EXHIBIT SC-1 (JIF-1)

Sierra Club
UT Docket 10-035-124
Exhibit SC-1 (JIF-1)
Witness: Jeremy Fisher

Jeremy I. Fisher, PhD

Curriculum Vitae

Synapse Energy Economics
485 Massachusetts Ave., Suite 2
Cambridge, MA 02139
http://www.synapse-energy.com

(617) 453-7045 (Direct)
(617) 661-3248 (Main)
(617) 661-0599 (Fax)
jfisher@synapse-energy.com

EMPLOYMENT

Scientist **2007-present**

Synapse Energy Economics

- Model and evaluation of avoided emissions from energy efficiency and renewable energy (Utah State, California Energy Commission, US EPA, State of Connecticut),
- Evaluation of heath, water, and social co-benefits of energy efficiency and renewable energy (Utah State, Civil Society Institute)
- Develop analysis of water consumption and withdrawals from electricity sector (Stockholm Environment Institute, Union of Concerned Scientists)
- Estimate of compliance costs for environmental regulations (Western Grid Group)
- Development of alternate energy plans for municipalities, states, and regions (Sierra Club Los Angeles, NRDC Michigan, Western Resource Advocates Nevada)
- Price impacts of carbon policy on electricity generators and consumers (NARUC, NASUCA, APPA, NRECA)
- Facilitate and provide energy sector modeling for stakeholder-driven carbon mitigation program in Alaska (Center for Climate Strategies)
- Estimate of greenhouse gas emissions reductions from energy efficiency, agricultural and forestry offsets for all US states (Environmental Defense Fund)
- Economic cost of climate change on energy sector in US and Florida (EDF, NRDC)
- Estimate full costs of nuclear waste decommissioning in West Valley site

Postdoctoral Research Scientist **2006-2007**

Tulane University, Department of Ecology and Evolutionary Biology

University of New Hampshire, Institute for the Study of Earth, Oceans, and Space

- Predicted forest mortality from wind damage using satellite data and ecosystem model
- Analyzed Gulf Coast ecosystem impacts of Hurricane Katrina
- Wrote and organized team synthesis review on causes of natural rainforest loss in the Amazon basin
- Redeveloped ecosystem model to explore carbon ramifications of long-term Amazon disturbance

Visiting Fellow **2007-2008**

Brown University, Watson Institute for International Studies

- Designed remote sensing study to examine migratory bird response to climate variability in Middle-East

Research Assistant **2001-2006**

Brown University, Department of Geological Sciences

- Used satellite data to track influence of local and global climate patterns on temperate forest seasonality
- Worked with West African collaborators to determine land-use impact on landscape degradation
- Investigated coastal power plant effluent through multi-temporal satellite data

Remote Sensing Analyst **2005-2006**

Consultant for Geosyntec. in Acton, Massachusetts

- Mapped estuary from hyperspectral remote sensing data to determine impact of engineered tidal system
- Developed suite of algorithms to correct optical and sensor error in hyperspectral dataset

Remote Sensing Specialist 2000
3Di, LLC. Remote Sensing Department. Easton, Maryland

Research Assistant 1999-2001
University of Maryland, Laboratory for Global Remote Sensing Studies

- Developed GIS tools for monitoring global ecological trends
- Created thermal model of continental ice properties from microwave satellite data

EDUCATION

Ph.D. Geological Sciences	**2006**	Brown University, Providence, Rhode Island
M.Sc. Geological Sciences	**2003**	Brown University, Providence Rhode Island
B.S. Geography	**2001**	University of Maryland, College Park, Maryland
B.S. Geology *(honors)*	**2001**	University of Maryland, College Park, Maryland

WHITE PAPERS

Fisher, J.I. , R. Wilson, N. Hughes, M. Wittenstein, B. Biewald. 2011. Benefits of Beyond BAU. White paper *for* Civil Society Institute. Synapse Energy Economics.

Fisher, J.I. and B. Biewald. 2011. Environmental Controls and the WECC Coal Fleet: Estimating the forward-going economic merit of coal-fired power plants in the West with new environmental controls.

Hausman, E.D, V Sabodash, N. Hughes, and **J.I. Fisher**. 2011. Economic Impact Analysis of New Mexico's Greenhouse Gas Emissions Rule. White paper *for* New Energy Economy.

Fisher, J.I. and F. Ackerman. 2011. The Water-Energy Nexus in the Western States: Projections to 2100. White paper *for* Stockholm Environment Institute.

Fisher, J.I., J. Levy, Y. Nishioka, P. Kirshen, R. Wilson, M. Chang, J. Kallay, and C. James. 2010. Co-Benefits of Energy Efficiency and Renewable Energy in Utah: Air Quality, Health and Water Benefits. White paper *for* State of Utah.

Hausman, E.D., **Fisher, J.I.,** L.A. Mancinelli, B.E. Biewald. 2009. Productive and Unproductive Costs of CO_2 Cap-and-Trade: Impacts on Electricity Consumers and Producers. White paper *for* the National Association of Regulatory Utility Commissioners, The National Association of State Utility Consumer Advocates (NASUCA), The National Rural Electric Cooperative Association (NRECA), The American Public Power Association (APPA). Synapse Energy Economics.

Bruce E. Biewald **Fisher, J.I.** C James. L. Johnston, D. Schlissel. R. Wilson. 2009. Energy Future: A Green Energy Alternative for Michigan. White paper *for* Sierra Club. Synapse Energy Economics.

James, C. **J.I. Fisher**. K Takahashi. 2009. Alaska Climate Change Strategy's Mitigation Advisory Group Final Report: Greenhouse Gas Inventory and Forecast and Policy Recommendations Addressing Greenhouse Gas Reduction in Alaska. Energy Supply and Demand Sectors. Submitted to the Alaska Climate Change Sub-Cabinet.

James, C. **J.I. Fisher**. K. Takahashi, B. Warfield. 2009. No Need to Wait: Using Energy Efficiency and Offsets to Meet Early Electric Sector Greenhouse Gas Targets. White paper *for* Environmental Defense Fund. Synapse Energy Economics

James, C., **J.I. Fisher**. **2008** Reducing Emissions in Connecticut on High Electric Demand Days (HEDD). White paper *for* the CT Department of Environmental Protection and the US Environmental Protection Agency. Synapse Energy Economics.

Hausman, E.D., **J.I. Fisher**, B. Biewald. **2008** Analysis of Indirect Emissions Benefits of Wind, Landfill Gas, and Municipal Solid Waste Generation. White paper *for* US. Environmental Protection Agency. Synapse Energy Economics.

Schlissel, D., **J.I. Fisher. 2008** A preliminary analysis of the relationship between CO_2 emission allowance prices and the price of natural gas. White paper *for* the Energy Foundation. Synapse Energy Economics.

Fisher, J.I., B. Biewald. **2008** Costly Changes to the Energy Sector. *in* F. Ackerman and E.A. Stanton. *The Cost of Climate Change*. National Resources Defense Council.

Fisher, J.I., B. Biewald. **2007** Electricity Sector. *in* E.A. Stanton and F. Ackerman. *Florida and Climate Change: The Costs of Inaction*. Tufts University.

PEER-REVIEWED PUBLICATIONS

J. T. Morisette, A. D. Richardson, A. K. Knapp, **J.I. Fisher** , E. Graham, J. Abatzoglou, B.E. Wilson, D. D. Breshears , G. M. Henebry, J. M. Hanes and L. Liang. **2009**. Tracking the rhythm of the seasons in the face of global change: Challenges and opportunities for phenological research in the 21st Century. In Press at *Frontiers in Ecology.*

Fisher, J.I. G.C. Hurtt, J.Q. Chambers, Q. Thomas. **2008** Clustered disturbances lead to bias in large-scale estimates based on forest sample plots. *Ecology Letters*. 11:6:554-563.

Chambers, J.Q**., J.I. Fisher**, H. Zeng, E.L. Chapman, D.B. Baker, and G.C. Hurtt. **2007** Hurricane Katrina's Carbon Footprint on U.S. Gulf Coast Forests. *Science*. 318:1107

Fisher, J.I., A.D. Richardson, and J.F. Mustard. **2007** Phenology model from surface meteorology does not capture satellite-based greenup estimations. *Global Change Biology* 13:707-721

Fisher, J.I. & J.F. Mustard. **2007** Cross-scalar satellite phenology from ground, Landsat, and MODIS data. *Remote Sensing of Environment* 109:261–273

Fisher, J.I., J.F. Mustard, and M. Vadeboncoeur. **2006** Green leaf phenology at Landsat resolution: Scaling from the field to the satellite. *Remote Sensing of Environment*. 100:2:265-279

Fisher, J.I. & J.F. Mustard. **2004** High spatial resolution sea surface climatology from Landsat thermal infrared data. *Remote Sensing of Environment*. 90:293-307.

Fisher, J.I., J. F. Mustard, and P. Sanou. **2004** Policy imprints in Sudanian forests: Trajectories of vegetation change under land management practices in West Africa. *Submitted, International J.Remote Sensing*

Fisher, J.I. and S.J. Goetz. **2001** Considerations in the use of high spatial resolution imagery: an applications research assessment. *American Society for Photogrammetry and Remote Sensing (ASPRS) Conference Proceedings*, St. Louis, MO.

SELECTED ABSTRACTS

J.I. Fisher. Phenological indicators of forest composition in northern deciduous forests. *American Geophysical Union.* San Francisco, CA. December 2007.

J.I. Fisher, A.D. Richardson, and J.F. Mustard. Phenology model from weather station meteorology does not predict satellite-based onset. *American Geophysical Union.* San Francisco, CA. December 2006.

Chambers, J., **J.I. Fisher**, G Hurtt, T. Baker, P. Camargo, R. Campanella, *et al.*, Charting the Impacts of Disturbance on Biomass Accumulation in Old-Growth Amazon Forests. *American Geophysical Union.* San Francisco, CA. December 2006.

Fisher, J.I., A.D. Richardson, & J.F. Mustard. Phenology model from surface meteorology does not capture satellite-based greenup estimations. *American Geophysical Union. Eos Trans. 87(52).* San Francisco, CA. December 2006.

Fisher, J.I., J.F. Mustard, and M. Vadeboncoeur. Green leaf phenology at Landsat resolution: scaling from the plot to satellite. *American Geophysical Union. Eos Trans. 86(52).* San Francisco, CA. December 2005.

Fisher, J.I. and J.F. Mustard. Riparian forest loss and landscape-scale change in Sudanian West Africa. *Ecological Association of America*. Portland, Oregon. August 2004.

Fisher, J.I. and J.F. Mustard. High spatial resolution sea surface climatology from Landsat thermal infrared data. *American Society for Photogrammetry and Remote Sensing (ASPRS) New England Region Technical Meeting*. Kingston, Rhode Island. November, 2004.

Fisher, J.I., J.F. Mustard, and P. Sanou. Trajectories of vegetation change under controlled land-use in Sudanian West Africa. *American Geophysical Union*. *Eos Trans. 85(47).* San Francisco, CA. December 2004.

Fisher, J.I. and J.F. Mustard. Constructing a climatology of Narragansett Bay surface temperature with satellite thermal imagery. *The Rhode Island Natural History Survey Conference*. Cranston, RI. March, 2003.

Fisher, J.I. and J.F. Mustard. Constructing a high resolution sea surface climatology of Southern New England using satellite thermal imagery. *New England Estuarine Research Society.* Fairhaven, MA. May, 2003.

Fisher, J.I. and J.F. Mustard. High spatial resolution sea surface climatology from Landsat thermal infrared data. *Ecological Society of America Conference.* Savannah, GA. August, 2003.

Fisher, J.I. and S.J. Goetz. Considerations in the use of high spatial resolution imagery: an applications research assessment. *American Society for Photogrammetry and Remote Sensing (ASPRS) Conference Proceedings*, St. Louis, MO. March, 2001.

SEMINARS AND PRESENTATIONS

Fisher, J.I. and B. Biewald. WECC Coal Plant Retirement Based On Forward-Going Economic Merit. Presentation *for* Western Grid Group. WECC, January 10, 2011.

Fisher, J.I. 2010. Protecting Electricity and Water Consumers in a Water-Constrained World. National Association of State Utility Consumer Advocates. November 16, 2010.

James, C., J.I. **Fisher,** D. White, and N. Hughes. 2010. Quantifying Criteria Emissions Reductions in CA from Efficiency and Renewables. CEC / PIER Air Quality Webinar Series. October 12, 2010.

Fisher, J.I. Climate Change, Water, and Risk in Electricity Planning. National Association of Regulatory Utility Commissioners (NARUC), Portland, OR. July 22, 2008.

Fisher, J.I. E. Hausman, and C. James. Emissions Behavior in the Northeast from the EPA Acid Rain Monitoring Dataset. Northeast States for Coordinated Air Use Management (NESCAUM), Boston, MA. January 30, 2008.

Fisher, J.I. J.F. Mustard, and M. Vadeboncoeur. Climate and phenological variability from satellite data. Ecology and Evolutionary Biology, Tulane University. March 24, 2006.

Fisher, J.I., J.F. Mustard, and M. Vadeboncoeur. Anthropogenic and climatic influences on green leaf phenology: new observations from Landsat data. Ecosystems Center at the Marine Biological Laboratory. Woods Hole, MA. Seminar, September 27, 2005.

Fisher, J.I. and J.F. Mustard. High resolution phenological modeling in Southern New England. Woods Hole Research Center. Woods Hole, MA. Seminar, March 16, 2005.

TEACHING

Teaching Assistant	**2005**	Global Environmental Remote Sensing, Brown University
Teaching Assistant	**2002 & 2004**	Estuarine Oceanography, Brown University
Laboratory Instructor	**2002**	Introduction to Geology, University of Maryland

FELLOWSHIPS

2007 Visiting Fellow, Watson Institute for International Studies, Brown University

2003 Fellow, National Science Foundation East Asia Summer Institute (EASI)
2003 Fellow, Henry Luce Foundation at the Watson Institute for International Studies, Brown University

UNIVERSITY SERVICE

Representative	**2005-2006**	Honorary Degrees Committee, Brown University
Representative	**2004-2006**	Graduate Student Council, Brown University

PROFESSIONAL ASSOCIATIONS

American Geophysical Union; Geological Society of America; Ecological Society of America; Sigma Xi

EXHIBIT SC-2 (JIF-2)

November 2, 2010

Sierra Club
UT Docket 10-035-124
Exhibit SC-2 (JIF-2)
Witness: Jeremy Fisher

Exhibit A

PacifiCorp's Emissions Reductions Plan

In connection with its Best Available Retrofit Technology ("BART") determinations and its other regional haze planning activities, the Wyoming Department of Environmental Quality, Air Quality Division ("AQD") asked PacifiCorp to provide additional information about its overall emission reduction plans through 2023. The purpose is to more fully address the costs of compliance on both a unit and system-wide basis. PacifiCorp is committed to reduce emissions in a reasonable, systematic, economically sustainable and environmentally sound manner while meeting applicable legal requirements. These legal requirements include complying with the regional haze rules which encompass a national goal to achieve natural visibility conditions in Class 1 areas by 2064

Summary

PacifiCorp owns and operates 19 coal-fueled generating units in Utah and Wyoming, and owns 100% of Cholla Unit 4, which is a coal-fueled generating unit located in Arizona. PacifiCorp is in the process of implementing an emission reduction program that has reduced, and will continue to significantly reduce emissions at its existing coal-fueled generation units over the next several years. From 2005 through 2010 PacifiCorp has spent more than $1.2 billion in capital dollars. It is anticipated that the total costs for all projects that have been committed to will exceed $2.7 billion by the end of 2022. The total costs (which include capital, O&M and other costs) that will have been incurred by customers to pay for these pollution control projects during the period 2005 through 2023, are expected to exceed $4.2 billion, and by 2023 the annual costs to customers for these projects will have reached $360 million per year.

Environmental benefits, including visibility improvements will flow from these planned emission reductions. PacifiCorp believes that the emission reduction projects and their timing appropriately balance the need for emission reductions over time with the cost and other concerns of our customers, our state utility regulatory commissions, and other stakeholders. PacifiCorp believes this plan is complementary to and consistent with the state's BART and regional haze planning requirements, and that it is a reasonable approach to achieving emission reductions in Wyoming and other states.

PacifiCorp's Long-Term Emission Reduction Commitment

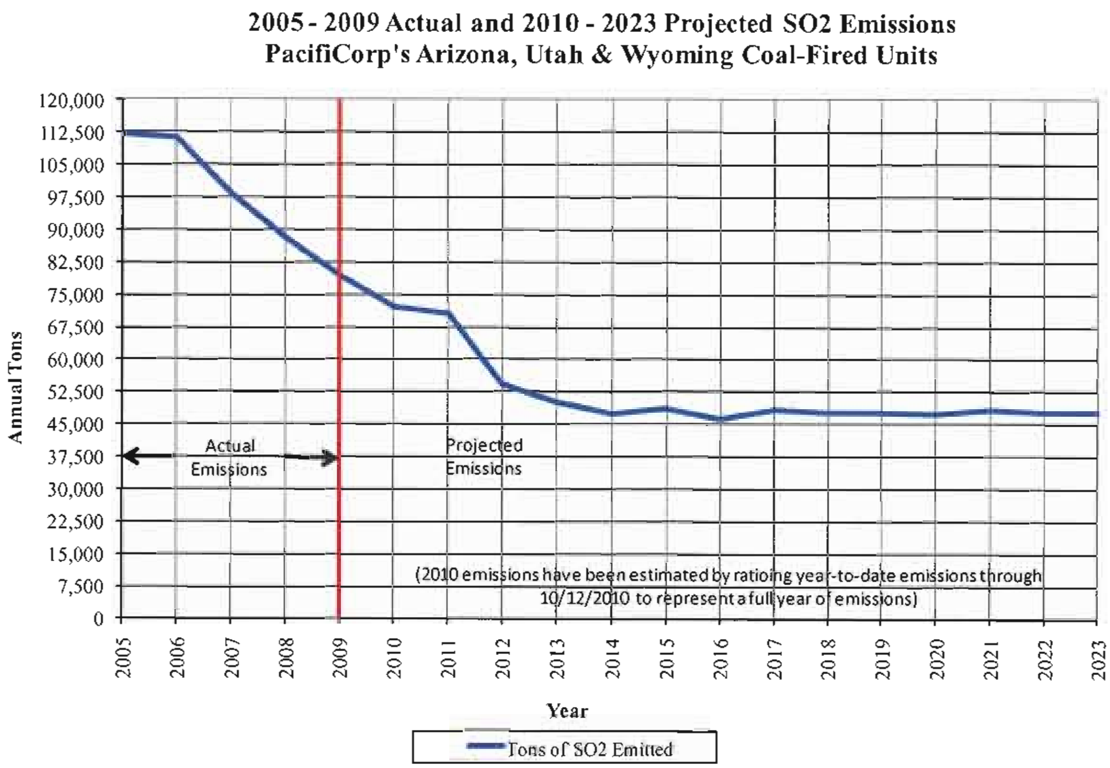
Table 1 below identifies the emission reduction projects and related construction schedules as currently included in PacifiCorp's reduction plan.

