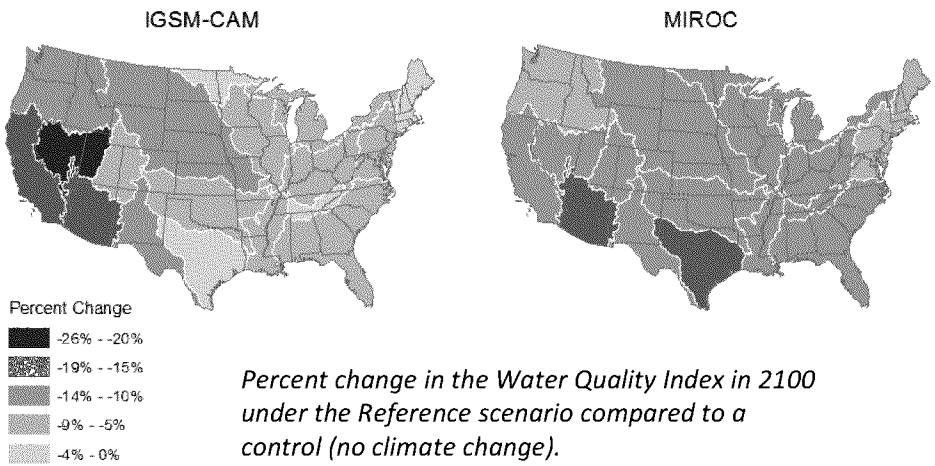
Water Quality

- Unmitigated climate change is projected to have adverse effects on water quality in the U.S., particularly in the Southwest.
- Global GHG mitigation prevents many of the water quality damages, primarily by reducing the warming of water bodies across the country, with smaller effects on nutrient loading.
- Under the Mitigation scenario, annual costs associated with decreased water quality are reduced by approximately 82% in 2100 compared to the Reference, saving an estimated $2.6-3.0 billion.

Change in Water Quality Damages with and without Global GHG Mitigation

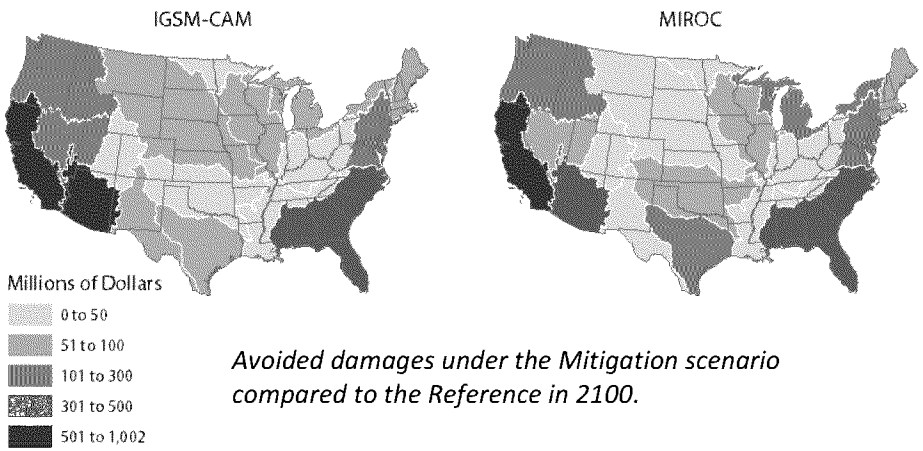


Effects of Unmitigated Climate Change on Water Quality in 2100



Percent change in the Water Quality Index in 2100 under the Reference scenario compared to a control (no climate change).

Benefits of Global GHG Mitigation for Water Quality in 2100



Avoided damages under the Mitigation scenario compared to the Reference in 2100.

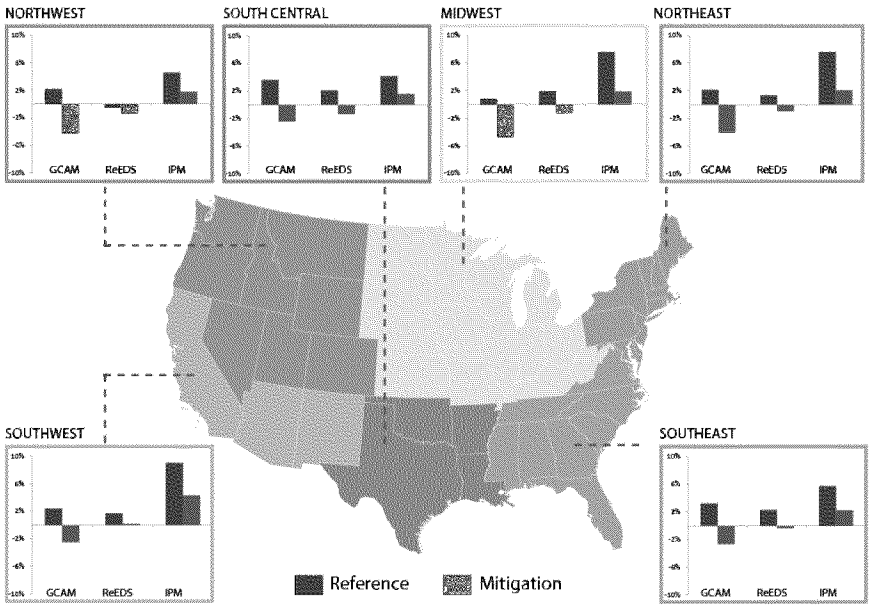
Projections using the relative wetter (IGSM-CAM) and drier (MIROC) climate models for the contiguous U.S.

