

AEP argues for continued life for coal units at four plants

These plants use a lot of Ohio coal

10/09/2014 by Barry Cassell

American Electric Power (NYSE: AEP) doesn't know at this point how the Obama Administration's Clean Power Plan, unveiled in June in draft form, will impact the coal-fired plants in Ohio it wants to protect for the future.

AEP's regulated **Ohio Power** unit on Oct. 3 applied with the Public Utilities Commission of Ohio for approval of a power purchase agreement (PPA) covering capacity it would buy from its **AEP Generation Resources** (AEPGR) affiliate, with costs under that PPA then passed along to Ohio Power ratepayers under a rate rider.

Ohio Power told the commission that this plan would protect the futures of these coal units in a deregulated Ohio power market, bringing cost-effective, reliable generation to ratepayers at stable prices over time.

John McManus, employed by **American Electric Power Service Corp.** (AEPSC) as Vice President-Environmental Services, said in supporting testimony that the draft version of the Clean Power Plan would have major impacts on coal-fired power inside and outside of Ohio. But he said those impacts are uncertain right now.

"The EPA's proposal requires CO2 reduction programs to be developed at the state level for sources and customers located in that state," McManus noted. "Ohio would develop a plan that takes into account the circumstances of the fossil generating units located within the state and that factors in the energy and economic needs of the state and its residents. Ohio would be able to take into consideration the value that the Cardinal, Conesville, Stuart and Zimmer generating units proposed to be included in the PPA provide in meeting those needs, even if Ohio participated in a regional plan.

"For example, under the proposed CPP, energy efficiency activities can only be used to offset emissions from generating assets located in the state, unless a multi-state or regional plan is developed. Because the plants are in-state, they would be part of the four building blocks that Ohio uses to meet the requirements of the proposed CPP, be it for a state or regional plan."

Company says Ohio's power future may involve electricity imports

Said Ohio Power's Oct. 3 application: "While the proposed PPA will not avoid closure of units already planned for retirement in 2015, it would incorporate a long-term solution for other Ohio coal plants that are on the economic bubble going forward. As a related matter, the proposed PPA would help begin to address the current prospects faced by Ohio of being a perpetual importer of power and a taker of volatile market prices in the future. Among other things, those bleak prospects could undermine Ohio's economy not only for large industrial customers but for all commercial and residential customers. It is AEP Ohio's position that the proposed PPA will help address those interests in a way that promotes the best interests of the State of Ohio."

The application noted that AEP Ohio has proposed adding these sub-critical units to its proposed AEPGR PPA Rider.

AEP Generation Resources has plans to close previously announced plants. The sub-critical units in the proposed PPA Rider were not included in those plans. However, there is no assurance that they will continue to operate. The proposed PPA Rider would provide more long-term certainty for these plants.

The plants included in the AEPGR PPA Rider employ 1,147 workers and provide \$86.2m of direct income. These plants consumed 5,451,000 tons of Ohio in 2013, which has a value of \$293m. The coal consumed by these plants reflects about 20% of Ohio's total production.

The subject plants are: The three-unit Cardinal Plant is located in Brilliant, Ohio, in Jefferson County. Units 1 and 2 were brought into service in 1967, with Unit 3 being brought into service in 1977. Units 1 and 2 have generating capacity of 590 MW, while Unit 3 has a generating capacity of 620. AEP Generation Resources owns Unit 1 and **Buckeye Power** owns Units 2 and 3. AEP Generation Resources operates the facility. Cardinal Unit 1 would be included in the proposed AEPGR PPA. It had approximately 350 employees in 2013, generated approximately 3,600,000 MWh of electricity in 2013 and used about 1,400,000 tons of Ohio-produced coal. The Conesville Plant is located in Conesville, Ohio (Coshocton County). It is comprised of three current units. Unit 4 was brought into service in 1973, Unit 5 was brought into service in 1976 and Unit 6 was brought into service in 1978. Unit 4 has a generating capacity of 780 MW and Units 5 and 6 have generating capacities of 405 MW. All units are owned by AEP Generation Resources and they would be included in the AEPGR PPA. The plant had approximately 260 employees in 2013. Conesville Plant generated approximately 4,700,000 MWh of electricity and used about 2,800,000 tons of Ohio produced coal. The Stuart Plant is located in Aberdeen, Ohio (Brown County). It is comprised of four units. Unit 1 was brought into service in 1971, Unit 2 was brought into service in 1970, Unit 3 was brought into service in 1972 and Unit 4 was brought into service in 1974. The plant has a total capacity of 2,334 MW. The plant is a joint venture of AEP Generation Resources, **Duke Energy** and **Dayton Power and Light**. AEP Generation Resources owns 26% of the facility (about 677 MW) and its share would be included in the AEPGR PPA. Duke Energy owns 39% of the plant. Dayton Power and Light owns the remaining 35% and operates the facility. The Stuart Plant employs approximately 375 workers. AEP Generation Resources share of the energy generated by the plant was around 3,500,000 MWh in 2013. The Zimmer Plant is sited in Moscow, Ohio (Clermont County). The plant, an unfinished nuclear facility that was converted to coal, has one unit. The facility was brought into service in 1991 and it has a capacity of 1,300 MW. The plant is a joint venture of AEP Generation Resources, Duke Energy and Dayton Power and Light. AEP Generation owns 25.4% of the facility (approximately 330 MW) and its share would be included in the AEPGR PPA. Duke Energy owns 46.5% of the plant and operates it. Dayton owns the remaining 28.1%. Zimmer has approximately 160 employees. AEP Generation Resources share of the energy generated by the plant was approximately 2,300,000 MWh in 2013. The Zimmer Plant used about 1,300,000 tons of Ohio in 2013.