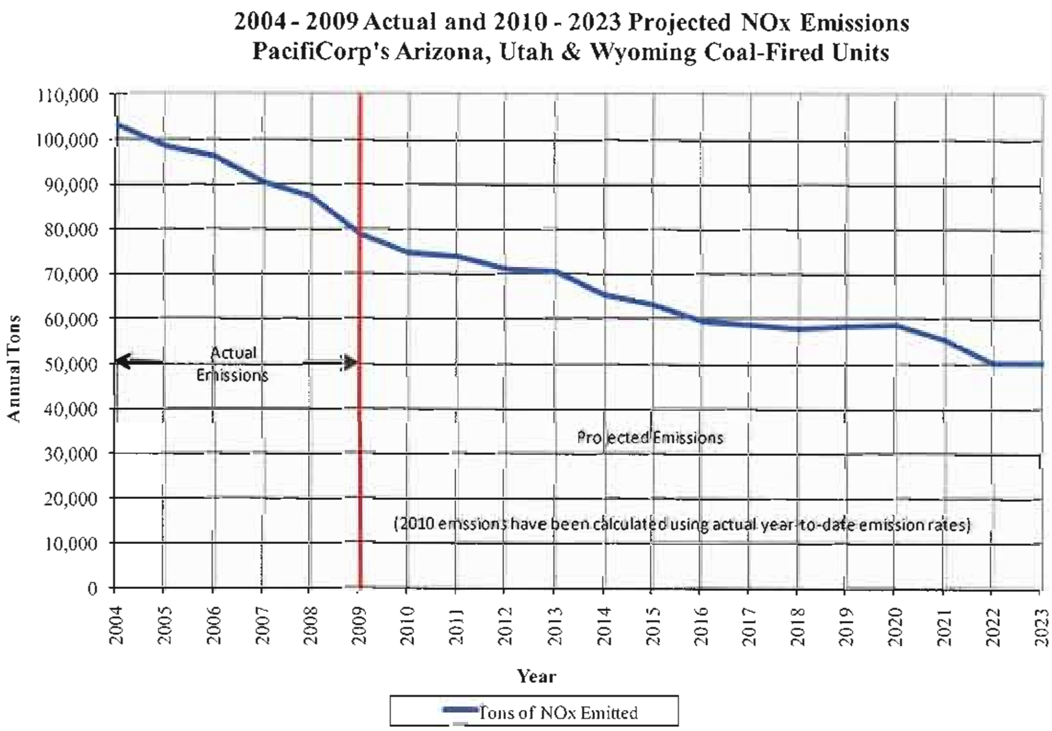
Table 1: Long-Term Reduction Plan

Plant Name	SO2 Scrubbers Installation - I Upgrades - U	Low NOx Burner Installations	Baghouse Installations	Status of SO2 / LNB / Baghouse Permitting	Selective Catalytic Reduction
Hunter 1	2014 - U	2014	2014	Permitted	
Hunter 2	2011 - U	2011	2011	Under Construction	
Hunter 3	Existing	2008	Existing	Completed	
Huntington 1	2010 - U	2010	2010	Under Construction	
Huntington 2	2007 - I	2007	2007	Completed	
Dave Johnston 3	2010 - I	2010	2010	Completed	
Dave Johnston 4	2012 - I	2009	2012	Under Construction	
Jim Bridger 1	2010 - U	2010		Completed	2022
Jim Bridger 2	2009 - U	2005		Completed	2021
Jim Bridger 3	2011 - U	2007		Permitted	2015
Jim Bridger 4	2008 - U	2008		Completed	2016
Naughton 1	2012 - I	2012		Under Construction	
Naughton 2	2011 - I	2011		Under Construction	
Naughton 3	2014 - U	2014	2014	Baghouse Permitted	2014
Wyodak	2011 - U	2011	2011	Under Construction	
Cholla 4	2008 - U	2008	2008	Completed	

The following charts represent the reductions in emissions that will occur at units owned by PacifiCorp in Utah, Wyoming and Arizona[1]. It is significant to note that permitting has been completed for all but the SCR projects; permitting for the SCR projects will be completed as needed in advance of project construction. The emission estimates shown in these charts have been calculated using projected unit generation and heat rate data in conjunction with each unit's permitted emission rate. In those cases were the units do not have emissions controls the estimates have been based on projections of the future coal quality. All projections used are from PacifiCorp's ten-year business plan. Actual future emissions will be less than those estimated in these charts since the units will operate below their permitted rates.

[1] PacifiCorp is also a joint owner of coal-fueled facilities in Colorado and Montana that are subject to regional haze planning requirements and for which PacifiCorp will incur associated costs of emissions controls.


2005 - 2009 Actual and 2010 - 2023 Projected SO2 Emissions
PacifiCorp's Arizona, Utah & Wyoming Coal-Fired Units
Annual Tons
120,000
112,500
105,000
97,500
90,000
82,500
75,000
67,500
60,000
52,500
45,000
37,500
30,000
22,500
15,000
7,500
0
Actual Emissions
Projected Emissions
(2010 emissions have been estimated by ratioing year-to-date emissions through 10/12/2010 to represent a full year of emissions)
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023
Year
Tons of SO2 Emitted


2004 - 2009 Actual and 2010 - 2023 Projected NOx Emissions
PacifiCorp's Arizona, Utah & Wyoming Coal-Fired Units
Annual Tons
110,000
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Actual Emissions
Projected Emissions
(2010 emissions have been calculated using actual year-to-date emission rates)
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023
Year
Tons of NOx Emitted

Project Installation Schedule

Emission reduction projects of the number and size described above take many years to engineer, plan and build. When considering a fleet the size of PacifiCorp's, there is a practical limitation on available construction resources and labor. There is also a limit on the number of units that may be taken out of service at any given time as well as the level of construction activities that can be supported by the local infrastructures at and around these facilities. Such limitations directly impact both the overall timing of these projects as well as their timing in relation to each other. Additional cost and construction timing limitations include the loss of large generating resources during some parts of construction and the associated impact on the reliability of PacifiCorp's electrical system during these extended outages. In other words, it is not practical, and it is unduly expensive, to expect to build these emission reduction projects all at once or even in a compressed time period. The pressure on emission reduction equipment and skilled labor is likely to be exacerbated by the significant emission reduction requirements necessitated by the Environmental Protection Agency's Clean Air Transport Rule which requires emission reductions in 31 Eastern states and the District of Columbia beginning in 2012 and 2014. The Environmental Protection Agency has indicated that a second Transport Rule is likely to be issued in 2011, requiring additional reductions in the Eastern U.S. beyond those effective in 2014. The balancing of these concerns is reflected in the timing of PacifiCorp's emission reduction commitments.

Priority of Emission Reductions

PacifiCorp's initial focus has been on installing controls to reduce SO_2 emissions which are the most significant contributors to regional haze in the western US. In addition, PacifiCorp continues to rely on the rapid installation of low NO_x burners to significantly reduce NOx emissions. Also, the installation of five SCRs (or similar NOx-reducing technologies) will be completed by 2023 and reduce NOx emissions even further. PacifiCorp's commitment also includes the installation of several baghouses to control particulate matter emissions. For those units which utilize dry scrubbers, baghouses have the added benefit of improving SO2 removal. Baghouses also significantly reduce mercury emissions.

In addition to reducing emissions at existing facilities, PacifiCorp has avoided increasing emissions by adding more than 1,400 megawatts of renewable generation between 2006 and 2010. In order to meet growing demand for electricity, PacifiCorp added non-emitting wind generation to its portfolio at a cost of over $2 billion and has dismissed further consideration of a new coal-fueled unit.

Emission Reductions and BART Deadlines

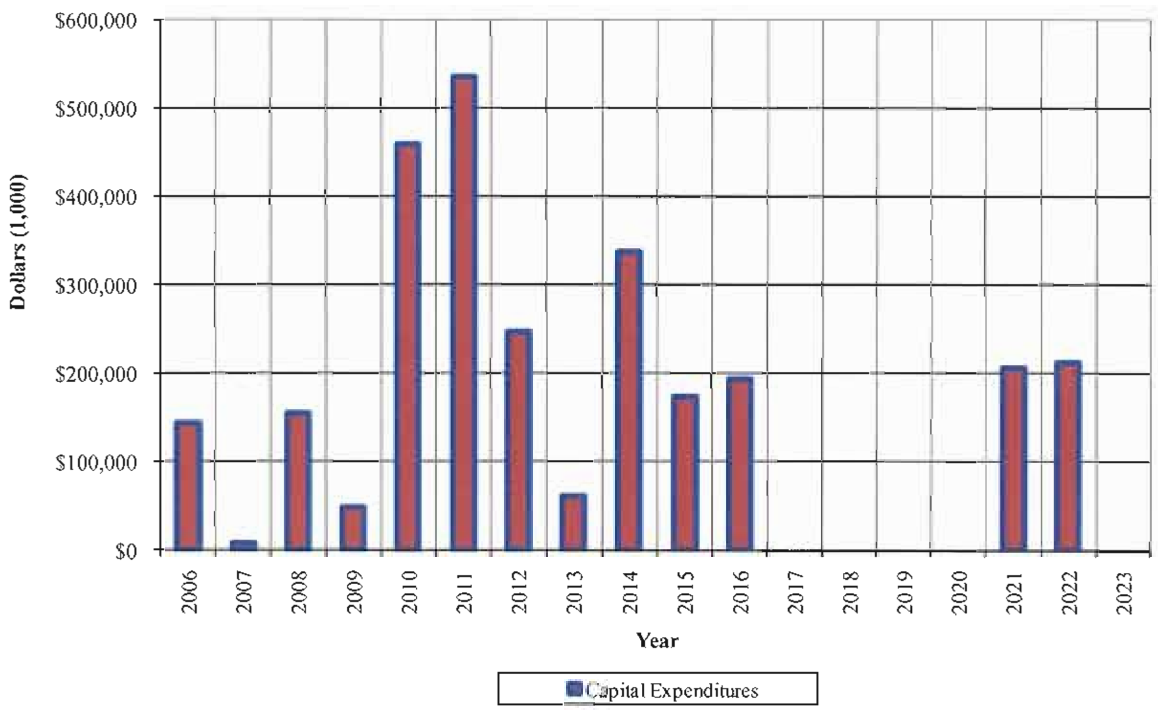
As depicted in the table and charts above, PacifiCorp began implementing its emission reduction commitments in 2005. This was well ahead of the emission reduction timelines under the regional haze rules which require BART to be installed no later than five years following approval of the applicable Regional Haze SIP. This also provides a graphic demonstration of the construction schedule and other limitations described above, as PacifiCorp was required to begin installing emission control projects at some units earlier in order to complete projects at other units within the five years after SIP approval. The table above demonstrates that most of the projects to be built between 2010 and 2014, likewise, will be installed in advance of the required completion date under BART requirements.

Customer Impacts

The following charts identify the timing and magnitude of the capital and O&M expenses that will be incurred due to the projects identified in Table 1. The charts identify:

1. The timing and magnitude of the capital costs.
2. The O&M expenses that will be incurred due to these projects.
3. The expected annual costs[2] through 2023 that customers will be incur as a result of these specific pollution control projects.

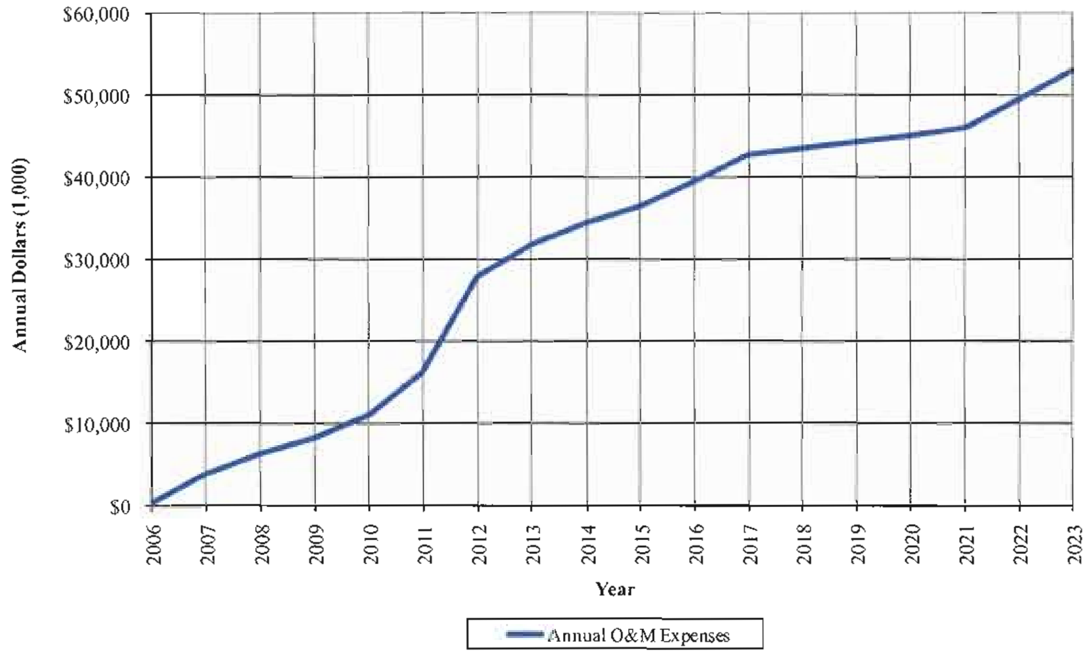
Capital Expenditures to Add Pollution Control Equipment onPacifiCorp's Arizona, Utah & Wyoming Coal-Fired Units



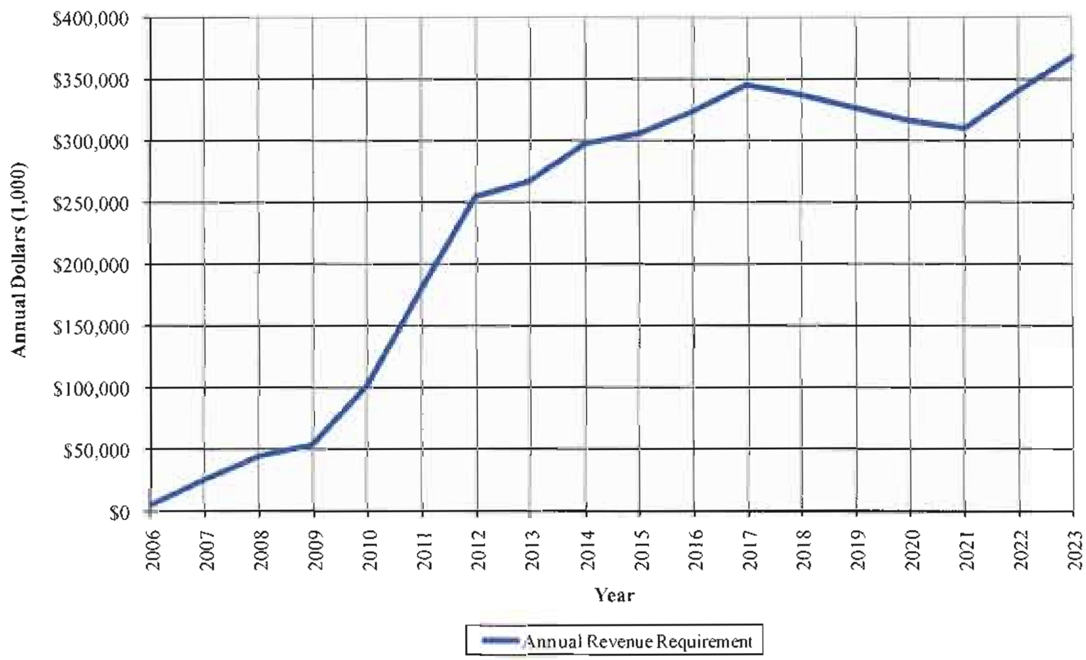
---

[2] PacifiCorp has made every attempt to provide an accurate estimate of the anticipated increase in annual revenue requirements that will ultimately be translated to increases in customers' electricity rates. However, there are several variables such as interest rates, inflation rates, discount rates, depreciation lives, and final construction costs and operating and maintenance expenses that will be considered at the time these projects actually go into rate base and will influence the actual revenue requirements associated with these capital projects.

Increases In O&M Expenses Due to Additional Pollution Control Equipment on Arizona, Utah & Wyoming Coal-Fired Units



Annual Increase to Customers Due to Additional Pollution Control Equipment on Arizona, Utah & Wyoming Coal-Fired Units



As can be seen from the previous charts, the rate increases for PacifiCorp customers associated with PacifiCorp's emission reduction strategy alone will be significant. In the event that PacifiCorp is required to accelerate or add to the planned emission reduction projects, the cost impacts to our customers can be expected to increase incrementally, particularly as plant outage schedules are extended and the need for skilled labor and material increases in the near term.

Of particular note, the projected costs reflect only the installation of the noted emission reduction equipment. These cost increases do not include other costs expected to be incurred in the future to meet further emission reduction measures or address other environmental initiatives, including but not limited to (see Attachment 1):

1. Implementation of Utah's Long Term Strategy for meeting regional haze requirements during the 2018-2023 time period.

2. The addition of mercury control equipment under the requirements of the upcoming mercury MACT provisions. PacifiCorp estimates that $68 million in capital will be incurred by 2015 and annual operating expenses will increase by $21million per year to comply with mercury reduction requirements. In addition, anticipated regulation to address non-mercury hazardous air pollutant (HAPs) emissions may require significant additional reductions of SO_2, as a precursor to sulfuric acid mist, from non-BART units that currently do not have specific controls to reduce SO_2 emissions.

3. Mitigating and controlling CO_2 emissions. While Congress has not yet passed comprehensive climate change legislation, in December 2009, the Administrator of the Environmental Protection Agency made a finding that greenhouse gases in the atmosphere threaten the public health and welfare of current and future generations. Having made the so-called "endangerment finding," EPA issued the final greenhouse gas tailoring rule, effective January 2, 2011, which will require greenhouse gas emissions to be addressed under PSD and Title V permits[3]. Likewise, mandatory reporting of greenhouse gas emissions to the Environmental Protection Agency commenced beginning in January 2010.

4. In addition, there are a number of regional regulatory initiatives, including the Western Climate Initiative that may ultimately impact PacifiCorp's coal-fueled facilities. PacifiCorp's generating units are utilized to serve customers in six states – Wyoming, Idaho, Utah, Washington, Oregon and California. California, Washington and Oregon are participants in the Western Climate Initiative, a comprehensive regional effort to reduce greenhouse gas emissions by 15% below 2005 levels by 2020 through a cap-and-trade program that includes the electricity sector; each state has implemented state-level emissions reduction goals. California, Washington and Oregon have also adopted greenhouse gas emissions performance standards for base load electrical generating resources under which emissions must not exceed 1,100 pounds of CO_2 per megawatt

[3] The Environmental Protection Agency has not yet published its proposed guidance on what constitutes Best Available Control Technology for greenhouses gases.

hour. The emissions performance standards generally prohibit electric utilities from entering into long-term financial commitments (e.g., new ownership investments, upgrades, or new or renewed contracts with a term of 5 or more years) unless the base load generation supplied under long-term financial commitments comply with the greenhouse gas emissions performance standards. While these requirements have not been implemented in Wyoming, due to the treatment of PacifiCorp's generation on a system-wide basis (i.e., electricity generated in Wyoming may be deemed to be consumed in California based on a multi-state protocol), PacifiCorp's facilities may be subject to out-of-state requirements.