See Boehlert et al. (2015)

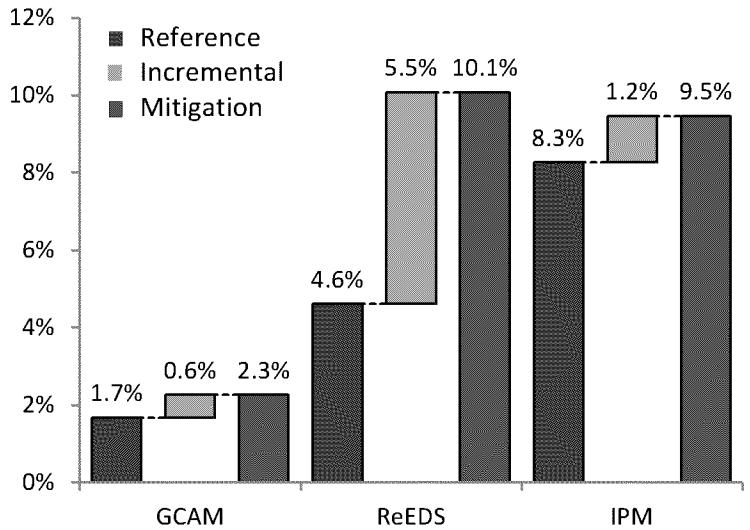
Electricity Demand and Supply

- Using three electric power sector models, analysis examines how projected rising temperatures affect electricity demand and supply (only analysis in CIRA that considers mitigation costs).
- Projected temperature changes increase electricity demand for A/C and lower demand for heating.
- Electricity demand increases 1.5%–6.5% nationally in 2050 when the air temperature projections from the Reference are included in electric power sector models (left figure). Meeting this additional demand raises power system costs by 1.7%–8.3% across the models (red bars in right figure).
- Accounting for costs in response to temperature in the Reference lowers the relative cost of mitigation. The incremental increase in power system costs from the Reference to the Mitigation scenario (0.6%–5.5%, yellow bars in right figure) is lower than the change in system costs (2.3%–10.1%, blue bars in right figure) when temperature increases are omitted.

Change in Regional Energy Demand in 2050



Percent Change in Cumulative Discounted System Costs (2015-2050)



• System costs include capital, operations, maintenance, and fuel

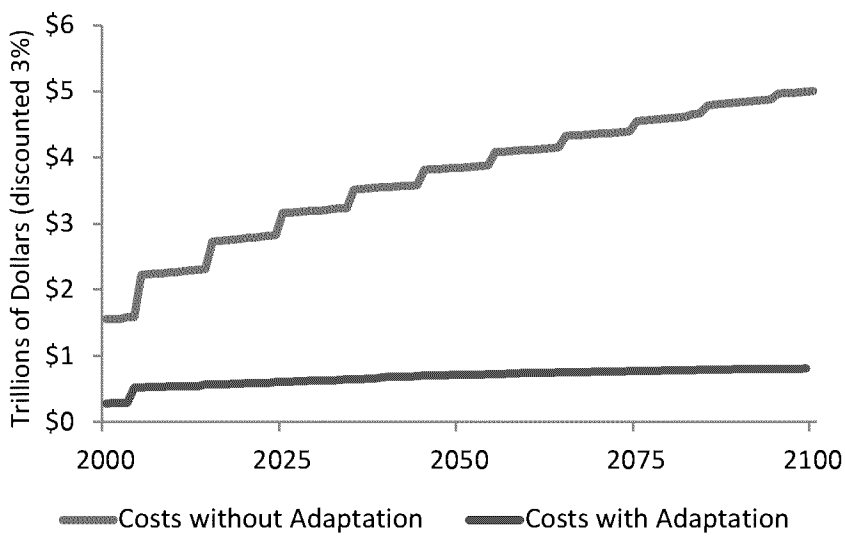
Both figures show results compared to a control with no climate change.

See McFarland et al. (2015)

