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November 6, 2014

Gina McCarthy, EPA Administrator
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Dear Administrator McCarthy:

On behalf of the National Association of University Forest Resources Programs representing 80 of the country's universities that have programs devoted to forest resources and who share a common purpose to advance the health, productivity and sustainability of our nation's forests, we are pleased to write you regarding your ongoing efforts on biomass carbon accounting.

As leaders in the science community, we appreciate your consistent emphasis on providing a strong science foundation for agency policy. We also acknowledge and wish to respond to your several requests for current, peer-reviewed science to inform the agency's work.

To that end, we provide the attached summary of science fundamentals, signed by more than 100 university experts in the field, that many in the science community, and the forestry disciplines in particular, strongly believe should underlie the agency's policy considerations for biomass carbon accounting. These fundamentals, which are essential to understanding and benefitting from the low carbon attributes of managed forests and the biomass derived from them, are also addressed in an article appearing in the November issue of the Journal of Forestry.

We appreciate the difficult task the agency faces as it tries to develop reasonable policies consistent with sound, relevant science. We recognize, for example, that in the carbon accounting context the agency must rely on the expertise and judgment of policy makers to establish appropriate baselines, monitoring protocols and other implementation and compliance approaches that apply science in a relatively simple and cost effective way. We believe the fundamentals we provide can support a variety of policy approaches that meet programmatic requirements while addressing the practical needs of both the regulating and regulated community.

We invite the EPA to carefully consider these science fundamentals and look forward to lending our expertise to the agency as it further develops a sound, science-based accounting policy for biomass energy.

Respectfully,

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Science Fundamentals of Forest Biomass Carbon Accounting

Policy makers are increasingly considering the use of forest biomass energy to meet national, regional and state energy and carbon emissions objectives. As they do so, it is imperative that their policy decisions be informed by current peer-reviewed science on the carbon impacts of woody biomass as an energy source. Some studies on the subject offer views with stringent assumptions that may be confusing to decision-makers.

Peer-reviewed literature examining the net emissions from the wide spectrum of forest-based activities reveals a number of important fundamentals policy makers should consider when characterizing the carbon impacts of the increased use of forest biomass for energy.[1] While these fundamentals do not address all of the issues policy makers confront, they help clarify those most directly affecting the potential role forest biomass energy can play in energy and climate policy.

As experts in forest science, we recommend the following four science fundamentals to policy makers and others seeking to develop a science-based approach to biomass energy production.

Fundamental 1: The carbon benefits of sustainable forest biomass energy are well established.

The long-term benefits of forest biomass energy are well-established in science literature. As stated in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, "In the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fibre or energy from the forest, will generate the largest sustained mitigation benefit.[2]" Most debates regarding the carbon benefits of forest biomass energy are about the timing of the benefits rather than whether they exist.

Fundamental 2: Measuring the carbon benefits of forest biomass energy must consider cumulative carbon emissions over the long term.

The most effective carbon mitigation measures are those which reduce carbon accumulation in the atmosphere over time. Forest biomass energy yields significant net decreases in overall carbon accumulation in the atmosphere over time compared to fossil fuels. Comparisons between forest biomass emissions

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1 Miner, R.A., R.C. Abt, J.L. Bowyer, M.A. Buford, R.W. Malmsheimer, J. O'Laughlin, E.E. Oneil, R.A. Sedjo, and K.E. Skog. 2014. Forest Carbon Accounting Considerations in U.S. Bioenergy Policy. *Journal of Forestry* Forthcoming http://www.ingentaconnect.com/content/saf/jof/pre-prints/content-jof14009

2 p. 543 Nabuurs, G.J., O. Masera, K. Andrasko, P. Benitez-Ponce, R. Boer, M. Dutschke, E. Elsiddig, et al. 2007. Forestry. Chapter 9 in *Climate change 2007: Mitigation*. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Metz, B., O.R. Davidson, P.R. Bosch, R. Dave, and L.A. Meyer (eds.). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. P. 541-584.

and fossil fuel emissions at the time of combustion and for short periods thereafter do not account for long term carbon accumulation in the atmosphere and can significantly distort or ignore comparative carbon impacts over time.

Fundamental 3: An accurate comparison of forest biomass energy carbon impacts with those of other energy sources requires the use of consistent timeframes in the comparison.

The most common timeframe for measuring the impacts of greenhouse gases is 100 years, as illustrated by the widespread use of 100-year global warming potentials.[3] This timeframe provides a more accurate accounting of cumulative emissions than shorter intervals. Measuring the net cumulative carbon emissions from forest biomass energy over a 100 year timeframe, as is done for fossil fuels, more accurately captures and more appropriately demonstrates the cumulative carbon benefits of biomass energy compared to fossil fuels.

Fundamental 4. Economic factors influence the carbon impacts of forest biomass energy.

Research demonstrates that demand for wood helps keep land in forest and incentivizes investments in new and more productive forests, all of which have significant carbon benefits. This is particularly true when landowner investments are made in anticipation of future market demand. Likewise wood markets significantly influence both the availability of wood and the kind of wood used for biomass energy. For example, large trees better suited for higher value markets are typically not used for energy. The consideration of landowner response to the marketplace is essential to fully accounting for the long-term carbon impacts of using forest biomass for energy.[4] Failing to consider the effects of markets and investment on carbon impacts can distort the characterization of carbon impacts from forest biomass energy.

Research on the use of forest biomass as an energy source to mitigate GHG emissions dates back to the late 1980's. Changes in technology, forest conditions, and markets and global economics will influence forest biomass utilization now and in the future. A commitment to continuing research on forest biomass utilization is necessary to quantify the risks and benefits associated with its use, encourage dialogue and debate, drive innovation and investment in new technologies and inform policy.

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[3] Forster, P., V. Ramaswamy, P. Artaxo, T. Berntsen, R. Betts, D.W. Fahey, J. Haywood, et al. 2007. Changes in atmospheric constituents and in radiative forcing. Chapter 2 in *Climate Change 2007: The physical science basis*. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor, and H.L. Miller (eds.). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[4] Alavalapati, J.R.R., P. Lal, A. Susaeta, R. Abt, and D. Wear. 2013. Forest biomass-based energy pp213-260. A chapter In Southern Forest Future Project edited by D. Wear and J. Griess, U.S. Forest Service General Technical Report SRS-178, 1318 pages.

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