Project

BH Replace Sub AA and JCC-2 Transformers - Phase 1 (2011 BH Replace Sub AA and two 69/13.8 kV Transforme
GP O&O Central Control Rack Room DCS Upgrade
BH Replace Combustion System hardware on C-CG-2 Gas Turbine
F4 DCS CP, AW and COMM Module Replacement
BH Natural Gas Line Replacement
GP 69kV Transmission Line Reliability Plan Project
BH Replace Combustion System Hardware on C-CG-1 Gas Turbine
BH Replace Combustion System hardware on C-CG-2 Gas Turbine
H-K2-001 & 002 Boiler Replacements
BH SVR Excitation Control Replacement for CoGen 1 & 2
BH Cogen 1 Upgrade

FMG Replace Substation JWW-1 at JWWTP
'BH Replace Combustion System Hardware on C-CG-1 Gas Turbine
BH Replacement Clarifier Charge Pump

GP 69kV TCC-3/3A & 4/4A Diff Protection

BH Replace Sub AA and JCC-2 Transformers - Phase 1 (2011 BH Replace Sub AA and two 69/13.8 kV Transforme
BH Cogen 2 Refurbishment
BH H-K-11 Rebuild
Sub K Battery String Replacement
Cogen 1 UPS Battery Replacement
F5 Rebuild H-K-003
Util Electrical Power to rental RO system
Sub J Battery Back Up System Replacement
BH H-K2-004 BMS & SIS Upgrade

Year Completed		Cost $K
2014	$	104
2014	$	341
2014	$	68
2014	$	243
2014	$	267
2014	$	1,090
2014	$	987
2015	$	2,800
2016	$	11,000
2016	$	600
2016	$	2,300
2017	$	4,900
2017	$	1,900
2017	$	1,900
2017	$	800
2018	$	19,000
2018	$	2,700
2018	$	5,400
2019	$	20
2019	$	20
2020	$	13,000
2020	$	550
2020	$	20
2022	$	2,600

Total Spend by Year	$	2,015
	$	2,800
	$	2.8

	EO Emission
Year Completed	**Benefit Classification**
2014	Electrical Reliability
	Steam Supply Reliability
	Process Improvements
2015	Steam Supply Reliability

Benefit Classification

Electrical Supply Reliability
DCS Upgrade
Steam Supply Reliability

Steam Supply Reliability
Electrical Supply Reliability
Steam Supply Reliability
Steam Supply Reliability
Steam Supply Reliability
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Steam Supply Reliability
Steam Supply Reliability
Electrical Supply Reliability
Future Consideration

2016	2017	2018	2019	2020
$ 13,900	$ 9,500	$ 27,100	$ 40	$ 13,570
$ 13.9	$ 9.5	$ 27.1	$ 0.0	$ 13.6

Reduction Efforts
Projects/Improvements
Substation and transformer improvements High voltage Transmission line improvements
Combustion system hardware replacement Boiler Natural Gas line replacement
DCS Upgrades AW and COMM module replacement
Gas turbine upgrades

2016	Steam Supply Reliability
	Process Improvements
2017	Electrical Reliability
	Steam Supply Reliability
2018	Electrical Reliability
	Steam Supply Reliability
2019	Electrical Reliability
	Steam Supply Reliability
	Process Improvements
2020	Electrical Reliability
	Steam Supply Reliability

Replacement of two boilers Replacement of controls on Cogen 1 & 2 Upgrades to Cogen 1
F8 process control improvements post start up
Replacement of a substation Improved electrical supply protection
Replacement of combustion hardware on gas turbine Replacement of clarifier charge pump
Replaced one substation and two transformers
Refurbished Cogen 2, rebuild H-K-11
Replaced substation battery string
Replaced Cogen 1 UPS
Made several control system changes to reduce the impact to other units when an F or G unit process has an upset or trip
Connected rental RO system to permanent power supply Replacement of substation battery backup system
Rebuilt one boiler