5. Regulations associated with coal combustion byproducts. In June 2010, the Environmental Protection Agency published a proposal to regulate the disposal of coal combustion byproducts under the Resource Conservation and Recovery Act's Subtitle C or D. Under either regulatory scenario, regulated entities, including PacifiCorp, would be required, at a minimum; to retrofit/upgrade or discontinue utilization of existing surface impoundments within five years after the Environmental Protection Agency issues a final rule and state adoption of the appropriate controlling regulations. It is anticipated that the requirements under the final rule will impose significant costs on PacifiCorp's coal-fueled facilities within the next eight to ten years.

6. The installation of significant amounts of new generation, including gas-fueled generation and renewable resources.

7. The addition of major transmission lines to support the renewable resources and other added generation.

8. Increasing escalation rates on fuel costs and other commodities

BART and Regional Haze Compliance

PacifiCorp firmly believes that the commitments described above meet the letter and intent of the regional haze rules, including the guidance provided by the EPA known as "Appendix Y." The regional haze program is a long-term effort with long-term goals ending in 2064. It must be approached from that perspective. It was never intended to require SCR on BART-eligible units within the first five years of the program. Rather, it calls for a transition to lower emissions exactly as PacifiCorp has implemented to date and as it has proposed going forward through 2023.

In its evaluation of emission reductions for regional haze purposes, the state should also consider several other variables which will significantly affect emissions and costs over the next ten years. These include such things as the development of new emission control technology, anticipated new emission reduction legislation and rules, the new ozone standard, the one hour SO_2 and NO_2 standards, the $PM_{2.5}$ standard, potential CO_2 regulation and costs, an aging fleet, and changing economic conditions. All of these variables matter and will affect the long-term viability of each PacifiCorp coal unit and will contribute to the reduction of regional haze in the course of the implementation of these programs. This, in turn, will affect the controls, costs and future operational expectations associated with these generating resources.

Conclusion

PacifiCorp has made a significant, long-term commitment to reducing emissions from its coal-fueled facilities and requests that the AQD consider this commitment as a reasonable approach to achieving emission reductions in Wyoming.

Attachment 1 Possible Timeline for Environmental Regulatory Requirements for the Utility Industry

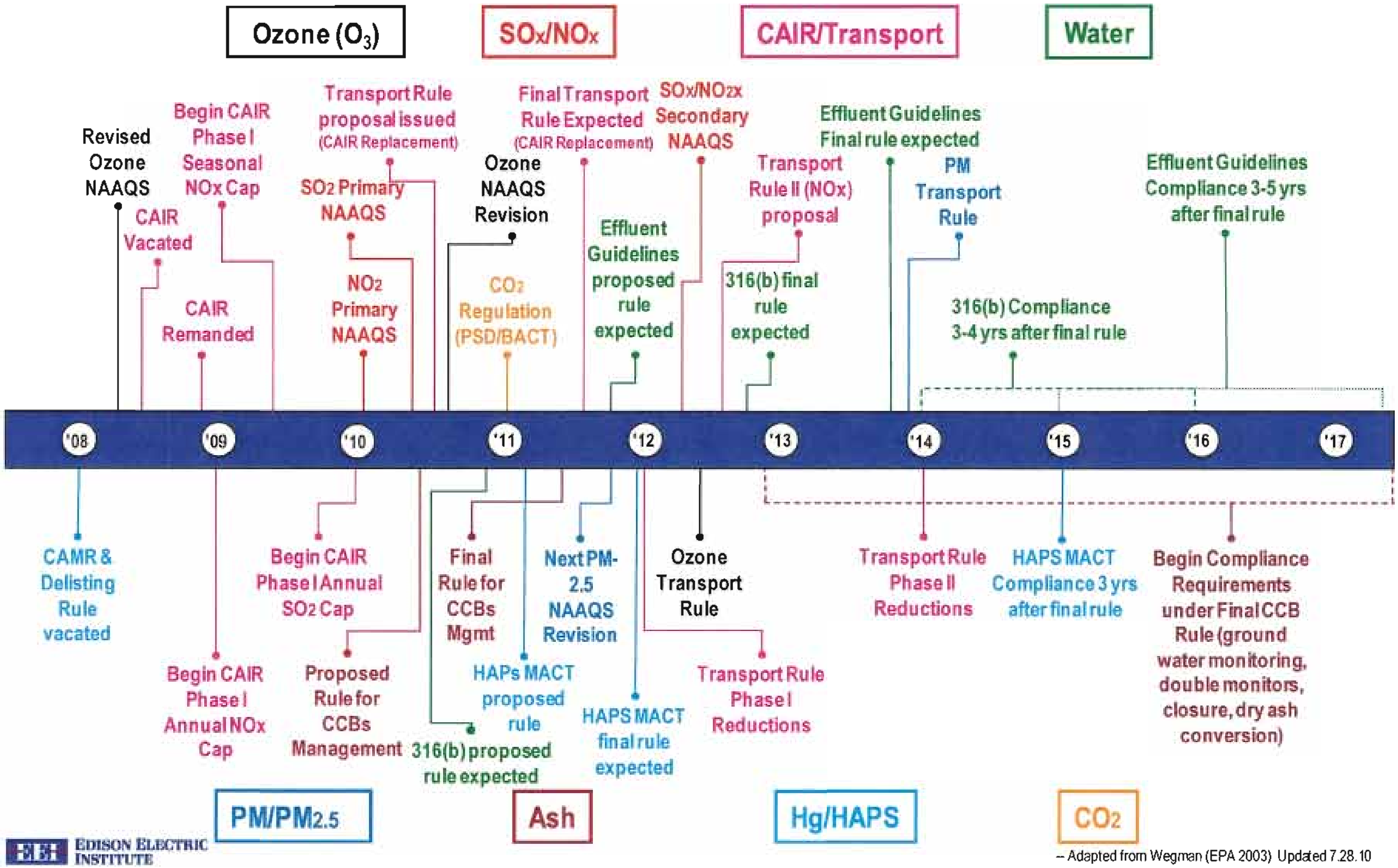


EXHIBIT SC-4 (JIF-4)

Sierra Club
UT Docket 10-035-124
Exhibit SC_4__(JIF-4)
Witness: Jeremy Fisher

WORLD RESOURCES INSTITUTE

WRI FACT SHEET

Response to EEI's Timeline of Environmental Regulations

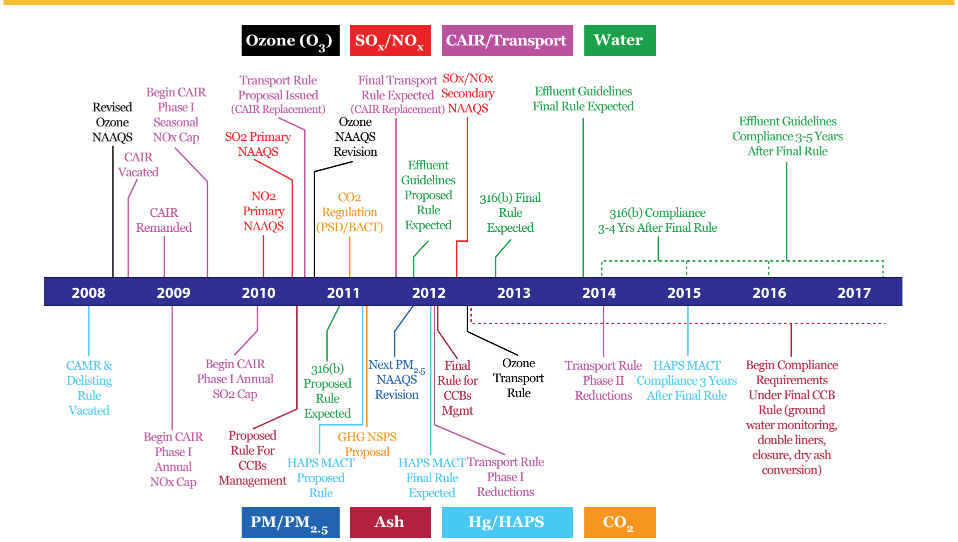
After years of delay, EPA gets back on track in issuing rules that provide a path to a cleaner power fleet.

After years of delay, the Environmental Protection Agency (EPA) is working to reduce dangerous and toxic pollutants released to the air and water by electric power plants, as required by the Clean Air Act and other statutes. Four key points about EPA's actions are clear:

- **Contrary to assertions by industry groups, EPA is pursuing a realistic timeline over the next decade to bring the electric power industry into compliance with the law.**
- **In most cases the electric power sector has been on notice for several years (in some cases several decades) that these pollutants would be regulated.**
- **Without new regulations, these pollutants will continue to impair America's waterways, heat the planet, perpetuate acid rain, and lead to preventable hospital visits and premature deaths.**
- **In each of its rulemakings, EPA provides for an extensive, open public process based on evidence. This leads to more robust and fair rules for the electric power sector. As EPA finalizes each rule, it will establish an increasingly clear pathway for investments in an American electric generation fleet for the 21st century.**

CEOs and other representatives of major electric power corporations have frequently suggested that EPA's regulatory timeline is unworkable.[1] The largest industry trade group, the Edison Electric Institute (EEI) has produced a slide that purports to display an onslaught of new requirements for

FIGURE 1: POSSIBLE TIMELINE FOR ENVIRONMENTAL REGULATORY REQUIREMENTS FOR THE UTILITY INDUSTRY



Sources: Edison Electric Institute 2010; Wegman, EPA 2003

WORLD RESOURCES INSTITUTE
10 G STREET, NE
WASHINGTON, DC 20002
www.wri.org

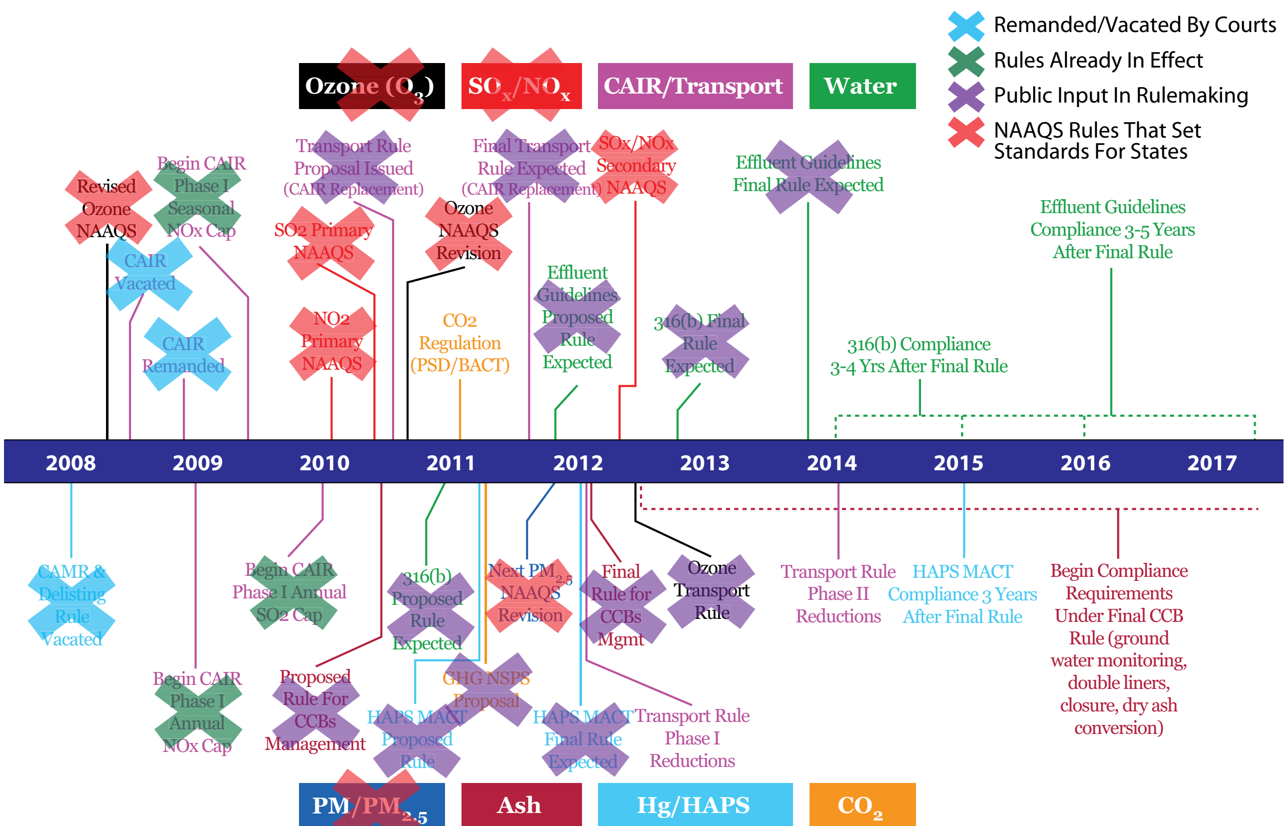
power plants.[2] EEI has been distributing this slide widely on Capitol Hill where it presumably hopes to win lawmakers' support for additional delays in EPA regulation or even a stripping of EPA's authority.

The EPA regulatory process is far from a "train wreck." EEI's misleading timeline reproduced in Figure 1, mostly consists of procedural events and activities that will not impose a direct compliance obligation on power plants. This serves only to spread confusion about EPA's actual regulatory schedule.

WRI has identified four categories of EPA activities on the EEI timeline that are potentially misleading. When these activities are removed, only the timing of actual new compliance obligations is left. In figure 2, "X"s (color coded for each filter in the screening process) have been applied to remove events from the figure that are not consequential from a compliance standpoint. The screening filters are as follows:

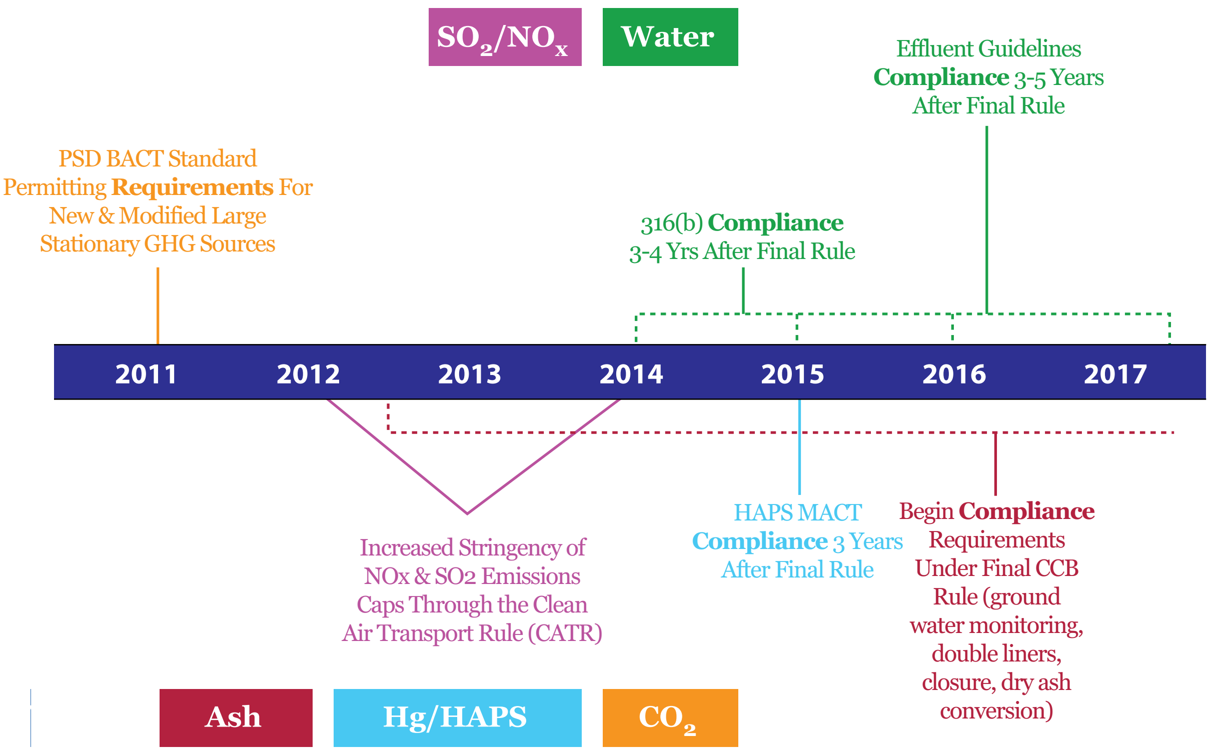
1. Rules that have been remanded or vacated by court decisions that do not impose compliance obligations.
2. Rules that are already in effect representing compliance obligations that already exist; there are no new requirements imposed by these rules.
3. Public input through the rulemaking process (leads to more robust and fair rules for the electric power sector, and should not be conflated with new compliance obligations).
4. National Ambient Air Quality Standard (NAAQS) rules for various pollutants that set standards for states to achieve. They do not establish new requirements for electric generation units.[3]

FIGURE 2: ENVIRONMENTAL REGULATORY REQUIREMENTS FOR THE UTILITY INDUSTRY, REMOVING ALL BUT NEW COMPLIANCE OBLIGATIONS



Sources: WRI Analysis based on Edison Electric Institute 2010, Wegman, EPA 2003.

FIGURE 3: REGULATORY COMPLIANCE OBLIGATIONS FOR THE UTILITY INDUSTRY



Sources: WRI Analysis based on Edison Electric Institute 2010, Wegman, EPA 2003.

Figure 3 shows a more accurate picture of the timeline for new requirements applicable to electric power plants.

EPA is carrying out the intent of Congress (through the passage of the bipartisan Clean Air Act and subsequent amendments) to clean the nation's air and water. These rules can help the United States transition to cleaner and more efficient power plants, by establishing a clear pathway for investments in an electric generation fleet for the 21st century.

The CAA requires EPA and states to regulate and reduce harmful pollutants from major emissions sources including power plants. To date, this framework has delivered substantial improvements in air quality and significant public health benefits estimated between $77 and $519 billion annually.[4] Over the next decade, power plants will be subject to new rules under the CAA as well as the Clean Water Act (CWA) and the Resource Conservation and Recovery Act (RCRA) to control substances that cause serious health problems and substantial damage to America's natural resources. These rules will take effect after long lead times. In most cases industry has been on notice for years that these pollutants would be regulated.

The electric power sector has had substantial notice—in some cases for decades—that power plants would be subject to regulations to control dangerous pollutants

Half of the regulations under consideration by EPA have been in the regulatory pipeline for over a decade. Due to administrative delays and litigation resulting in court decisions remanding or vacating previous rules, many of these rules have not been finalized or the final rules were reversed. In many cases Congress has set statutory deadlines for EPA to act, EPA has missed the deadlines, and courts have ordered EPA to act. Table 1 outlines the amount of time the electric sector has had to prepare for new regulations.