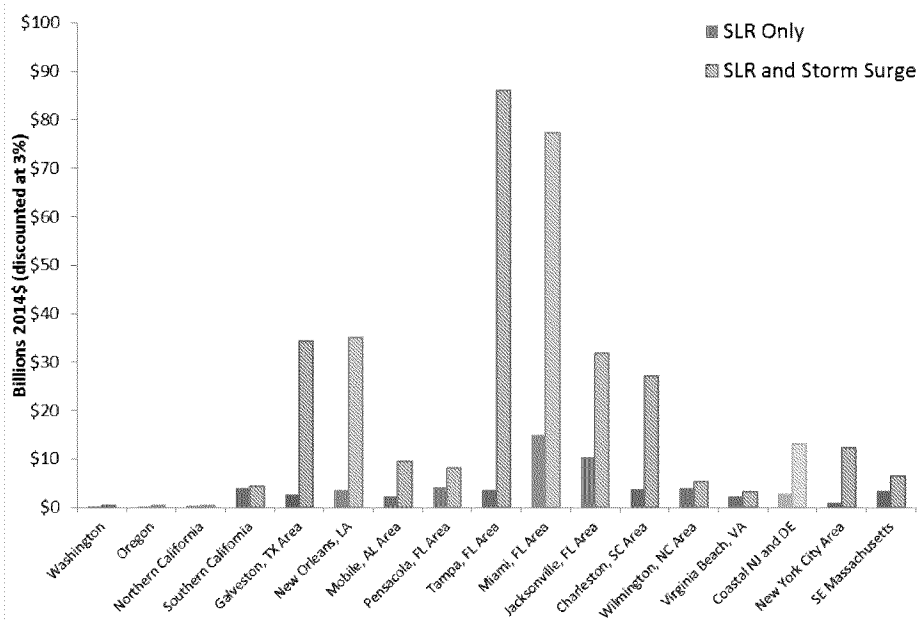
Coastal Property

- A large amount of coastal property in the U.S. is at risk of inundation from SLR and storm surge. The cumulative cost of inaction (no adaptation) in the face of SLR and storm surge through 2100 is estimated at $5.0 trillion (discounted at 3%).
- When adaptation is included, the cumulative economic impacts of SLR and storm surge on coastal property through 2100 for the REF are $810B. Global mitigation avoids $20B of these costs (both discounted at 3%), but the majority of these benefits are realized late in the century.
- Important caveats: analysis assumes that adaptation measures will be well-timed, and does not include other coastal assets (e.g., roads, energy infrastructure).
- Areas projected to be abandoned have a higher percentage of socially vulnerable populations than areas likely to be protected.

Effect of Adaptation on Costs of Unmitigated Climate Change



Regional Costs of Sea Level Rise and Storm Surge through 2100

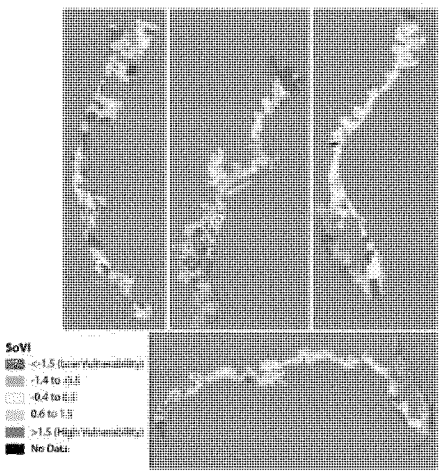


For both figures:
- Sea level rise (56in by 2100) and storm surge under the Reference.
- Adaptation responses include abandonment, shoreline armoring, beach nourishment, and property elevation.

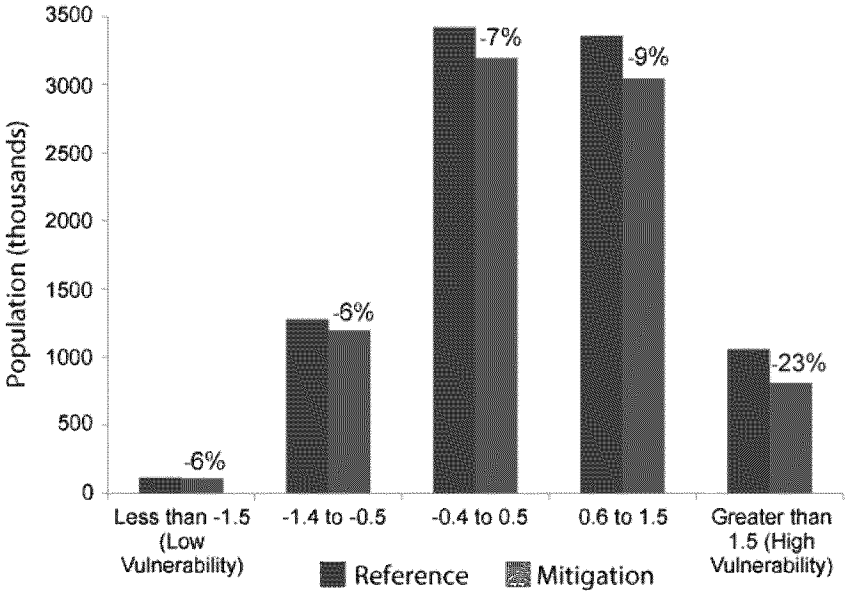
See Neumann et al. (2014a) and Neumann et al. (2014b)

Coastal Property: Environmental Justice

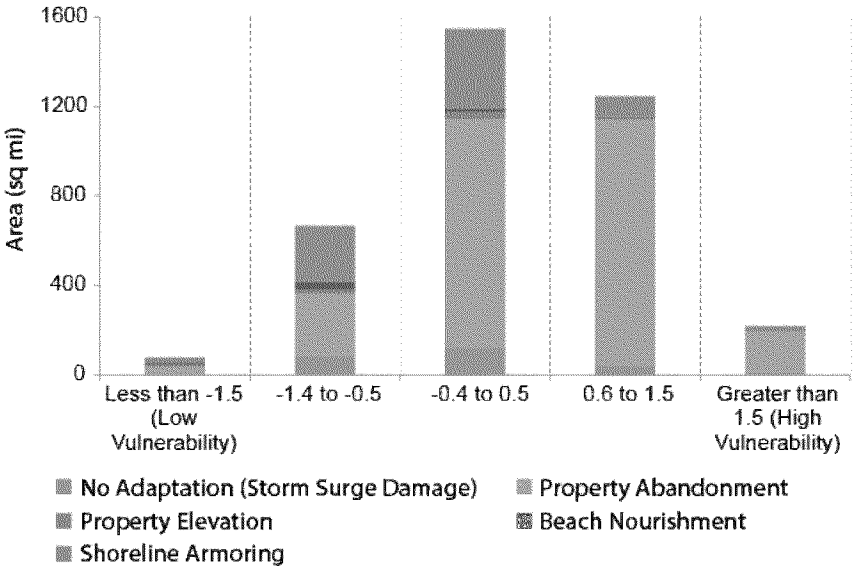
- The approach estimates how sea level rise and storm surge risks are distributed across different socioeconomic populations along the U.S. coastline, and how these populations may respond to these risks.
- The benefits of global GHG mitigation in reducing the number of people vulnerable are particularly high for those that are most socially vulnerable.
- In the most socially vulnerable populations, a relatively larger proportion of the area inhabited is likely to be abandoned rather than protected through adaptation measures.