AEP says these plants provide valuable grid support in the region

Robert Bradish, the Vice President-Grid Development for AEPSC, said in Oct. 3 testimony about the grid need for this capacity: "The retirement of large, baseload generating resources can significantly change the magnitude and direction of power flows on the transmission system. Specifically, areas that have been historically net exporters of power may now be forced to import power from other areas of the system. These changes in power flows can result in constraints. Additionally, these units provide grid support in the form of spinning reserves and reactive power. The momentum created by the spinning generating units creates resistance to sudden changes caused by system disturbances. The spinning units can quickly react to adjust system voltage, frequency and power factor, which are also ancillary services provided by the generating units to PJM to support system reliability.

"The transmission grid requires reactive power sources to maintain voltage levels and stability. Since baseload coal generation serves as the primary source of reactive power today, the loss of the PPA Units will also require replacement sources of reactive power. The coal-fired PPA Units can store a substantial amount of fuel on site, which helps maintain transmission grid reliability during adverse weather conditions, such as the Polar Vortex experienced in PJM earlier this year."

Bradish added about AEP's assessment of the grid impacts of shutting these units: "AEP's preliminary assessment has determined that both thermal overloads and low voltage conditions result following the retirement of the generating units.

In some cases, the power flow models did not converge, which is an indication of severe system reliability concerns. Since the AEP transmission system serves as a thoroughfare for PJM, power flows change significantly in magnitude and direction, depending on the conditions modeled. For example, under peak conditions the AEP transmission system is typically utilized to transport power from areas in the west to areas north and east of the AEP system. Under light load conditions, power flows primarily from west to east and south of the AEP system as a result of increased wind generation, pump loads at hydro storage facilities, and reduced natural gas generation during off-peak hours. The variability of these factors, combined with the loss of centrally located base load generation sources, create vastly different stresses that must be accounted for in maintaining a reliable transmission system.”

Some of these units have air emissions needs for MATS

Toby Thomas, employed by the AEP Generation Resources as Vice President- Competitive Generation, said that each of the nine generating units included in the PPA is fired with pulverized coal. All of the units are equipped with low-NOx burners (LNBs) that minimize the creation of NOx during the combustion process. Conesville Units 4, 5, and 6 are also equipped with over-fire air systems that further reduce NOx via controlling the combustion process. All units are also equipped with electrostatic precipitators (ESPs), which reduce emission of particulate matter by more than 99%. Cardinal Unit 1 is also equipped with selective catalytic reduction (SCR) to further reduce emissions of NOx. The unit is also equipped with a flue gas desulfurization (FGD) scrubber system to reduce emissions of SO2. Conesville Unit 4 is equipped with SCR for NOx emissions reduction and an FGD system that allows it to consume a blend of high sulfur and low sulfur coals. Conesville Units 5 and 6 are equipped with FGD systems. Stuart Units 1-4 are equipped with SCR and FGD for reduction of NOx and SO2 emissions. Zimmer Unit 1 is equipped with SCR for NOx reduction as well as FGD for SO2 reduction.

Thomas wrote: “These generating units, Cardinal 1, Conesville 4, 5, and 6, Stuart 1, 2, 3, and 4, and Zimmer 1, are all generating units that I would describe as marginal units with respect to their economic viability while operating in a deregulated market. Although these units are not currently planned to be retired in the next few years for economic or environmental reasons, as further explained below the future market-based revenue uncertainty and fixed cost structure make them vulnerable to early retirement. These units are capable of safely and reliably generating electricity, and can be economically viable in a deregulated market if the market price of electricity reaches sufficient levels.”

He added: “Each of the plants in question is capable of continuing to operate beyond 2030, based on current knowledge of physical equipment at each unit and presuming an appropriate level of future capital investment and maintenance expense can be justified economically.”