The case of mercury from power plants provides a good example of how much regulatory lag time there has been for the electric power industry to prepare for new pollutant rules. The CAA required EPA to study mercury and other hazardous air pollutant (HAP) emissions from electric power plants and determine whether or not regulating these emissions would be necessary and appropriate. In 2000, EPA determined that regulations were appropriate effectively putting the electric power industry on notice that controls on mercury would be required. EPA then proposed and finalized rules (including the Clean Air Mercury Rule) that were ultimately vacated by the courts, which found that EPA had not acted within the constraints of the CAA. EPA now intends to issue revised draft and final rules in accordance with CAA requirements in 2011. Compliance obligations would take effect in 2015.

TABLE 1. REGULATORY LAG TIME OF MAJOR POLLUTANT RULES

Pollutant	Notice that new or more stringent rules would be imposed[5]	Year in which compliance obligations will be imposed[6]	Regulatory lag time	Comments
Mercury	2000	2015	15 years	After a study required by statute and subject to public review, EPA found in 2000 that it was "necessary and appropriate" to regulate mercury and other pollutants from power plants as HAPs
SO_2 and NO_X	1990 for initial rules. 2003 for increased stringency of rules.	Initially in 1995 for SO_2 with increasing stringency beginning in 2010 (for SO_2) and again in 2012. Technology standards for NO_X were first imposed in 1995, Northeast NO_X cap started in 1999; initial expansion in 2003, and then again in 2009	5 years for initial rules. 6-7 years for more stringent rules	New rules for SO_2 and NO_X represent increasing stringency under existing frameworks.
Greenhouse Gases (GHGs)	2009 (December)	2011	13 months	EPA found that GHGs endanger public health and welfare. EPA rules to regulate GHGs from light-duty vehicles take effect on January 2, 2011, the CAA requires BACT for a pollutant once it is subject to regulation under the Act.
Coal Combustion Residuals (CCR, or Coal Ash)	2007 EPA Notice of Data Availability solicited initial reactions to EPA data.	No sooner than mid-2012, requirements phased in	At least 3 years	Initial requests for information were initiated in 2007, signaling the intention to regulate. Depending on EPA final rules timetables for compliance will vary.
Cooling water intake	1972	No sooner than 2014. Requirements are incorporated permit by permit, which could take up to 5 years	38 years	The CWA amendments of 1977 require these regulations but no final rule has been implemented due to delay and court orders
Power plant effluent	1982 CWA mandates periodic review of existing regulations for potential update.	2015 Final rule not expected before 2012. Requirements are incorporated permit by permit, which could take up to 5 years	23 years	Effluent guidelines are required to be reviewed periodically. The last update was in 1982.

Note: Regulatory lag time is calculated from the date that it was made clear under statutory requirements and court decisions that new or more stringent rules would be pursued relative to the current expected date that compliance will be required.

Thus, the electric power industry has had 15 years to prepare, from the determination in 2000 to the expected date of compliance obligations in 2015.

FINALIZING REGULATIONS PROVIDES CERTAINTY

Finalizing regulations removes uncertainty that might otherwise stymie new investments. The ultimate stringency and compliance obligations for most of the regulations EPA is pursuing will remain uncertain until rules are final. The statutes — RCRA, CWA and the CAA — establish which pollutants will be subject to regulation and the relevant legal standards; the specifics are established during the EPA rulemakings. The longer it takes EPA to finalize new pollutant rules, the longer plant operators face uncertainty as to what will be required.

NOT ALL EPA ACTIONS WILL CREATE NEW REGULATORY REGIMES

It is important to note that some EPA rules do not constitute new regulatory programs. For example, sulfur dioxide (SO_2) emissions from power plants have been covered by cap-and-trade programs that began in 1995. Nitrogen oxides (NO_X) emissions were the subject of a cap-and-trade program covering plants in the eastern half of the country since at least 2003. The Clean Air Interstate Rule and its successor, the Transport Rule, extend NO_X cap-and-trade to new states and increase the stringency of requirements for units already subject to the cap-and-trade for NO_X and SO_2. Power plant operators are familiar with these regulatory frameworks and are familiar with their operation. While increasing the stringency of these rules may require additional investments in control strategies, there is no fundamentally new requirement in play.

THE EPA REGULATORY PROCESS PROVIDES OPPORTUNITIES FOR INDUSTRY INPUT

There are few, if any surprises in the very public and largely transparent EPA regulatory process. Multiple events must take place before any actual compliance obligation is imposed on an electric power plant or any other regulated entity. The EPA must issue proposed rules and seek public comment. Some rulemakings are initiated with advanced notices of proposed rulemaking, so that the process has extra opportunities for industry and public comment, and some start with studies that are conducted with public input and comment. This process allows the electric power industry to have substantial input into the shape of new regulations and allows the industry to better understand what may be required of them by EPA when rules are finalized. Fears of agency overreach are misplaced given the built-in limitations on EPA's authority contained in the CAA.[7]

Often rules are litigated; one outcome can be to send the rule back to EPA for further work. Many of EPA's rules are issued on schedules established by the federal courts — because EPA has already missed the statutory deadline for promulgation. Only the final rule imposes a direct compliance obligation — after which there are practical implications for power plant owners and operators as they make investments in their generation fleets.

WHY IS EPA REGULATING POWER PLANTS AT ALL?

EPA is responding to direction from Congress to reduce the human health and environmental effects of mercury (as well as other HAPs), SO_2, NO_X, greenhouse gases (GHGs), coal ash, cooling water intake and discharge, industrial water effluent. Mercury is a neurotoxin that causes brain damage. SO_2 and NO_X cause acid rain, regional haze and can cause or worsen asthma and aggravate cardio-pulmonary disease leading to increased hospital visits and premature death. A recent example of the dangers of coal ash was the major spill of ash at the Tennessee Valley Authority's Kingston plant in 2008 where irresponsible containment of coal ash caused waterways and communities to be inundated with waste.[8] Electric power plants are major sources of many pollutants that EPA is regulating or intends to regulate.

Electric power plants are a major source of pollutants that substantially contribute to ongoing public health and environmental problems that impose real costs to the economy. When just air pollutants are considered, electric power plants represent the following shares of total U.S. emissions in 2005:

- 70 percent of SO_2 emissions
- 50 percent of mercury emissions
- 34 percent of GHG emissions
- 18 percent of NO_X emissions

By controlling these emissions using appropriate regulations under clear statutory authority EPA will go a long way towards meeting its mandate to protect public health and welfare. The electric power industry has had substantial time to prepare for regulations and once rules are final the industry will have a clear regulatory roadmap to guide investments. Misleading charts that exaggerate EPA actions such as those distributed by EEI cause confusion that will only increase uncertainty for the electric power industry and jeopardize important efforts to protect public health.

For more information, please contact John Larsen; jlarsen@wri.org.

ENDNOTES

1. See page 3 of the "An Exchange on Change" Edison Electric Institute, 2010. http://www.eei.org/magazine/EEI%20Electric%20Perspectives%20Article%20Listing/2010-09-01-EXCHANGE.pdf
2. The Edison Electric Institute has circulated a chart, a version of which can be found here, http://www.eei.org/meetings/Meeting%20Documents/EPA-CAAUtilityRegTimelineTrainWreckChart.ppt that grossly misrepresents the EPA regulatory timeline for coal fired power plants. Through this article, WRI is countering this misleading chart.
3. If states believe that the only way to come into attainment of NAAQS standards is by obtaining additional reductions from electric generators, then the most likely way for states to affect those changes is through modification of the existing regulations that already control emissions of those same pollutants. EPA could undertake similar action through a future update to the transport rule.
4. Figures are in 2001 dollars and apply only to EPA air rules. See page 13 of the Office of Management and Budget's 2010 report. http://www.whitehouse.gov/sites/default/files/omb/legislative/reports/2010_Benefit_Cost_Report.pdf
5. Based on statutory requirements and court rulings.
6. Assuming no additional delays in rulemaking due to administrative actions, litigation and/or court actions.
7. http://www.wri.org/stories/2010/11/what-are-limits-epa-clean-air-act-holds-answers.
8. http://www.nytimes.com/2008/12/25/us/25sludge.html?scp=11&sq=Roane%20County%20tennessee%20coal&st=cse.

ABOUT WRI

The World Resources Institute is an environmental think tank that goes beyond research to find practical ways to protect the earth and improve people's lives. Our mission is to move human society to live in ways that protect Earth's environment and its capacity to provide for the needs and aspirations of current and future generations.

EXHIBIT SC-5 (JIF-5)

EPA Regulatory Timeline for Air Pollutant Classes

Color Codes	Initial indication of likely regulation	First regulatory step- laying groundwork	Proposed regulation or regulatory action	Final regulatory action

	Regional Haze	Mercury and Hazardous Air Pollutants	Ozone National Ambient Air Quality Standards	PM2.5 National Ambient Air Quality Standards	SO2 National Ambient Air Quality Standards	NO2 National Ambient Air Quality Standards
<= 1995	1990 CAAA emphasis on visibility and haze 1991 EPA establishes Grand Canyon Visibility Transport Commission	1990 CAAA EPA given authority to control Hg and HAPS 1995 Settlement: Utility Air Toxics Study	EPA forms subcommittee on revised ozone and PM NAAQS, and regional haze	EPA forms subcommittee on revised ozone and PM NAAQS, and regional haze		
1996						
1997	Regional Haze proposed regulations [62 FR 41138]	EPA delivers Mercury Study Report to Congress	0.080 ppm Ozone NAAQS Promulgated			
1998		EPA "Utility Air Toxics Study" to Congress				
1999	Regional Haze Regulations; Final Rule [64 FR 35714]			PM2.5 Air quality criteria assessment [EPA/600/P–95/001aF–cF. 3v]		
2000		"Appropriate and necessary" finding for utility Hg [65 FR 79825]				
2001				PM2.5 NAAQS Risk Analysis Scoping Plan		
2002						
2003						
2004	EPA proposes BART guidelines	EPA proposes Utility Steam HAPs and Hg rule [69 FR 4652]		PM2.5 Air quality criteria assessment [EPA/600/p-99/002aD]		
2005	EPA issues BART guidelines [70 FR 39104]	Clean Air Mercury Rule (CAMR) issued; proposed revision of "appropriate and necessary" finding [70 FR 62200]	EPA issues CAIR under "good neighbor provisions" of CAA [70 FR 25162]	EPA issues CAIR under "good neighbor provisions" of CAA [70 FR 25162]		Integrated science assessment for NO2 [70 FR 73236]
2006		EPA reverses utility "appropriate and necessary" finding; issues C&T rule for mercury [71 FR 33388]		35 µg/m3 PM2.5 NAAQS Promulgated [71 FR 61144]	Integrated science assessment for SO2 [71 FR 28023]	
2007			0.075 ppm Ozone NAAQS Proposed [72 FR 37818]	Integrated science assessment for PM2.5 [72 FR 35462]		
2008		Court of Appeals vacates EPA removal of power plants from CAA list of HAP sources.	0.075 ppm Ozone NAAQS Promulgated [73 FR 16436]		Risk and Exposure Assessment for SO2 [73 FR 42341]	Risk and Exposure Assessment for NO2 [73 FR 20045]
2009			EPA announces strengthening [EPA Fact Sheet] / Clean Air Transport Rule Proposed		50-100 ppb SO2 NAAQS Proposed [74 FR 64810]	80-100 ppb NO2 NAAQS Proposed [74 FR 34404]
2010			0.060 ppm Ozone NAAQS Proposed [77 FR 2940]	Risk Assessment for PM2.5 [75 FR 4067]	75 ppb SO2 NAAQS Promulgated [75 FR 35520]	100 ppb NO2 NAAQS Promulgated [75 FR 6474]
2011		EPA issues proposed rule on power plant mercury and air toxics standards [75 FR 24976]	0.060 Ozone NAAQS Expected [DC Circuit No. 08-1200]	PM2.5 NAAQS Expected [EPA, Oct 5, 2010]		

EPA Regulatory Timeline for Non-Air Pollutants

Initial indication of likely regulation	First regulatory step- laying groundwork	Proposed regulation or regulatory action	Final regulatory action

	Coal Combustion Residuals	Cooling Water Use - 316(b)	Effluent Limitation Guidelines
<= 1995		1995 Consent decree - EPA agrees to issue rules to implement Sec 316(b) of CWA	1982 Effluent guidelines for Steam EGUs
1996			
1997			
1998			
1999			
2000			
2001		EPA issues final rules for new facilities - Phase I	
2002		Consent decree establishing schedule for Phase II and Phase III	
2003			
2004		Phase II rules - existing generating units. [69 FR 41575] *Appealed*	
2005	Steam Generating Point Source study identifies CCR as effluent source		EPA Steam Electric Power Generating Point Source study identifies steam electric generating industry for study and review of effluent guidelines
2006		EPA issues final Phase III rules - existing small generating units and manufacturing plants on case-by-case. *Appealed*	Effluent Guidelines Program Plan provides update on study
2007		Phase II rules suspended [72 FR 37107]	
2008	Kingston TVA spill		Effluent Guidelines Program Plan provides update on study
2009	EPA announces New Action to Prevent Coal Ash Releases; requests impoundment data from utilities	Phase II remanded to EPA by US Supreme Court	EPA announces decision to proceed with rulemaking revising effluent guidelines
2010	EPA proposes CCR rule [75 FR 35127]	Phase III remanded to EPA. New settlement agreement on existing facilities	
2011		Cooling water intake proposed rule [76 FR 22174]	

EXHIBIT SC-7 (JIF-7)

Sierra Club
UT Docket 10-035-124
Exhibit SC_7__(JIF-7)
Witness: Jeremy Fisher

Figure 2.1 – Environmental Regulatory Timeline at the Federal Level

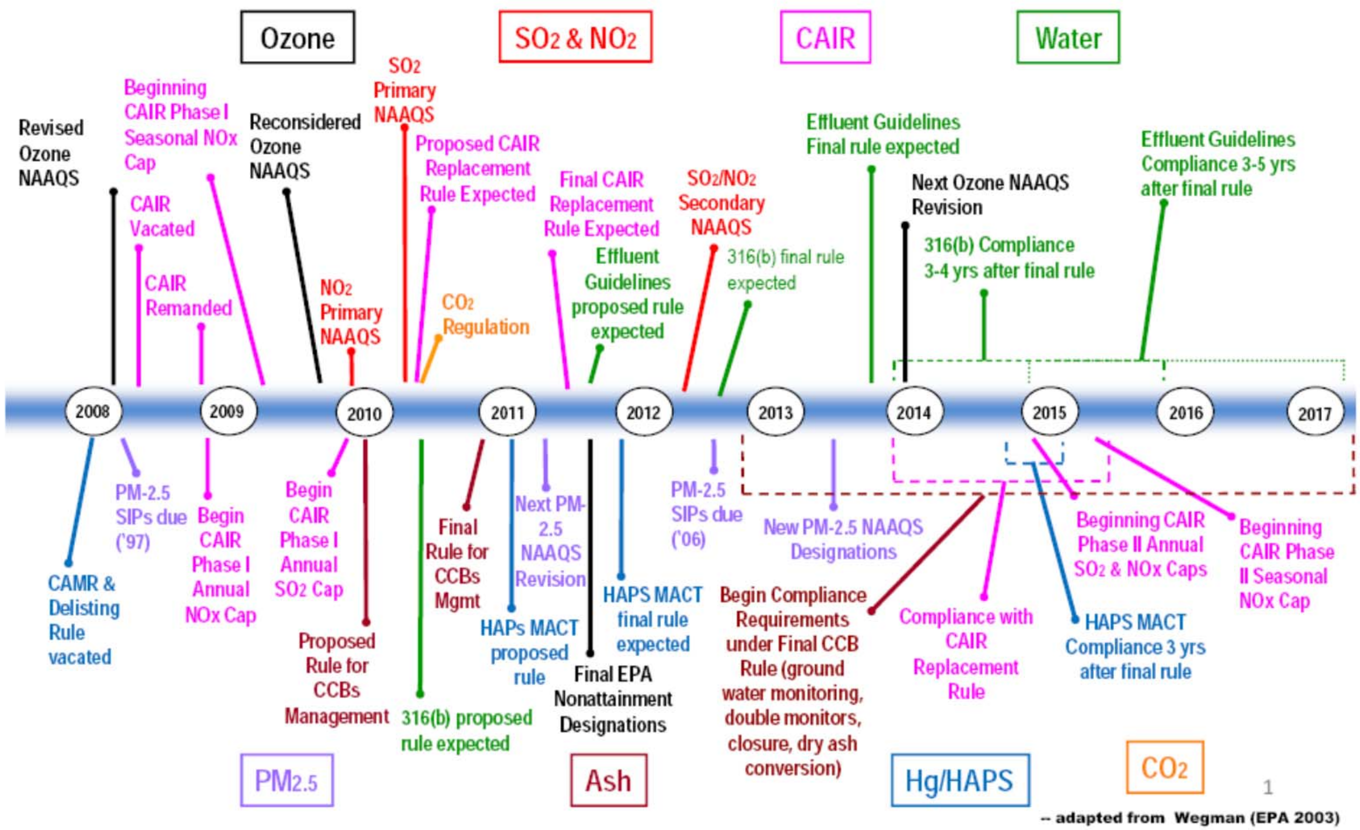


EXHIBIT SC-8 (JIF-8)

Rocky Mountain Power
Attachment DPU 24.13

ROCKY MOUNTAIN POWER

Present Value Revenue Requirement Summaries
2008-2009 10-Year Business Plan
2011 10-Year Business Plan

May 2011

CAI Capital Projects Study
2008-2009 10-Year Business Plan

PacifiCorp's 10-year plan includes multiple comprehensive air initiative (CAI) projects for the coal generation fleet. This analysis addresses, on a macro basis, whether continued unit operations of the company's coal plants through the regulatory depreciation life, produces enough net value to pay for the proposed CAI capital. The present value evaluation takes a merchant plant analysis approach in that each unit's revenue requirement cost is netted against the value of the unit's generation as measured by the forward price curve at projected CO2 price levels. The results of the analyses indicate that at the $8 per ton CO2 price level assumption basis for PacifiCorp's 2009 10-year business plan, all the coal units will be above breakeven in terms of present value revenue requirement differential (PVRR(d)).

The PVRR(d) comparison of continued unit operations with CAI capital versus market value of generation is shown in the attached charts.

Study Approach

The study represents a macro effort to analyze the economics of PacifiCorp's coal fleet with respect to PacifiCorp's plan for CAI capital projects.

The analysis calculates the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2009 through each successive year through its regulated depreciation life. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit end of life is extended in one year increments. The $8 CO2 scenario utilizes the 2009 10-year plan capacity factors.

The PVRR(d) is calculated by subtracting fuel, O&M, environmental emissions cost, and on-going and CAI capital revenue requirement cost from revenue similar to a merchant plant valuation. The revenue is derived using forward price curves from Structure and Pricing's model runs at the $8 CO2 price scenario.