Social Vulnerability of Population at Risk through 2100



Potential Adaptive Responses Across Populations



See Martinich et al. (2012) and Neumann et al. (2014b)

www.epa.gov/cira

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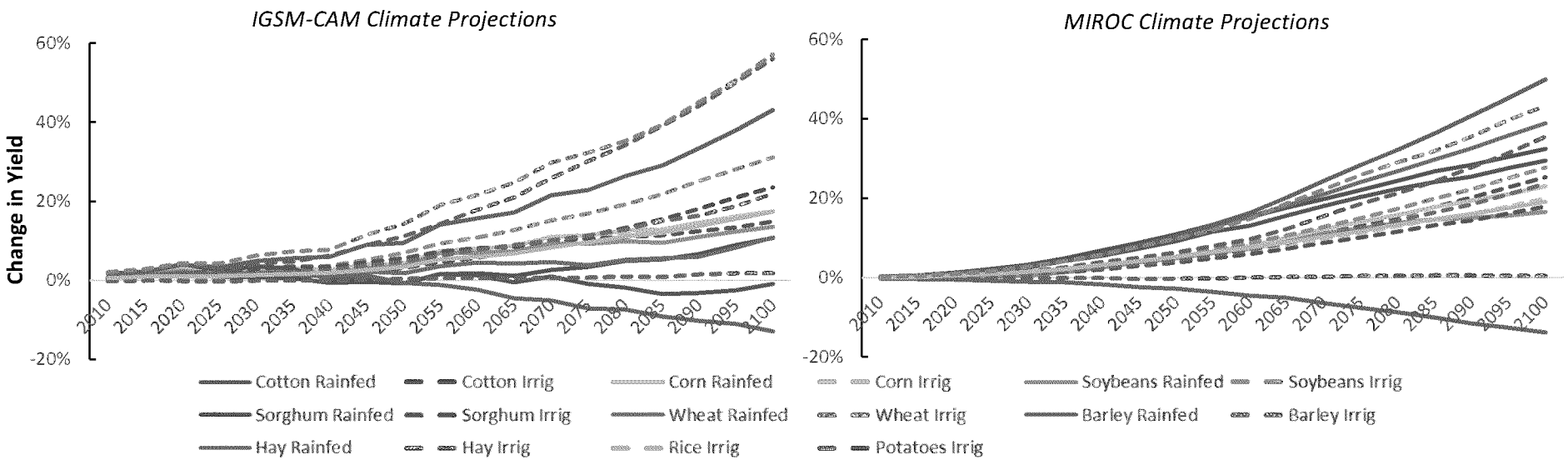
Agriculture and Forestry

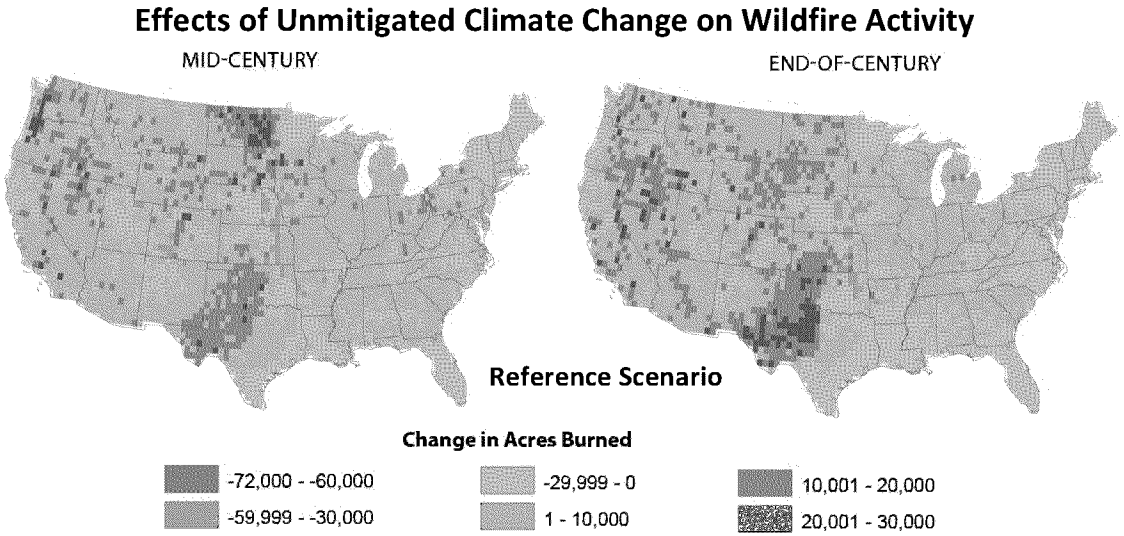
- Estimate effects of GHG mitigation on U.S. crop yields (EPIC), forest yields (MC1), and markets (FASOM).
- Compared to the Reference, global GHG mitigation results in larger yields across all regions for irrigated and most rainfed crops.
- Yields are most positively affected by global GHG mitigation in the South, Northeast benefits the least.
- Change in hard/softwood growth is small (<5%) under both scenarios, with the effect of GHG mitigation depending upon climate model (followup work will estimate effects of changes in wildfire/pest/disease).
- Consistent with the observed changes in yields over time and across crops, global GHG mitigation under the Policy scenario generally results in lower crop prices compared to the Reference, resulting in cumulative net gains to consumers that outweigh any losses to producers.
- Analysis assumes that the agriculture/forestry sectors do not participate in the GHG mitigation.

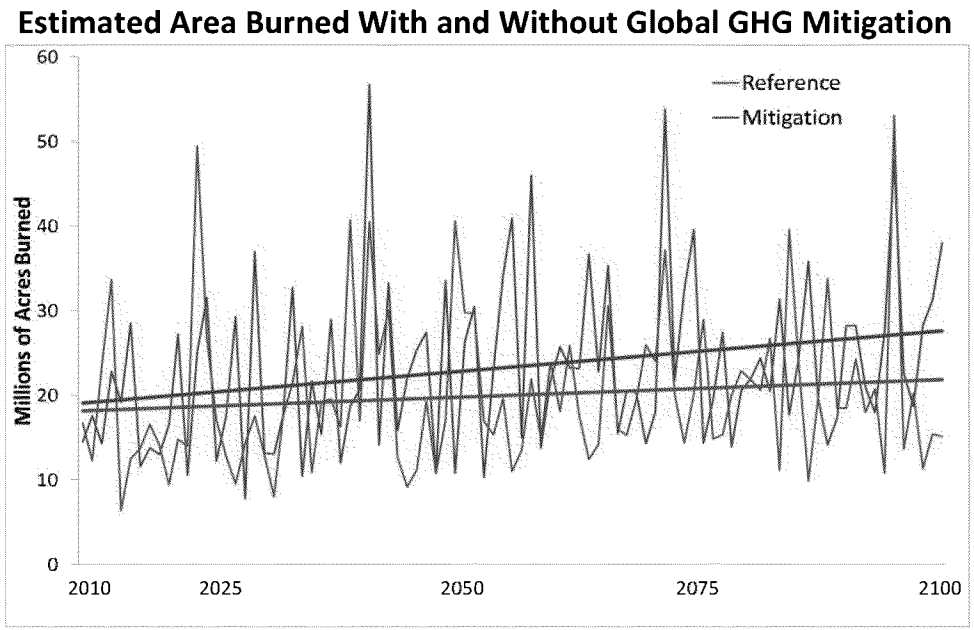
The Effect of Global GHG Mitigation on U.S. Crop Yields Using EPIC (Mitigation vs. Reference)



See Beach et al. (2015)

Wildfire





Both figures present estimates using climate projections of the IGSM-CAM climate model.

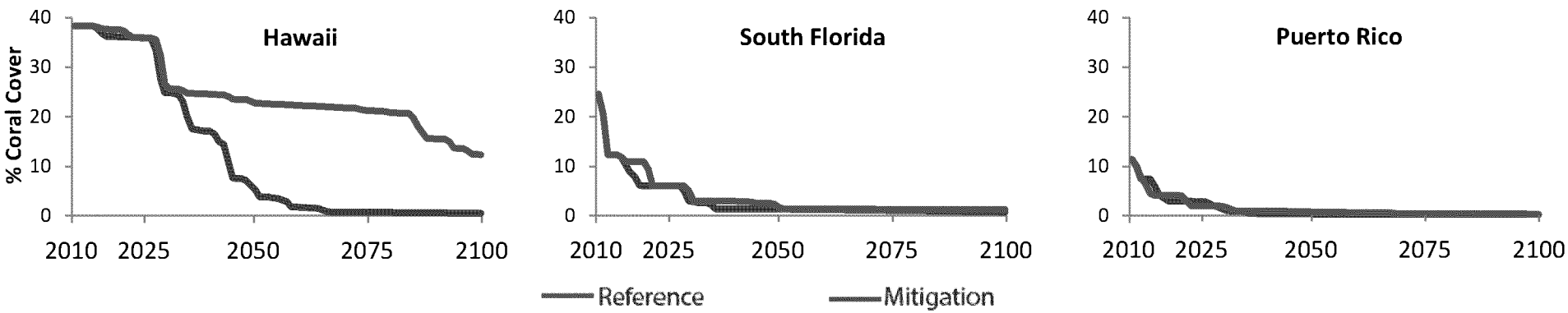
- Without global GHG mitigation, climate change is projected to dramatically increase wildfires, especially in the West.
- Global GHG mitigation is projected to reduce the cumulative area burned through 2100 by approximately 210-300 million acres compared to the Reference, an area 2-3 times the size of California.
- Global GHG mitigation avoids an estimated $8.6-11 billion in wildfire response costs and $3.4 billion in fuel management costs (discounted at 3%).
- Other damages, such as health impacts from decreased air quality or property damage, are not included.