Key Assumptions

Pricing

1. Forward flat price curves for the $8/ton CO2 price scenario, as of 12/31/2008, were provided through the end of the study period.
2. Fuel pricing was provided through 2018 from the 2009 10-year plan; prices were escalated at the corporate escalation rate thereafter.
3. Forward price curves do not include the market effects of plant closure(s).

Revenues

1. The analysis period for calculating capital payback is assumed to begin in 2009.
2. Dispatch is based on annual capacity factors derived from the approved 2009 10-year plan capacity factors.
3. Potential extrinsic optionality value in dispatch is not included.

Capital / O&M

1. CAI capital dollars are taken from the approved 2009 10-year plan.
2. The 10-year plan contains multiple CAI projects that go into service in different years.
3. Existing capital is considered a "sunk cost" and is not included.
4. On-going capital and O&M costs from the 10-year plan have been included. Capital and O&M beyond the 10-year plan are based on the company's Strategic Asset Plan.
5. Plant/Unit decommissioning costs of $40 per installed kW (corporate assumption, 2009 dollars) are included in the year of closure, adjusted at corporate escalation rates.

Other

1. The capacity factors for the $8 CO2 scenario are from the 10-year plan GRID run.
2. Discount rate is 7.1%.
3. Analysis life is assumed to be from 2009 through the Utah Commission stipulated book depreciation lives.
4. Full regulatory recovery of all existing and future costs is assumed.
5. SO2 allowance costs are included based upon corporate emission forward price forecasts.

Dave Johnston Units 3 & 4, 2008 Study

Assumptions as stated above with the following exceptions:

1. Forward flat price curves for the $8/ton CO2 price scenario are as of 12/31/2007.
2. 2008 10-year plan assumptions for capital, O&M, generation and fuel prices are used as the study baseline.
3. Analysis life is assumed to begin in 2008.
4. Discount rate is 7.3%.

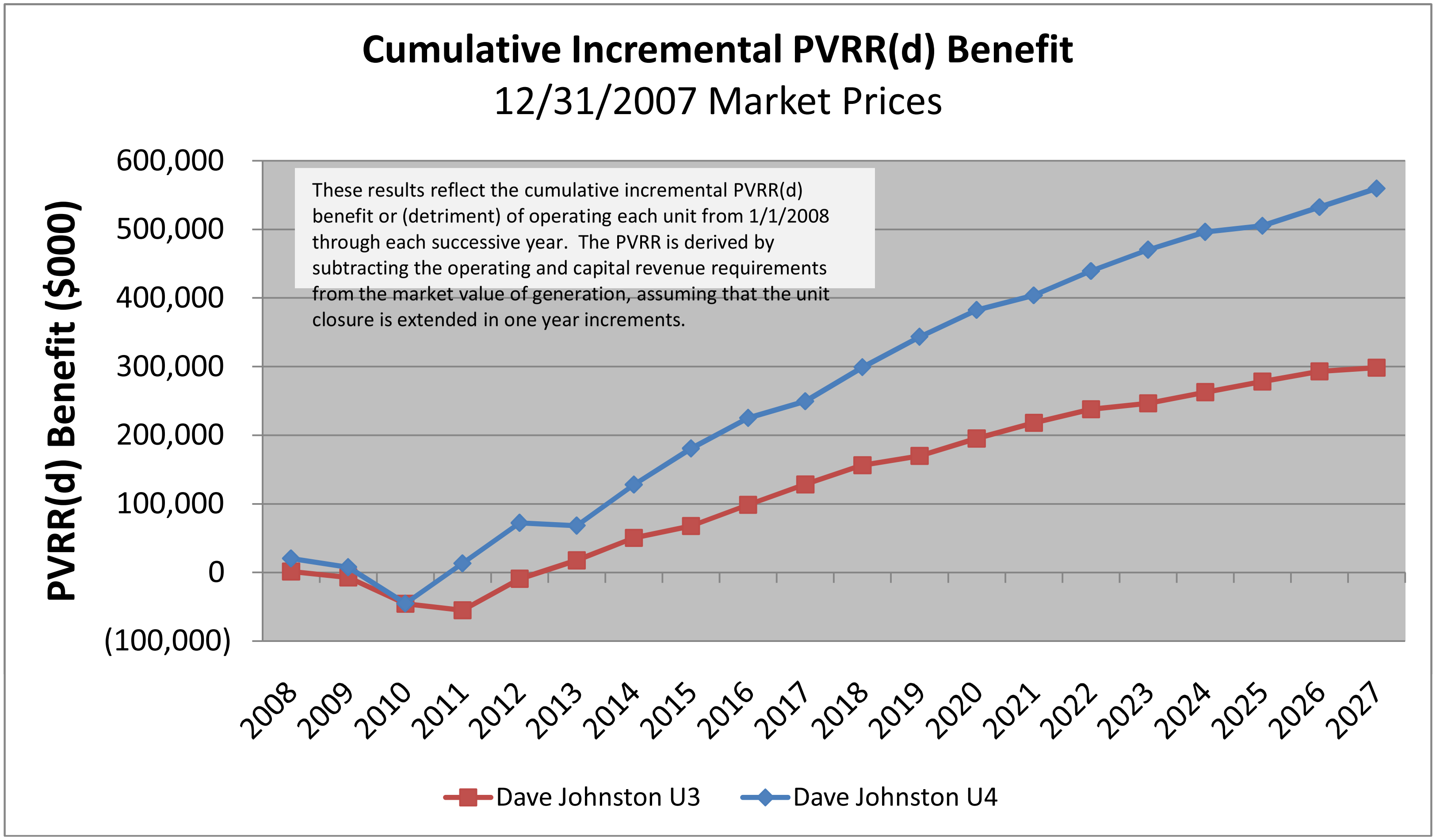
Significant CAI Capital Included

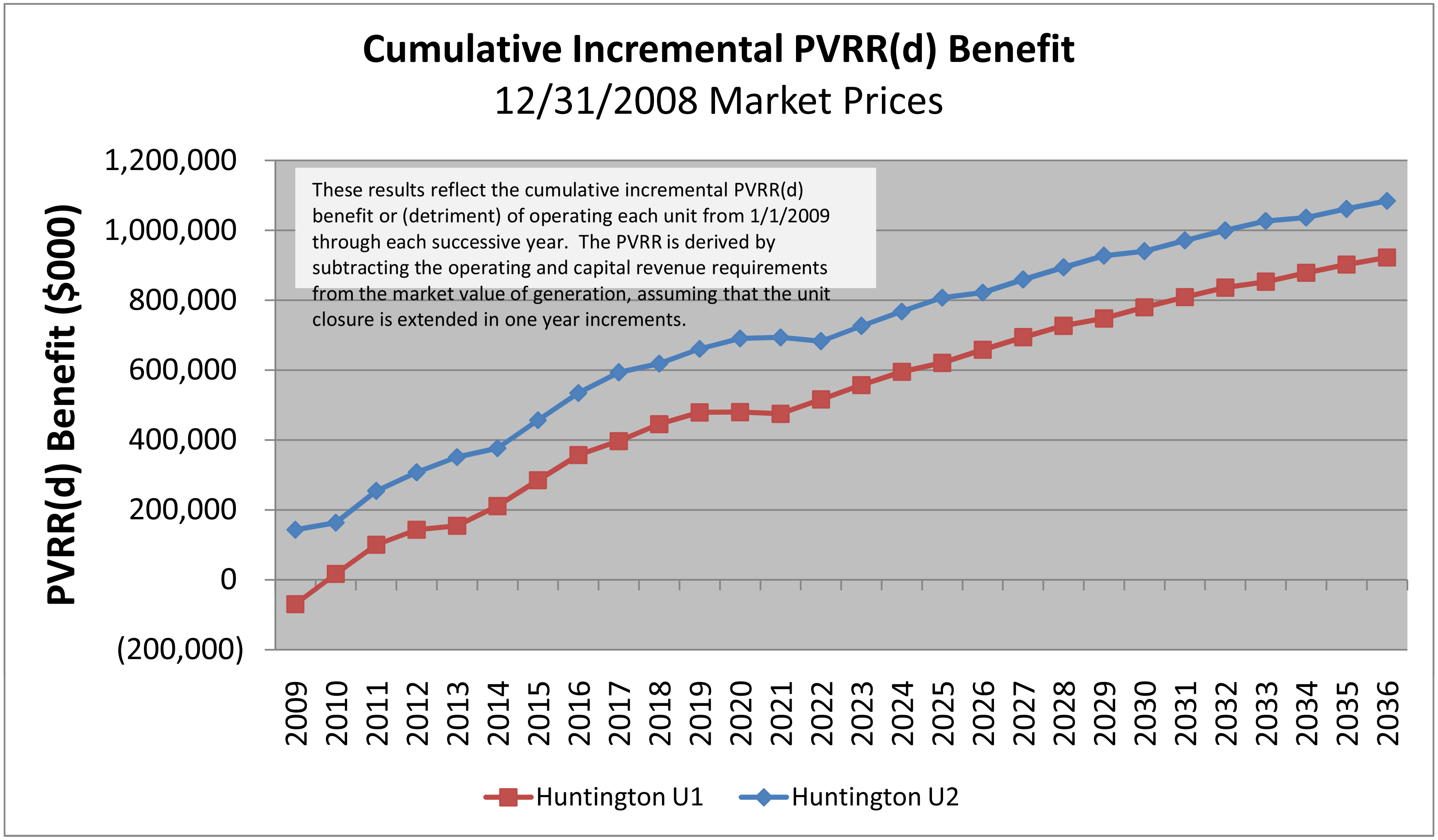
Table 1: Major pollution control equipment costs by year for PacifiCorp owned coal-fueled units included in economic analyses.

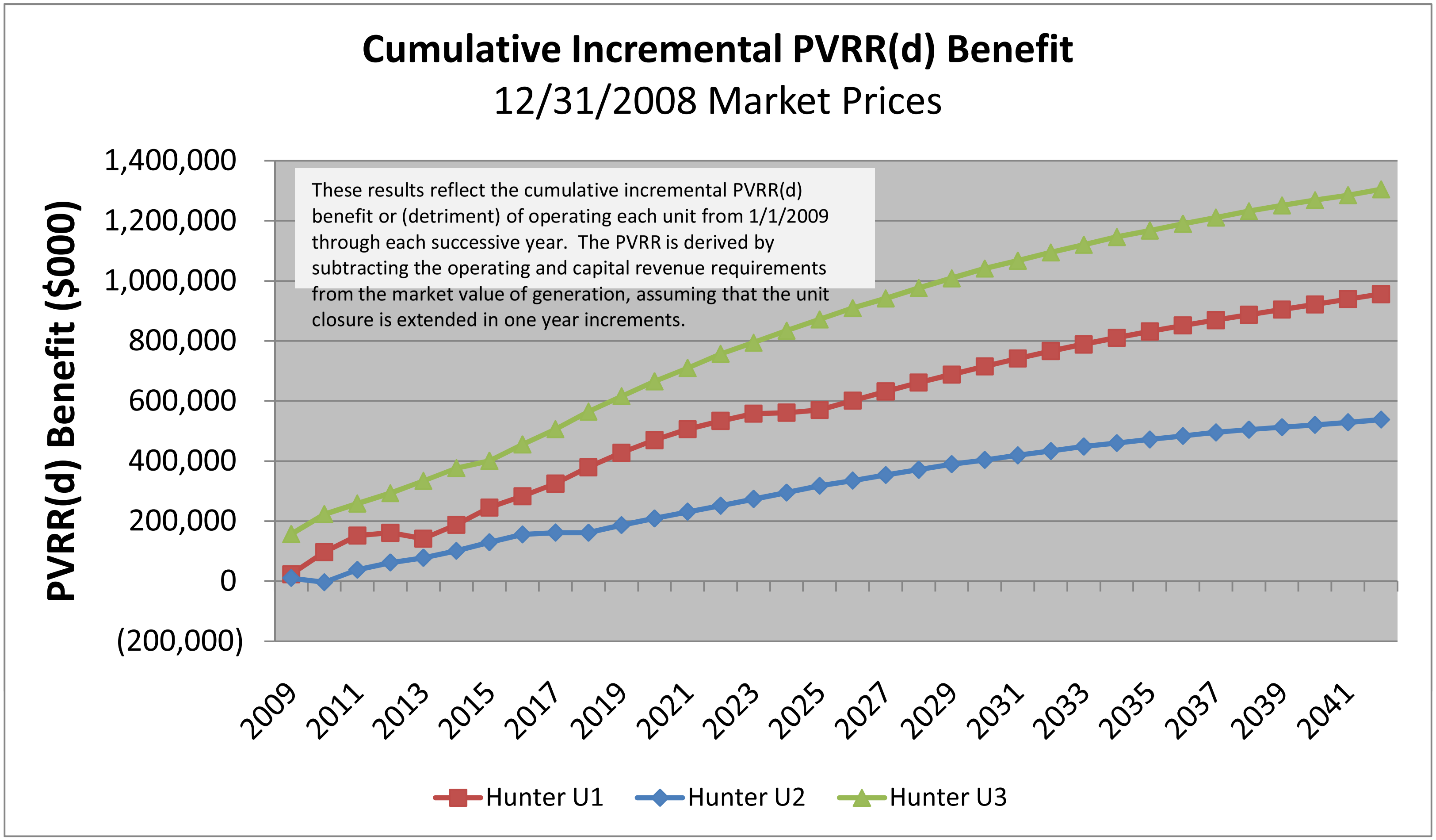
Pollutant/Equipment	SOx		PM	NOx	
Unit	Phase 1[1]	Phase 2[2]	Baghouse[3]	LNB	SCR[4]
Hunter 1	2010		2010	2010	2022
Hunter 2	2011		2011	2011	2023
Hunter 3					2016
Huntington 1	2010		2010	2010	2022
Jim Bridger 1	2010	2030		2010	2022
Jim Bridger 2	2009	2029			2021
Jim Bridger 3	2011	2027			2015
Jim Bridger 4	2008	2028		2012	2016
Naughton 1	2012			2012	2027
Naughton 2	2011			2011	2026
Naughton 3	2014		2014		2024
Wyodak	2011		2011	2011	2026

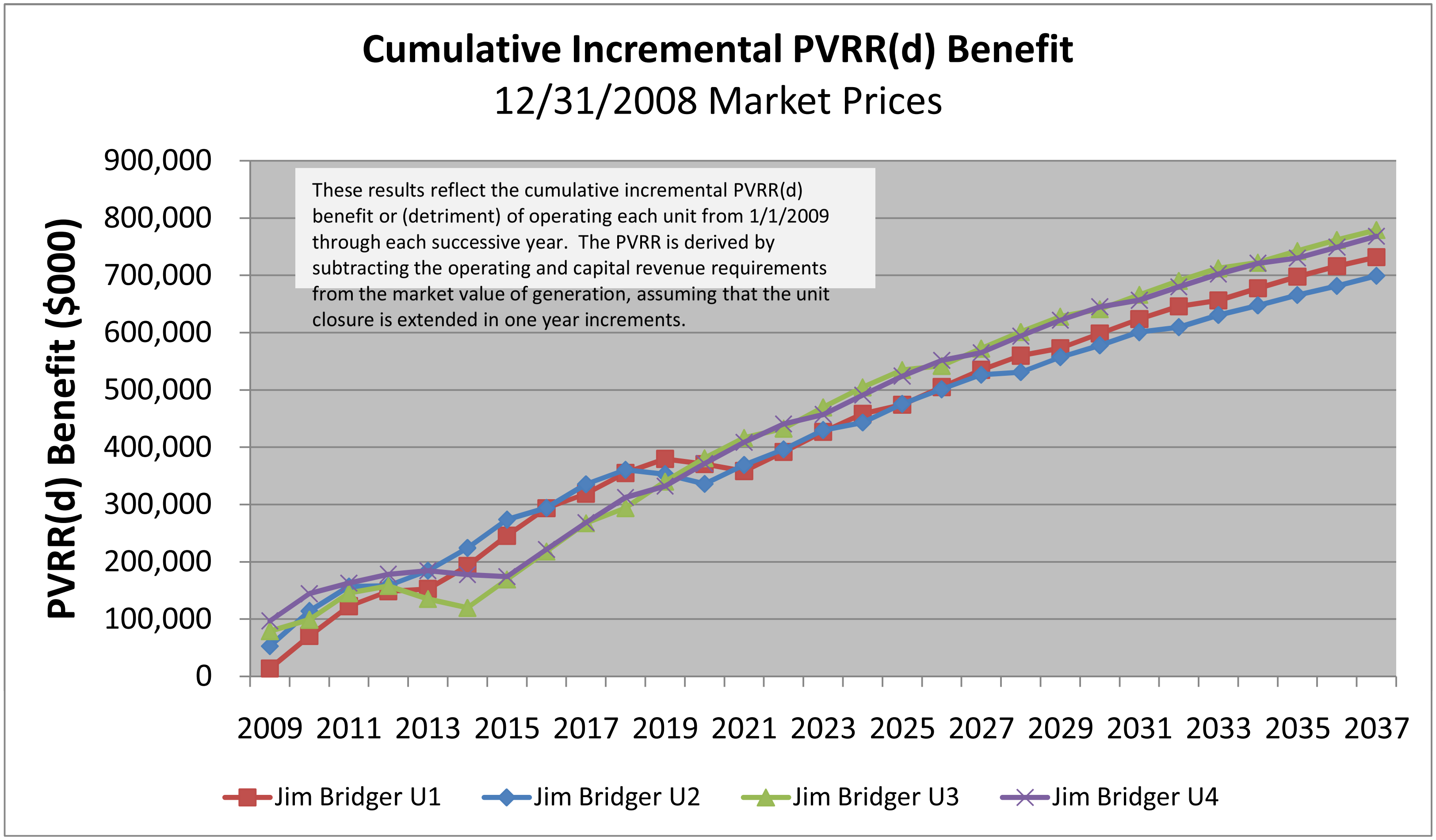
Notes

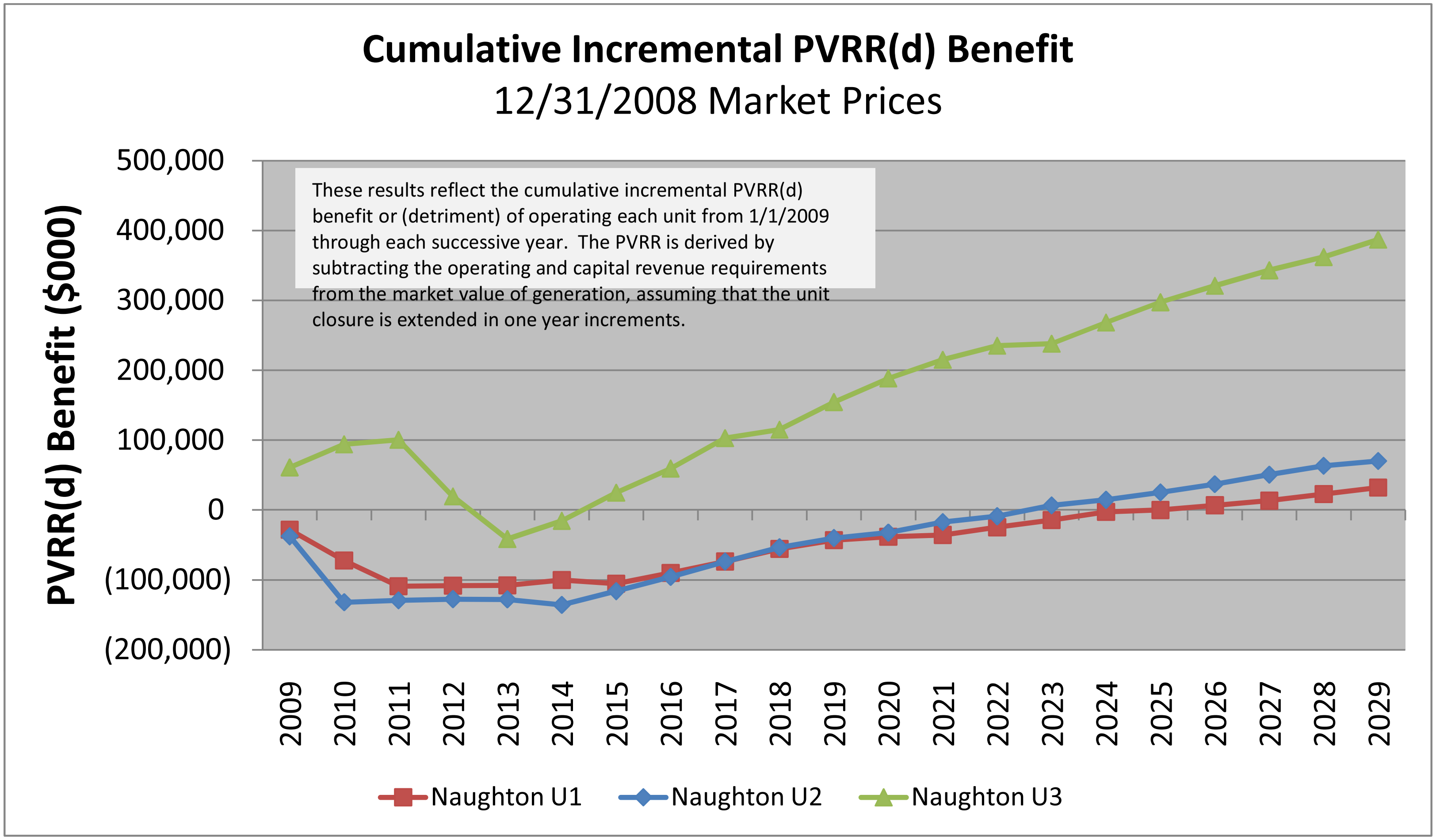
1 Phase 1 implies baseline scrubber upgrades across the fleet.
2 Phase 2 implies new technology and/or equipment installation to achieve 95% sulfur dioxide removal rate on the Jim Bridger units.
3 Baghouse and scrubber installations also reduce mercury emissions and support anticipated HAPs MACT compliance as a co-benefit.
4 The company has included these SCRs in the economic analyses to add conservatism to the PVRR(d) results presented. The SCRs at Jim Bridger and Naughton are required; however, no company commitments or agency actions have been taken that require installation of the other SCRs listed.

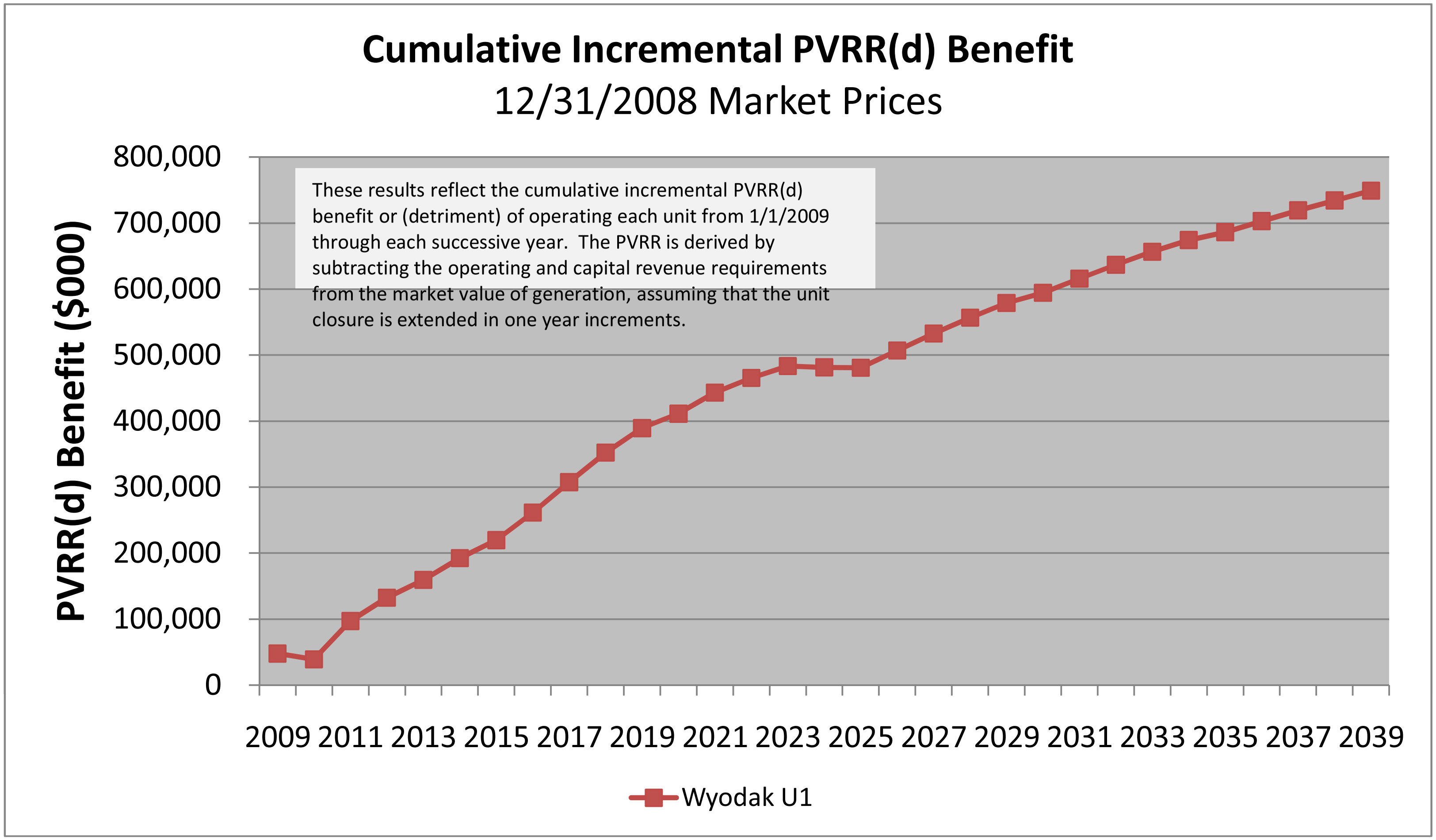

Cumulative Incremental PVRR(d) Benefit
12/31/2007 Market Prices
These results reflect the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2008 through each successive year. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit closure is extended in one year increments.
PVRR(d) Benefit ($000)
600,000
500,000
400,000
300,000
200,000
100,000
0
(100,000)
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
Dave Johnston U3
Dave Johnston U4


Cumulative Incremental PVRR(d) Benefit
12/31/2008 Market Prices
PVRR(d) Benefit ($000)
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
(200,000)
These results reflect the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2009 through each successive year. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit closure is extended in one year increments.
2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036
Huntington U1
Huntington U2


Cumulative Incremental PVRR(d) Benefit
12/31/2008 Market Prices
PVRR(d) Benefit ($000)
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
(200,000)
These results reflect the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2009 through each successive year. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit closure is extended in one year increments.
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
Hunter U1
Hunter U2
Hunter U3


Cumulative Incremental PVRR(d) Benefit
12/31/2008 Market Prices
PVRR(d) Benefit ($000)
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
These results reflect the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2009 through each successive year. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit closure is extended in one year increments.
2009 2011 2013 2015 2017 2019 2021 2023 2025 2027 2029 2031 2033 2035 2037
Jim Bridger U1
Jim Bridger U2
Jim Bridger U3
Jim Bridger U4


Cumulative Incremental PVRR(d) Benefit
12/31/2008 Market Prices
PVRR(d) Benefit ($000)
500,000
400,000
300,000
200,000
100,000
0
(100,000)
(200,000)
These results reflect the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2009 through each successive year. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit closure is extended in one year increments.
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
Naughton U1
Naughton U2
Naughton U3


Cumulative Incremental PVRR(d) Benefit
12/31/2008 Market Prices
These results reflect the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2009 through each successive year. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit closure is extended in one year increments.
PVRR(d) Benefit ($000)
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
2009 2011 2013 2015 2017 2019 2021 2023 2025 2027 2029 2031 2033 2035 2037 2039
Wyodak U1

CAI Capital Projects Study
2011 10-Year Business Plan

PacifiCorp's 10-year plan includes multiple comprehensive air initiative (CAI) projects for the coal generation fleet. This analysis addresses, on a macro basis, whether continued unit operations of the company's coal plants through the regulatory depreciation life, produces enough net value to pay for the proposed CAI capital. The present value evaluation takes a merchant plant analysis approach in that each unit's revenue requirement cost is netted against the value of the unit's generation as measured by the forward price curve at projected CO2 price levels.

Two sets of CO2 price assumptions have been used to evaluate potential outcomes. The first curve represents the $19 per ton CO2 price level assumption basis for PacifiCorp's current 10-year business plan. The second curve represents a low/high CO2 price level assumption scenario that is aligned with the Coal Utilization Case Studies completed as part of the Company's 2011 Integrated Resource Plan. In this scenario, CO2 prices start out lower but then in the long run reach much higher levels.

The results of the analyses indicate that at the $19 per ton CO2 price level assumption basis for PacifiCorp's current 10-year business plan, all the coal units will be above breakeven in terms of present value revenue requirement differential (PVRR(d)). The results of the analyses indicate that under the low/high CO2 price scenario, all of the coal units will be above breakeven in terms of PVRR(d).

The PVRR(d) comparison of continued unit operations with CAI capital versus unit closure is shown in the attached charts.

Study Approach
The study represents a macro effort to analyze the economics of PacifiCorp's coal fleet with respect to PacifiCorp's plan for CAI capital projects.

The analysis calculates the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2011 through each successive year through its regulated depreciation life. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit end of life is extended in one year increments. The $19/ton CO2 price scenario utilizes the current 10-year plan capacity factors, the IRP low/high CO2 price scenario utilizes the 10-year plan capacity factors in as much as the plants are in the money, otherwise the plants are not dispatched.

The PVRR(d) is calculated by subtracting fuel, O&M, environmental emissions cost, and on-going and CAI capital revenue requirement cost from revenue similar to a merchant plant valuation. The revenue is derived using forward price curves from Structure and Pricing's model runs at the $19 CO2 price scenario.

Key Assumptions

Pricing

1. Forward flat price curves for the \$19/ton CO_2 price scenario, as of 12/31/2010, were provided through the end of the study period.
2. Fuel pricing was provided through 2020 from the 2011 10-year plan; prices were escalated at the corporate escalation rate thereafter.
3. Forward price curves do not include the market effects of plant closure(s).

Revenues

1. The analysis period for calculating capital payback is assumed to begin in 2011.
2. Dispatch is based on annual capacity factors derived from the current 2011 10-year plan capacity factors.
3. Potential extrinsic optionality value in dispatch is not included.

Capital / O&M

1. CAI capital dollars are taken from the approved 2011 10-year plan.
2. The 10-year plan contains multiple CAI projects that go into service in different years.
3. Capital placed in service prior to 1/1/2011 is considered a "sunk cost" and is not included in the analysis. Capital for the FGD projects at Naughton units 1 and 2 is also considered a “sunk cost” because construction of the facilities is nearing completion.
4. On-going capital and O&M costs from the 10-year plan have been included. Capital and O&M beyond the 10-year plan are based on the company’s average spend during the current 10-year plan period.
5. Plant/Unit decommissioning costs of \$40 per installed kW (corporate assumption, 2009 dollars) are included in the year of closure, adjusted at corporate escalation rates.

Other

1. The capacity factors for the both CO_2 scenario are from the 10-year plan GRID run, the IRP low/high scenario is further refined to dispatch only when in the money.
2. Discount rate is 7.15%.
3. Analysis life is assumed to be from 2011 through the Utah Commission stipulated book depreciation lives.
4. Full regulatory recovery of all existing and future costs is assumed.
5. SO_2 allowance costs are included based upon corporate emission forward price forecasts.

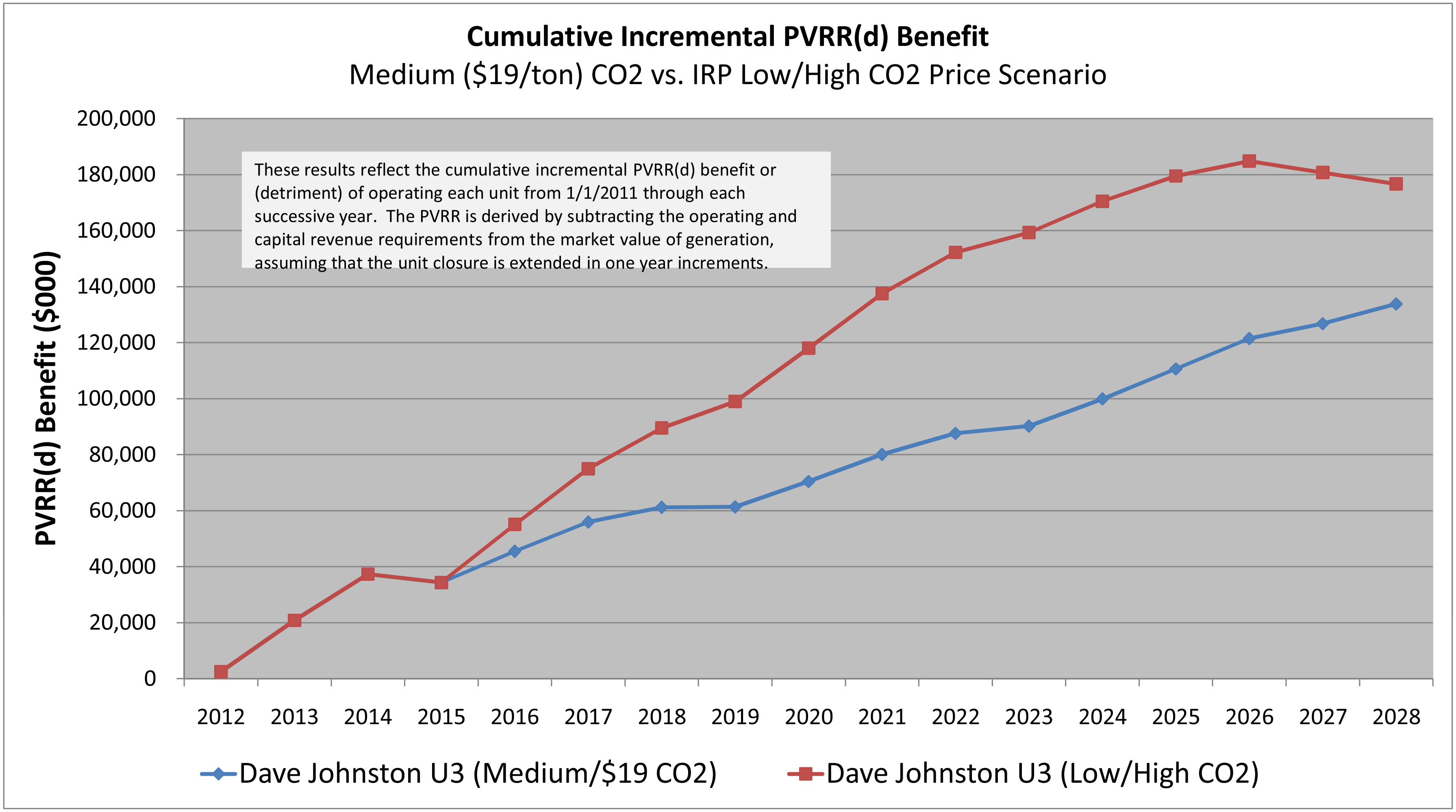
Significant CAI Capital Included

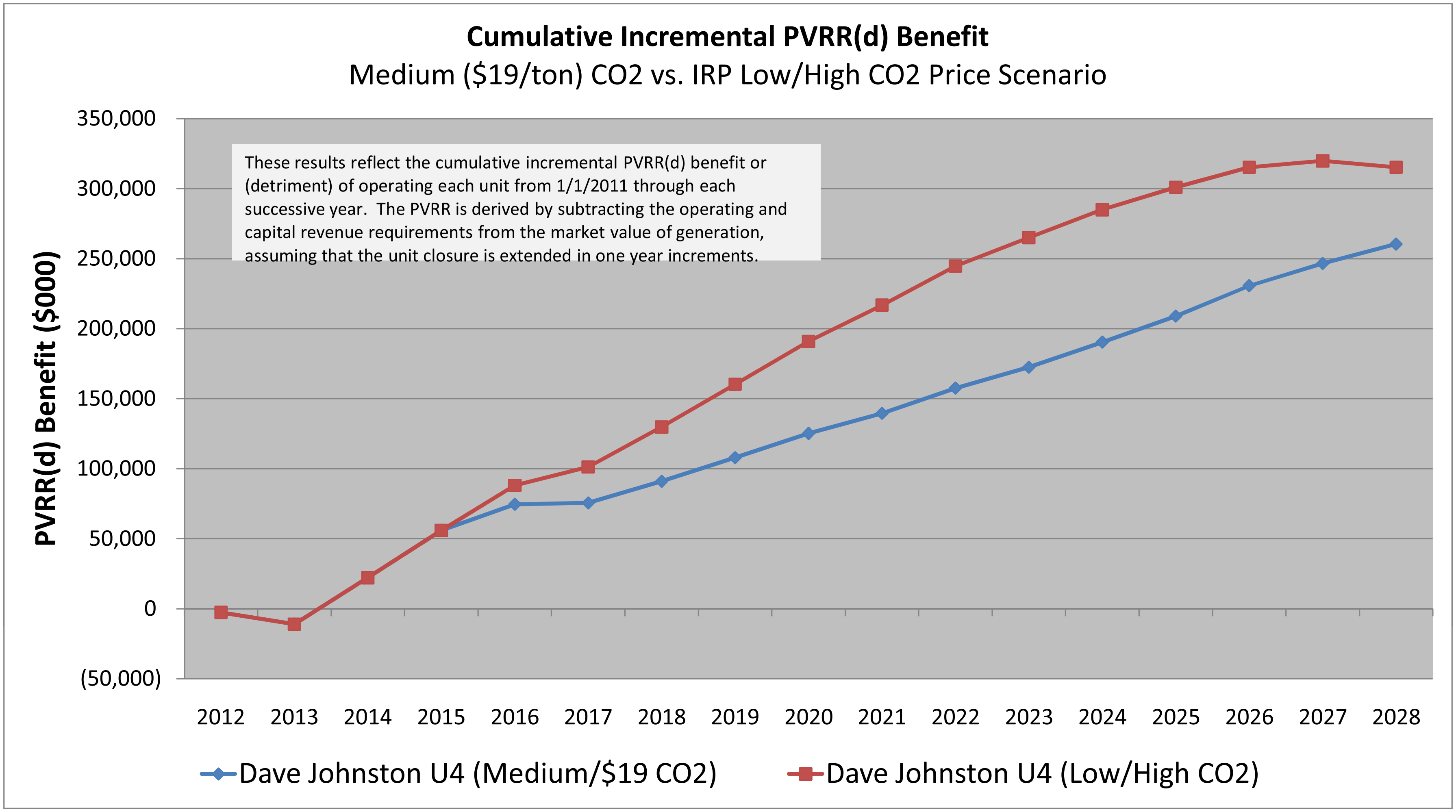
Table 1: Major pollution control equipment costs by year for PacifiCorp owned coal-fueled units included in economic analyses.