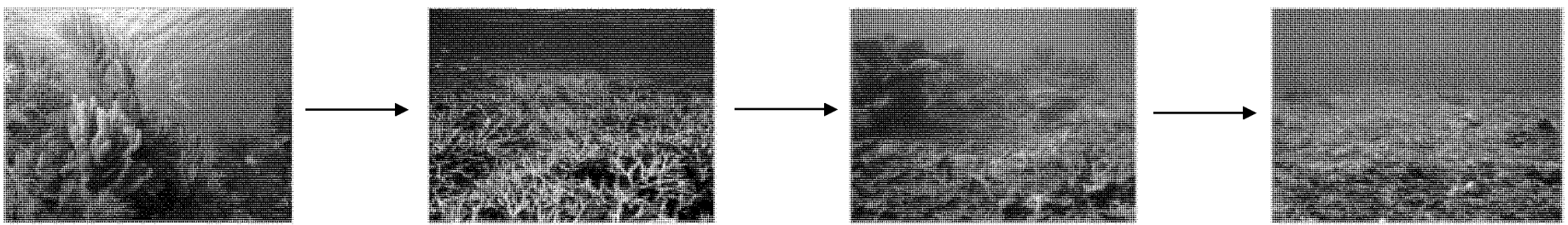
See Mills et al. (2014b) and Lee et al. (2015)

Coral Reefs

- Coral reefs are declining due to climate and non-climate stressors. Without global GHG mitigation, extensive loss of shallow corals is projected by 2050 for major reef locations.
- Global GHG reductions delay Hawaiian coral reef loss compared to the Reference, but provide only minor benefits in Puerto Rico and South Florida, as these reefs are already being affected by climate change, and other stressors.
- The Mitigation scenario avoids an estimated $22 billion (discounted at 3%) through 2100 in lost recreational value for all three regions, compared to the Reference. Estimates do not include the value of other reefs services (e.g., shoreline protection, fish habitat).

Change in Coral Reef Cover with and without Global GHG Mitigation at Major U.S. Reefs



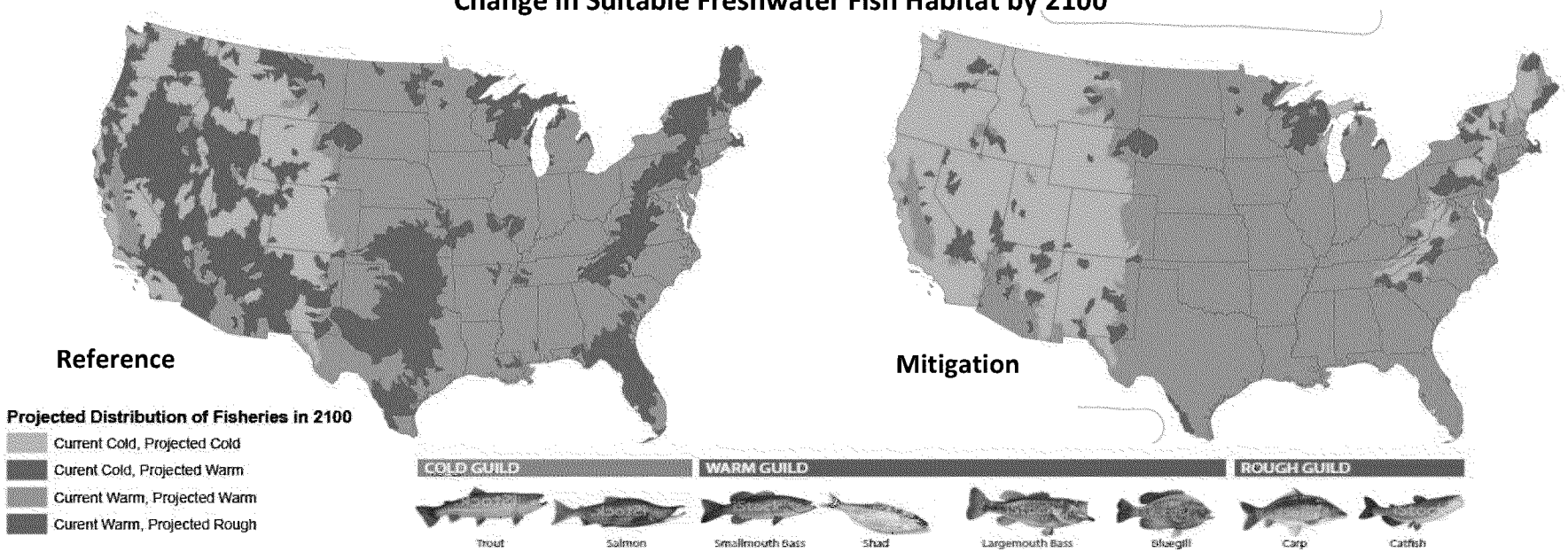


See Lane et al. (2014) and Lane et al. (2013)

Freshwater Fish

- Unmitigated climate change results in significant changes to the spatial distribution of where freshwater fish are today.
  - Under the Reference, warm-water and rough fisheries expand considerably.
- Coldwater fish habitat is projected to decline by approximately 62% through 2100 under the Reference, but only by 12% under the global GHG mitigation scenario.
  - Mitigation preserves coldwater habitat in most of Appalachia & the Mountain West
- The Mitigation scenario avoids $380M to $1.5B (discounted at 3%) in <u>total</u> recreational fishing damages through 2100 compared to the Reference.