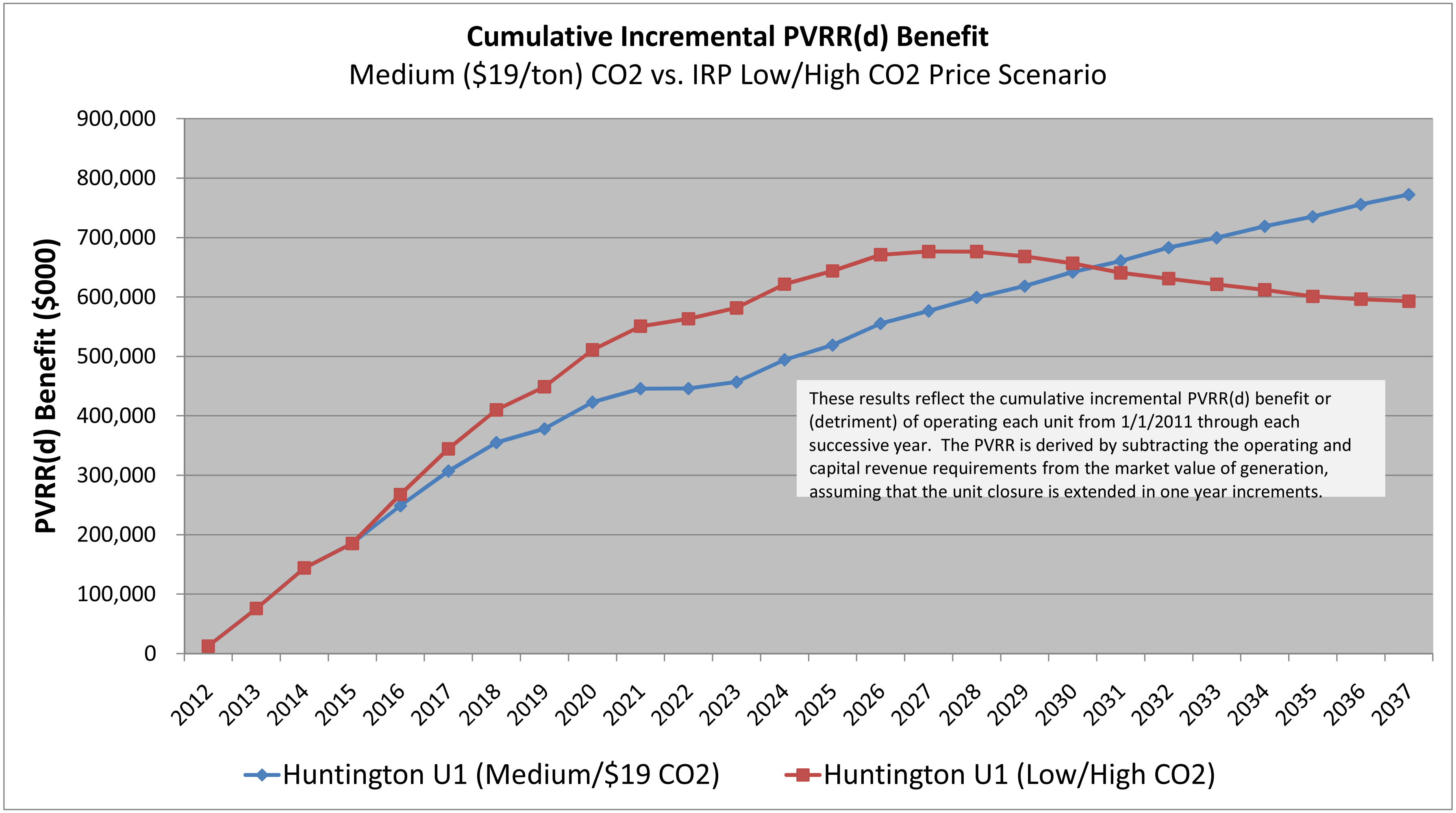
Pollutant/Equipment	SOx		PM	NOx	
Unit	Phase 1[1]	Phase 2[2]	Baghouse[3]	LNB	SCR[4]
Hunter 1	2014		2014	2014	
Hunter 2	2011		2011	2011	2023
Hunter 3					2024
Huntington 1	2010		2010	2010	2023
Jim Bridger 1	2010	2030			2022
Jim Bridger 2	2009	2029			2021
Jim Bridger 3	2011	2027			2015
Jim Bridger 4	2008	2028			2016
Naughton 1	2012			2012	
Naughton 2	2011			2011	
Naughton 3	2014		2014		2014
Wyodak	2011		2011	2011	

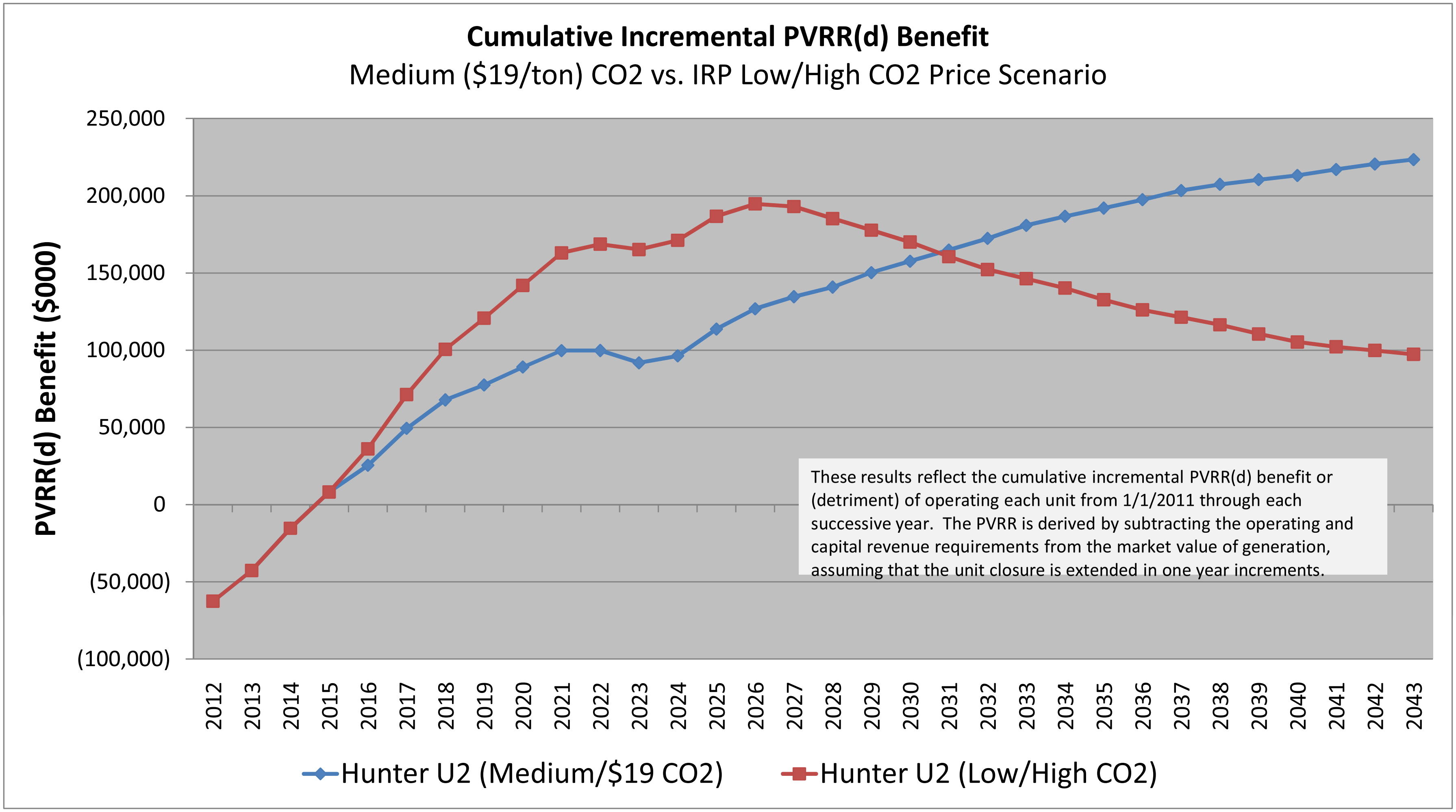
Notes

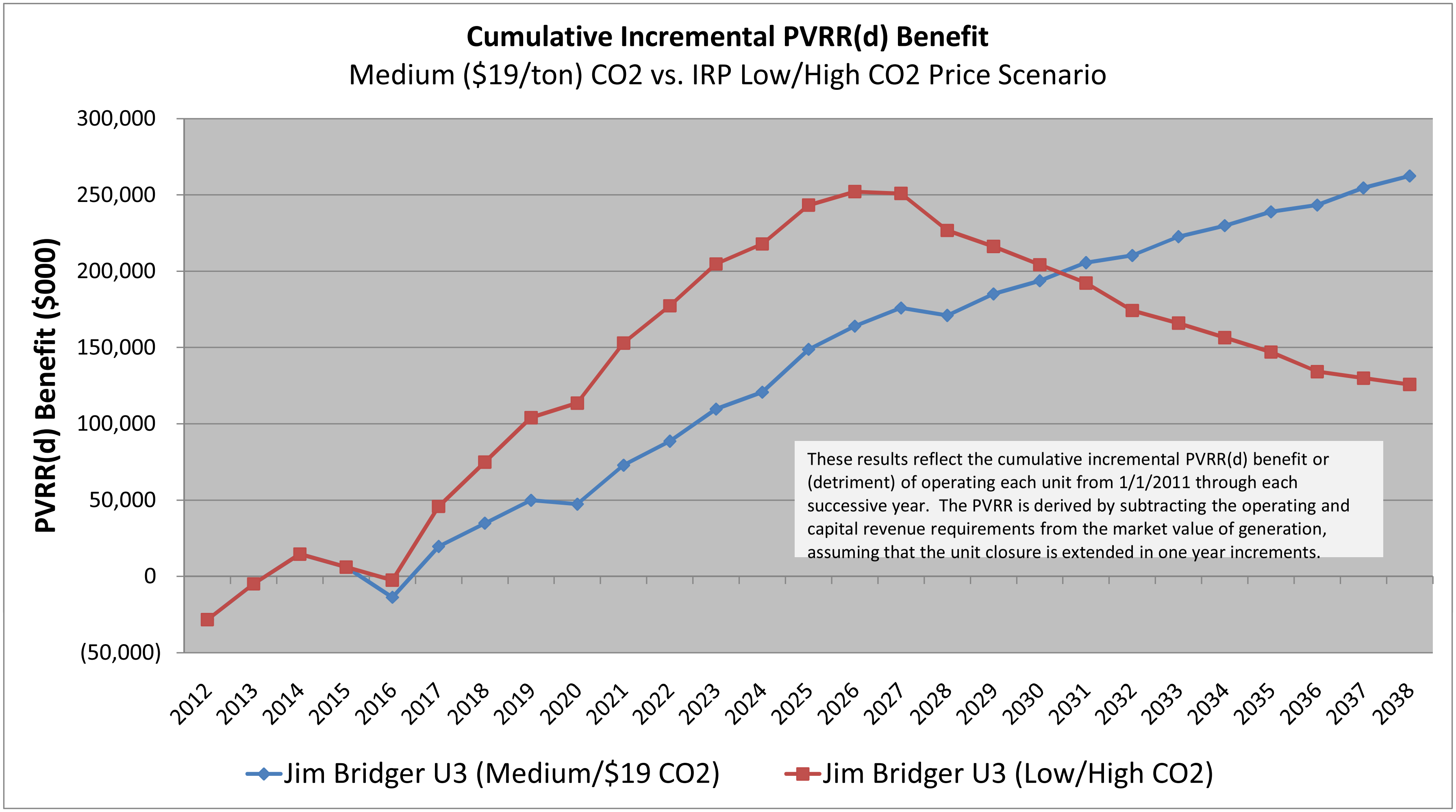
1 Phase 1 implies baseline scrubber upgrades across the fleet.
2 Phase 2 implies new technology and/or equipment installation to achieve 95% sulfur dioxide removal rate on the Jim Bridger units.
3 Baghouse and scrubber installations also reduce mercury emissions and support anticipated HAPs MACT compliance as a co-benefit.
4 The company has included these SCRs in the economic analyses to add conservatism to the PVRR(d) results presented. The SCRs at Jim Bridger and Naughton are required; however, no company commitments or agency actions have been taken that require installation of the other SCRs listed.

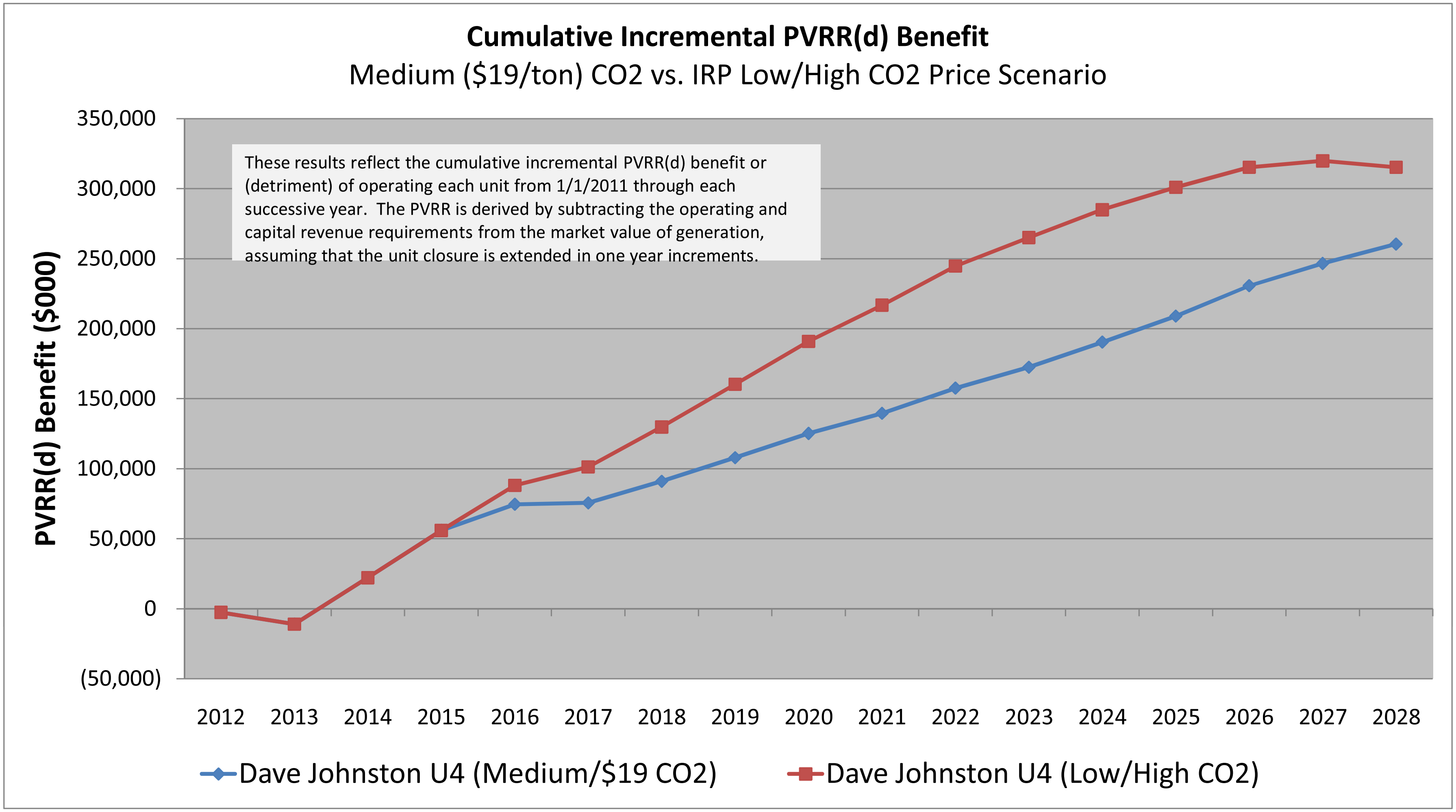

Cumulative Incremental PVRR(d) Benefit
Medium ($19/ton) CO2 vs. IRP Low/High CO2 Price Scenario
PVRR(d) Benefit ($000)
200,000
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
These results reflect the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2011 through each successive year. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit closure is extended in one year increments.
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Dave Johnston U3 (Medium/$19 CO2)
Dave Johnston U3 (Low/High CO2)

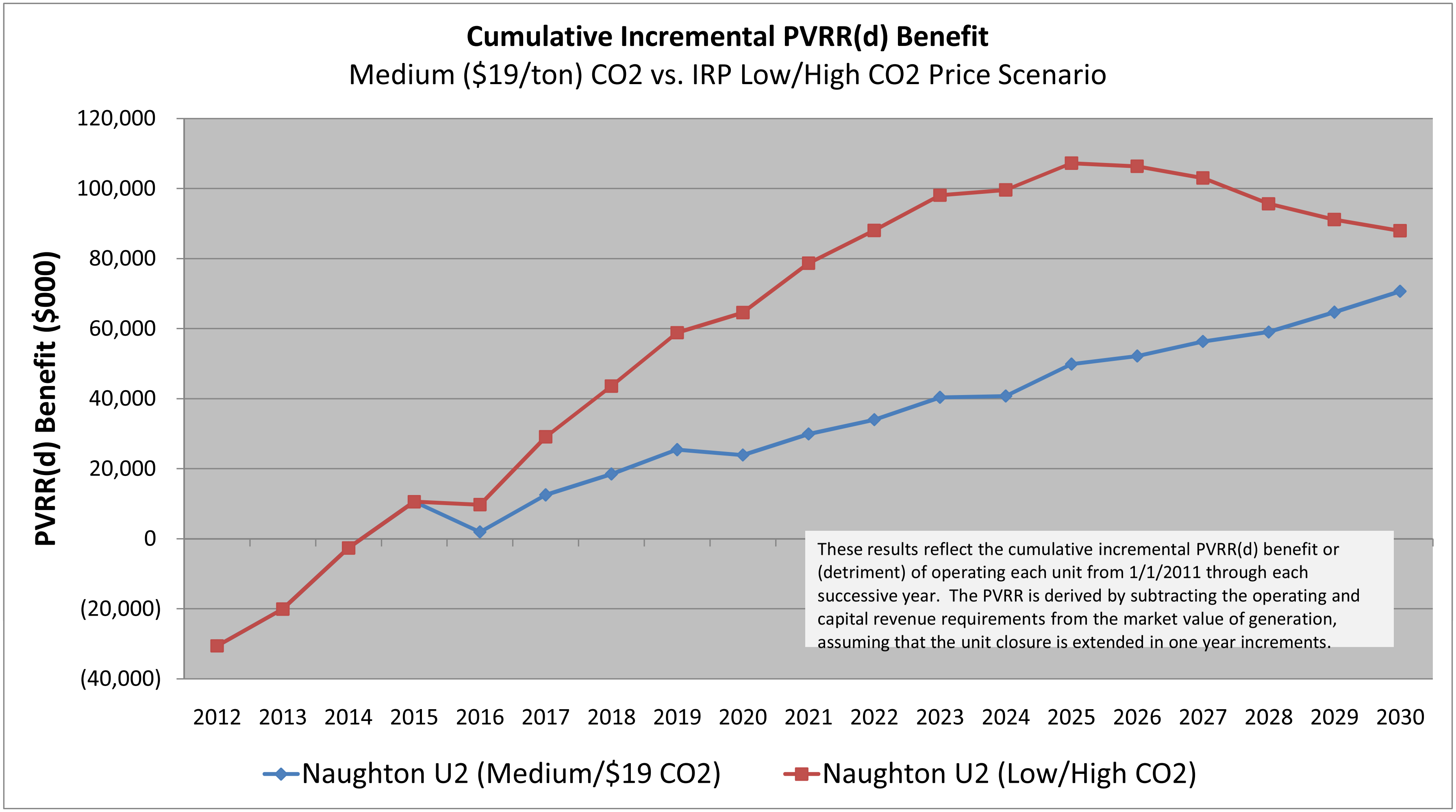

Cumulative Incremental PVRR(d) Benefit
Medium ($19/ton) CO2 vs. IRP Low/High CO2 Price Scenario
These results reflect the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2011 through each successive year. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit closure is extended in one year increments.
PVRR(d) Benefit ($000)
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
(50,000)
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Dave Johnston U4 (Medium/$19 CO2)
Dave Johnston U4 (Low/High CO2)


Cumulative Incremental PVRR(d) Benefit
Medium ($19/ton) CO2 vs. IRP Low/High CO2 Price Scenario
PVRR(d) Benefit ($000)
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
These results reflect the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2011 through each successive year. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit closure is extended in one year increments.
Huntington U1 (Medium/$19 CO2)
Huntington U1 (Low/High CO2)


Cumulative Incremental PVRR(d) Benefit
Medium ($19/ton) CO2 vs. IRP Low/High CO2 Price Scenario
PVRR(d) Benefit ($000)
250,000
200,000
150,000
100,000
50,000
0
(50,000)
(100,000)
2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043
These results reflect the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2011 through each successive year. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit closure is extended in one year increments.
Hunter U2 (Medium/$19 CO2)
Hunter U2 (Low/High CO2)


Cumulative Incremental PVRR(d) Benefit
Medium ($19/ton) CO2 vs. IRP Low/High CO2 Price Scenario
PVRR(d) Benefit ($000)
300,000
250,000
200,000
150,000
100,000
50,000
0
(50,000)
2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038
These results reflect the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2011 through each successive year. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit closure is extended in one year increments.
Jim Bridger U3 (Medium/$19 CO2)
Jim Bridger U3 (Low/High CO2)


Cumulative Incremental PVRR(d) Benefit
Medium ($19/ton) CO2 vs. IRP Low/High CO2 Price Scenario
These results reflect the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2011 through each successive year. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit closure is extended in one year increments.
PVRR(d) Benefit ($000)
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
(50,000)
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
Dave Johnston U4 (Medium/$19 CO2)
Dave Johnston U4 (Low/High CO2)


Cumulative Incremental PVRR(d) Benefit
Medium ($19/ton) CO2 vs. IRP Low/High CO2 Price Scenario
PVRR(d) Benefit ($000)
120,000
100,000
80,000
60,000
40,000
20,000
0
(20,000)
(40,000)
2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030
These results reflect the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2011 through each successive year. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit closure is extended in one year increments.
Naughton U2 (Medium/$19 CO2)
Naughton U2 (Low/High CO2)

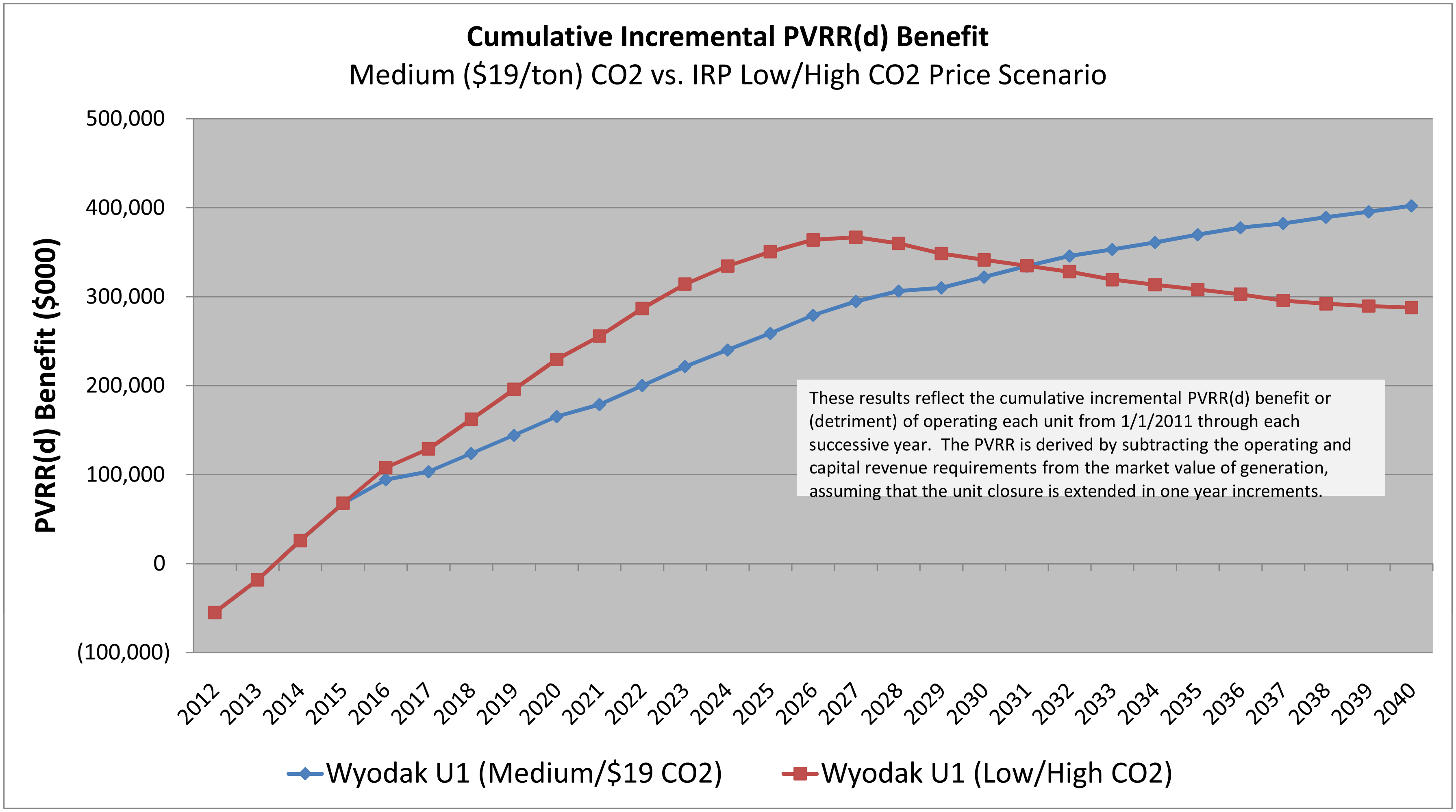

Cumulative Incremental PVRR(d) Benefit
Medium ($19/ton) CO2 vs. IRP Low/High CO2 Price Scenario
PVRR(d) Benefit ($000)
500,000
400,000
300,000
200,000
100,000
0
(100,000)
2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040
These results reflect the cumulative incremental PVRR(d) benefit or (detriment) of operating each unit from 1/1/2011 through each successive year. The PVRR is derived by subtracting the operating and capital revenue requirements from the market value of generation, assuming that the unit closure is extended in one year increments.
Wyodak U1 (Medium/$19 CO2)
Wyodak U1 (Low/High CO2)

EXHIBIT SC-9 (JIF-9)

Sierra Club
UT Docket 10-035-124
Exhibit SC-9 (JIF-9)
Witness: Jeremy Fisher

Current, Projected, and Emerging Capital Expendatures to Current and Emerging Environmental Regulations

Previous Retrofits MPA & WY Rate Case	Current Case Retrofits Exhibit RMP_(SRM-3) 8.8.22	Projected Retrofits Costs estimated	Emerging Retfofits Costs estimated

Dave Johnston 3	2008 -	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020 +
SO_2		FGD [BART] $293.0	$9.5										
NO_X			LNB [BART] $2.6					SCR [BART] $52.1					
Particulates		Baghouse [BART] *above*											
Mercury			Hg testing [MACT] $1.1	$0.3				ACI [MACT] $2.9					
Coal Ash									Coal Ash Remediation [CCR] ~				
Effluent									Effluent Remediation [Effluent rule] ~				
Water Use											Cooling Tower; Entrainment Remediation [Cooling rule] $58.1		
Turbine Upgrade			Controls $12.0										

Dave Johnston 4	2008 -	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020 +
SO_2					FGD [BART] $100.8								
NO_X		LNB [BART] $8.9						SCR [BART] $76.0					
Particulates					Baghouse [BART] $58.3								
Mercury								ACI [MACT] $3.1					
Coal Ash									Coal Ash Remediation [CCR] ~				
Effluent									Effluent Remediation [Effluent rule] ~				
Water Use		Cooling $5.8								Impingement Remediation [Cooling rule] ~			
Turbine Upgrade			Upgrade $26.2										

Current, Projected, and Emerging Capital Expendatures to Current and Emerging Environmental Regulations

Exhibit SC-___(JIF-9)
Witness: Jeremy Fisher

Previous Retrofits	Current Case Retrofits	Projected Retrofits	Emerging Retfofits
MPA & WY Rate Case	Exhibit RMP_(SRM-3) 8.8.22	Costs estimated	Costs estimated

Naughton 1	2008 -	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020 +
SO_2					FGD [BART] $120.3								
NO_X			LNB [BART] $0.5		LNB [BART] $9.4			SCR [BART] $105.8					
Particulates			FGC [BART] $0.9					Baghouse [MACT] $75.3					
Mercury								ACI [MACT] $3.3					
Coal Ash									Coal Ash Remediation [CCR] ~				
Effluent									Effluent Remediation [Effluent rule] ~				
Water Use										Impingement Remediation [Cooling rule] ~			
Turbine Upgrade													

Naughton 2	2008 -	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020 +
SO_2				FGD [BART] $157.5									
NO_X				LNB [BART] $10.4				SCR [BART] $48.1					
Particulates			FGC [BART] $1.0					Baghouse [MACT] $45.3					
Mercury				Hg testing [MACT] $0.5				ACI [MACT] $2.8					
Coal Ash									Coal Ash Remediation [CCR] ~				
Effluent									Effluent Remediation [Effluent rule] ~				
Water Use										Impingement Remediation [Cooling rule] ~			
Turbine Upgrade													

Naughton 3	2008 -	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020 +
SO_2							FGD Upgrade [BART] ~						
NO_X							LNB & SCR [BART] $67.5						
Particulates							Baghouse [BART] $55.5						
Mercury								ACI [MACT] $3.0					
Coal Ash									Coal Ash Remediation [CCR] ~				
Effluent									Effluent Remediation [Effluent rule] ~				
Water Use										Impingement Remediation [Cooling rule] ~			
Turbine Upgrade		Cooling $5.0											

Current, Projected, and Emerging Capital Expendatures to Current and Emerging Environmental Regulations

Exhibit SC-___(JIF-9)
Witness: Jeremy Fisher

Previous Retrofits	Current Case Retrofits	Projected Retrofits	Emerging Retfofits
MPA & WY Rate Case	Exhibit RMP_(SRM-3) 8.8.22	Costs estimated	Costs estimated

Wyodak 1	**2008 -**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020 +**
SO_2													
NO_X				LNB [BART] $12.3				SCR [BART] $78.1					
Particulates				Baghouse [BART] $103.2									
Mercury								ACI [MACT] $3.1					
Coal Ash									Coal Ash Remediation [CCR] ~				
Effluent									Effluent Remediation [Effluent rule] ~				
Water Use				ACC replace $22.2						Impingement Remediation [Cooling rule] ~			
Turbine Upgrade													

Bars spanning more than one year: ACI [MACT] covers 2014–2016; Coal Ash Remediation and Effluent Remediation cover 2015–2017; Impingement Remediation covers 2016–2018.

Jim Bridger 1	**2008 -**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020 +**
SO_2		FGD Upgrades [BART] $16.0	$1.0										
NO_X			LNB [BART] $8.6					SCR [BART] $106.6					SCR
Particulates								Baghouse [MACT] $73.9					
Mercury								ACI [MACT] $3.3					
Coal Ash									Coal Ash Remediation [CCR] ~				
Effluent									Effluent Remediation [Effluent rule] ~				
Water Use										Impingement Remediation [Cooling rule] ~			
Turbine Upgrade			Upgrade $4.7										

Bars spanning more than one year: FGD Upgrades [BART] covers 2009–2010; Baghouse [MACT] and ACI [MACT] cover 2014–2016; Coal Ash Remediation and Effluent Remediation cover 2015–2017; Impingement Remediation covers 2016–2018.

Jim Bridger 2	**2008 -**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020 +**
SO_2		FGD Upgrade [BART] $14.7											
NO_X	LNB [BART]							SCR [BART] $106.6					SCR
Particulates								Baghouse [MACT] $73.9					
Mercury			Hg testing [MACT] $0.6					ACI [MACT] $3.3					
Coal Ash									Coal Ash Remediation [CCR] ~				
Effluent									Effluent Remediation [Effluent rule] ~				
Water Use										Impingement Remediation [Cooling rule] ~			
Turbine Upgrade													

Bars spanning more than one year: Baghouse [MACT] and ACI [MACT] cover 2014–2016; Coal Ash Remediation and Effluent Remediation cover 2015–2017; Impingement Remediation covers 2016–2018.

Exhibit SC-___(JIF-9)
Witness: Jeremy Fisher

Current, Projected, and Emerging Capital Expendatures to Current and Emerging Environmental Regulations

Previous Retrofits	Current Case Retrofits	Projected Retrofits	Emerging Retfofits
MPA & WY Rate Case	Exhibit RMP_(SRM-3) 8.8.22	Costs estimated	Costs estimated

Jim Bridger 3	**2008 -**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020 +**
SO_2				FGD Upgrade [BART] $17.1									
NO_X	LNB [BART]							SCR [BART] $106.6					
Particulates								Baghouse [MACT] $73.9					
Mercury								ACI [MACT] $3.3					
Coal Ash									Coal Ash Remediation [CCR] ~				
Effluent									Effluent Remediation [Effluent rule] ~				
Water Use										Impingement Remediation [Cooling rule] ~			
Turbine Upgrade													

Jim Bridger 4	**2008 -**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020 +**
SO_2					FGD Upgrade [BART] $2.2								
NO_X		LNB [BART]							SCR [BART] $107.5				
Particulates								Baghouse [MACT] $74.3					
Mercury								ACI [MACT] $3.3					
Coal Ash									Coal Ash Remediation [CCR] ~				
Effluent									Effluent Remediation [Effluent rule] ~				
Water Use										Impingement Remediation [Cooling rule] ~			
Turbine Upgrade													

Current, Projected, and Emerging Capital Expendatures to Current and Emerging Environmental Regulations

Exhibit SC-___(JIF-9)
Witness: Jeremy Fisher

Previous Retrofits	Current Case Retrofits	Projected Retrofits	Emerging Retfofits
MPA & WY Rate Case	Exhibit RMP_(SRM-3) 8.8.22	Costs estimated	Costs estimated

Hunter 1	**2008 -**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020 +**
SO_2					FGD Upgrade [BART] $18.5								
NO_X							LNB [BART] ~	SCR [BART] $91.2					
Particulates							Baghouse [BART] $67.9						
Mercury								ACI [MACT] $3.2					
Coal Ash									Coal Ash Remediation [CCR] ~				
Effluent									Effluent Remediation [Effluent rule] ~				
Water Use										Impingement Remediation [Cooling rule] ~			
Turbine Upgrade													

Hunter 2	**2008 -**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020 +**
SO_2				FGD Upgrade [BART] $33.9									
NO_X				LNB [BART] $6.6				SCR [BART] $91.2					
Particulates				Baghouse [BART] $55.4									
Mercury								ACI [MACT] $3.2					
Coal Ash									Coal Ash Remediation [CCR] ~				
Effluent									Effluent Remediation [Effluent rule] ~				
Water Use										Impingement Remediation [Cooling rule] ~			
Turbine Upgrade				Upgrade $21.6									

Hunter 3	**2008 -**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020 +**
SO_2					Wet Stack $3.1								
NO_X								SCR [BART] $92.3					
Particulates													
Mercury								ACI [MACT] $3.2					
Coal Ash									Coal Ash Remediation [CCR] ~				
Effluent									Effluent Remediation [Effluent rule] ~				
Water Use										Impingement Remediation [Cooling rule] ~			
Turbine Upgrade					Upgrade $28.7								

Current, Projected, and Emerging Capital Expendatures to Current and Emerging Environmental Regulations

Exhibit SC-___(JIF-9)
Witness: Jeremy Fisher

Previous Retrofits	Current Case Retrofits	Projected Retrofits	Emerging Retfofits
MPA & WY Rate Case	Exhibit RMP_(SRM-3) 8.8.22	Costs estimated	Costs estimated

Huntington 1	2008 -	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020 +
SO_2				FGD Upgrade [BART] $40.6									
NO_X			LNB [BART] $9.5					SCR [BART] $87.6					
Particulates		Baghouse [BART] ~	$92.9										
Mercury								ACI [MACT] $3.2					
Coal Ash													
Effluent									Effluent Remediation [Effluent rule] ~				
Water Use										Impingement Remediation [Cooling rule] ~			
Turbine Upgrade			Upgrade $29.1										

Huntington 2	2008 -	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020 +
SO_2													
NO_X								SCR [BART] $87.6					
Particulates													
Mercury								ACI [MACT] $3.2					
Coal Ash													
Effluent									Effluent Remediation [Effluent rule] ~				
Water Use										Impingement Remediation [Cooling rule] ~			
Turbine Upgrade													