Change in Suitable Freshwater Fish Habitat by 2100

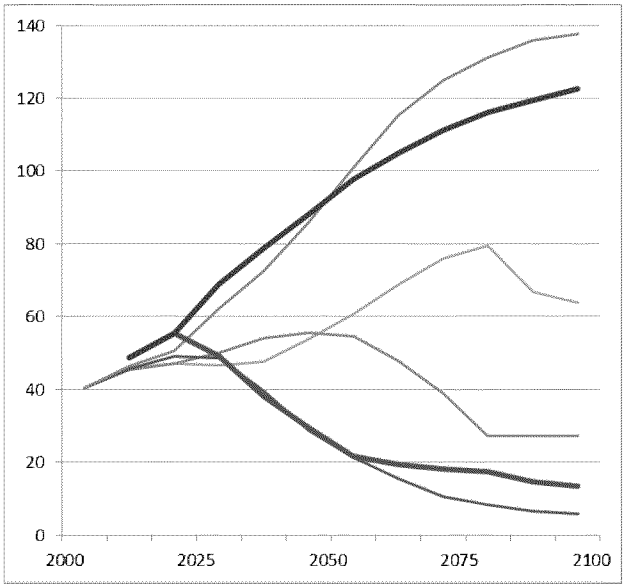


See Lane et al. (2014) and Jones et al. (2012)

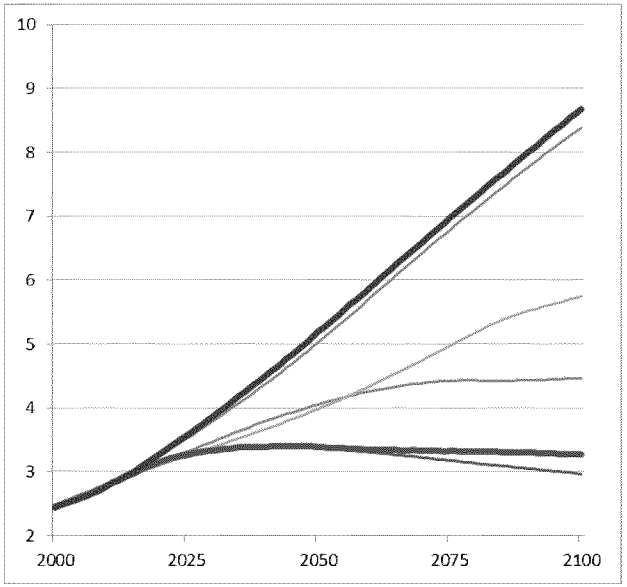
Appendix

CIRA Global GHG Emissions Scenarios

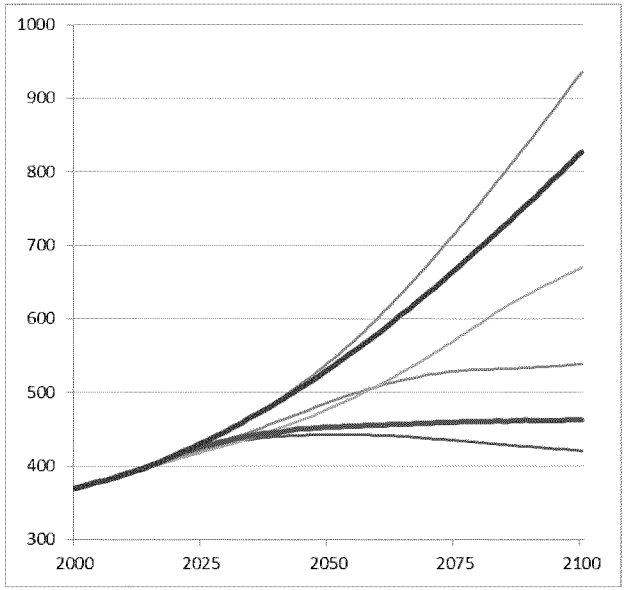
Global GHG Emissions (GT CO_2-eq.)



GHG Radiative Forcing (W/m^2)



CO_2 Concentration (ppm)

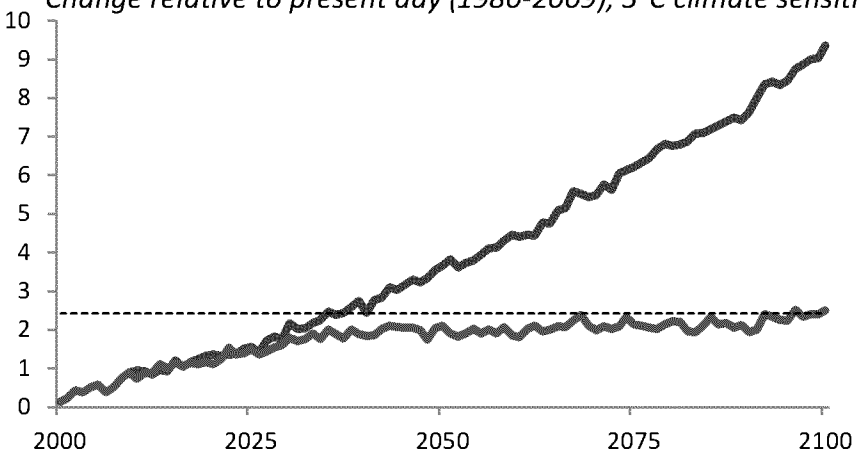


Reference Mitigation

RCP 8.5 RCP 6.0 RCP 4.5 RCP 2.6

Change in Global Mean Temperature (°F)

Change relative to present day (1980-2009), 3°C climate sensitivity



- Emission scenarios developed using MIT's Emissions Prediction and Policy Analysis (EPPA) model, and the Integrated Global System Modeling (IGSM) Framework.

See Paltsev et al. (2013)

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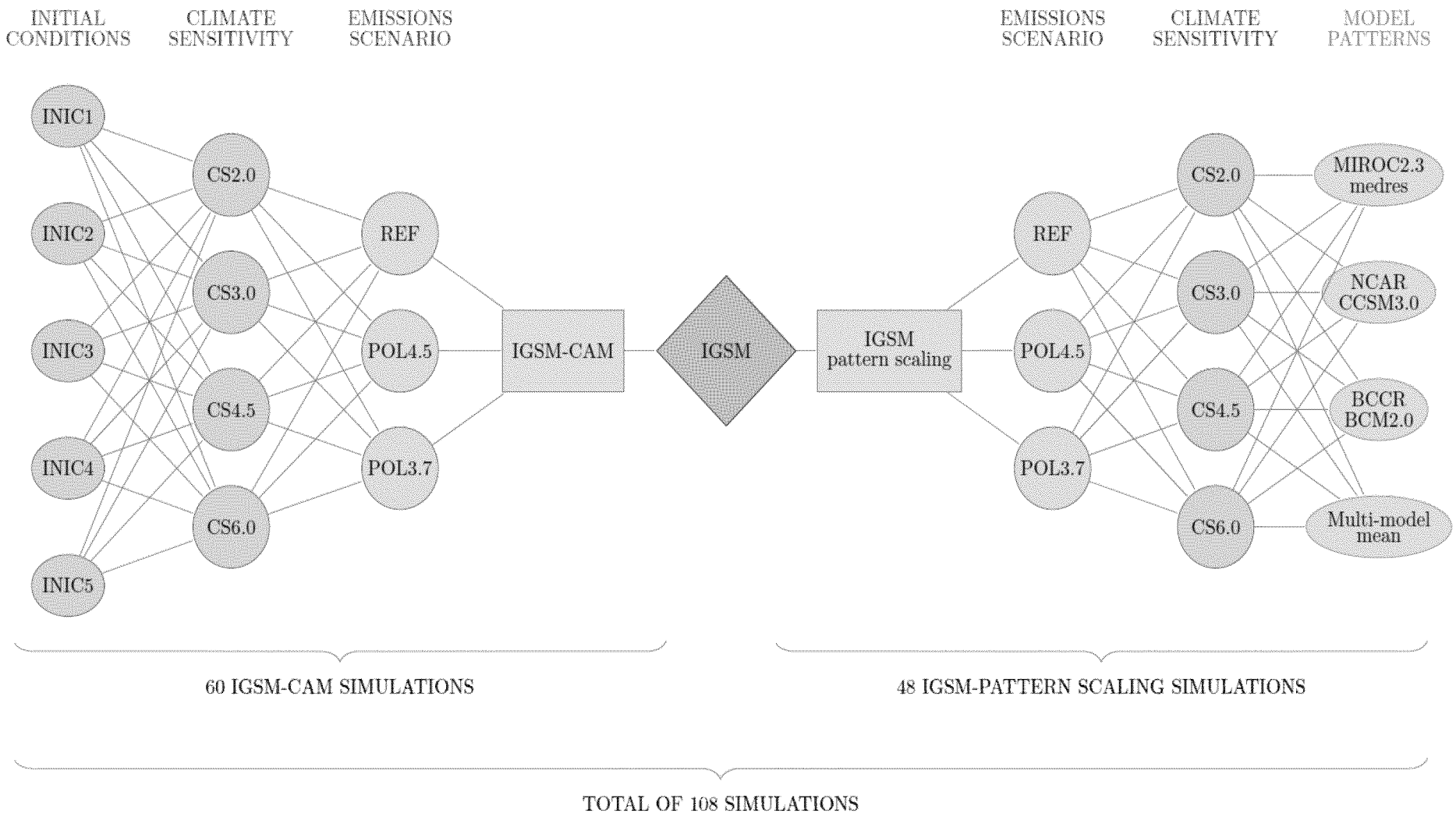
CIRA Uncertainty Framework For Climate Projection



See Monier et al. (2014)

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CIRA Impact Sector Coverage

Human health
- ● Thermal stress (mortality)
- ● Air quality
- ○ Vector-borne disease
- ○ Other extreme event morbidity, mortality
- ● Environmental justice / vulnerable populations
- ● Labor supply/productivity

Agriculture
- ● Crop yield (U.S.)
- ○ Crop yield (global)
- ○ Specialty crops (U.S. and global)
- ○ Livestock production
- ○ Dairy production
- ● Carbon storage

Forests
- ● Change in timber production (U.S.)
- ● Change in CO_2 storage
- ● Wildfire

Freshwater Resources
- ● Drought
- ● Flooding damages
- ● Water supply and demand
- ● Water quality
- ○ Groundwater

Ecosystems
- ● Species-level (coral, freshwater fish, shellfish)
- ○ Biodiversity
- ○ Coastal wetlands
- ○ Other acidification effects

Energy
- ● Temperature effects on energy (electricity) supply and demand
- ◐ Precipitation and system effects on hydro power
- ◐ Change in thermo-cooling capacity
- ○ Climate & system effects on wind/solar generation
- ○ Extreme event effects on reliability

Infrastructure
- ● Non-coastal roads and bridges
- ● Coastal property
- ● Urban drainage
- ● Inland property damages from floods
- ◐ Coastal energy infrastructure
- ◐ Alaska infrastructure
- ○ Coastal infrastructure (e.g., roads, POTWs)
- ○ Transportation waterways
- ○ Telecommunication infrastructure

Tourism
- ● Coral reef recreation
- ● Recreational fishing
- ○ Other recreation (e.g., winter, boating, birding)

Other
- ○ Impacts beyond the contiguous U.S.
- ○ Residual damages post extreme events (e.g., hurricanes)
- ○ Catastrophic climate change (e.g., ice sheet collapse)
- ○ National security risks (e.g., conflict, mass migration)

KEY
- ● Existing CIRA capacity
- ◐ In progress
- ○ Not currently in CIRA

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