Thomas said about compliance plans for the federal Mercury and Air Toxics Standards (MATS), which are due to take initial effect in April 2015: “The units that are equipped with SCR and FGD (Cardinal Unit 1, Conesville Unit 4, Stuart Units 1-4 and Zimmer Unit 1) systems are anticipated to meet the mercury requirements under the MATS Rule via the co-benefit removal of mercury, whereby the SCR converts mercury to a state that is soluble in, and removed by, the existing FGD equipment. However, because Conesville Units 5 and 6 are not equipped with SCR systems, additional capital investment is necessary to ensure compliance with the mercury requirements of the MATS Rule. At this time, the Company is developing a design for the future installation of an emerging technology that will allow the units to meet mercury emission limits established under the MATS Rule at a lower capital cost than would be incurred for the installation of an SCR system. Cardinal Unit 1 and Conesville Units 4, 5, and 6, Stuart 1, 2, 3 and 4 and Zimmer also plan to install mercury monitoring equipment to ensure that they are in compliance with the monitoring provisions of the MATS Rule.”

Ohio has trouble attracting new power generation, AEP says

Pablo Vegas, President and Chief Operating Officer of AEP Ohio, testified that while some new generating capacity is planned in Ohio, the state is not attractive enough to bring in enough new capacity to replace the mostly coal-fired capacity that is being lost.

“Ohio has distinct disadvantages to attracting generation investment,” Vegas noted. “Because Ohio has moved to SSO

procurement through short-term auctions, investors can only count on projected market revenues to support long-term investment decisions. As discussed above, eleven years of market results have proven that the capacity markets in PJM do not provide sufficient returns in PJM's western footprint to support new investment. Based strictly on market economics, new generation is more likely to be built in eastern PJM, where PJM's capacity market has traditionally identified constrained delivery areas where capacity clearing prices are greater.

“While reliance on the capacity market is enough to deter generation investment in Ohio, its location in proximity to several regulated states also puts it at a disadvantage to attracting investment. Ohio's adjacent neighbors Indiana, West Virginia, Michigan, and Kentucky all provide regulated recovery of generation investments providing investors more clarity regarding the return on such large investments. Near-neighbor Virginia not only provides regulated cost recovery, but also employs rate incentives and accelerated cost recovery mechanisms to encourage new generation investments. It is no surprise that during 2012-2015 when Ohio is adding just 291 MW of capacity, Virginia will add over 2,200 MW. By contrast, Pennsylvania (Ohio's deregulated neighbor) is adding just 595 MW in same time frame, with all but 140 MW located in the eastern half of the state where capacity prices have traditionally been greater.”

Vegas noted that the 1,400-MW, coal-fired Muskingum River Plant in Waterford, Ohio, is scheduled to retire in June 2015. Over several years, AEP Ohio explored several options to maintain the plant as a viable facility. For example, AEP Ohio had plans, and had begun the process of retrofitting Muskingum River Unit 5 (MR5) with environmental controls to comply with the Clean Air Interstate Rule and MATS. AEP also explored the possibility of converting MR5 to, or replacing it with, a gas-powered facility to protect its generation supply and limit the economic damage to the area. Indeed, AEP Ohio had committed, as part of a package deal, to replace the retiring MR5 unit with a new combined cycle gas plant to be dubbed MR6 as part of the ESP II Stipulation and Recommendation that was initially adopted by the commission but subsequently rejected. More recently, MR5 was considered for a fuel switch, where the existing boiler could be fueled with natural gas, which would have required a significantly smaller investment than the environmental retrofits or the new MR6 Unit.

“Unfortunately, the PJM capacity market auction results could not justify either of these investments,” Vegas wrote. “This MR 5 example highlights the issue with generation investments in Ohio. While AEP Ohio's plan to convert a coal-fired plant to a gas-fired plant was thwarted by the capacity markets, in nearby states AEP Ohio's affiliates are moving forward with similar conversions. **Kentucky Power Company** recently sought and received regulatory approval to convert one of its coal-fired plants to natural gas, retaining some of the employees and tax base that would have been lost if it had been forced to retire the unit. Likewise, **Appalachian Power Company**, another AEP subsidiary is also in the process of converting two of its coal-fired units in Virginia to natural gas because of their ability to recover the investment due to regulatory support there.”

ABOUT THE AUTHOR

Barry Cassell

Barry Cassell is Chief Analyst for *GenerationHub* covering coal and emission controls issues, projects and policy. He has covered the coal and power generation industry for more than 26 years, beginning in November 2011 at *GenerationHub* and prior to that as editor of SNL Energy's *Coal Report*. He was formerly with *Coal Outlook* for 15 years as the publication's editor and contributing writer, and prior to that he was editor of *Coal & Synfuels Technology* and associate editor of *The Energy Report*. He has a bachelor's degree from Central Michigan University.

Barry can be reached at barryc@pennwell.com.

For information on how to subscribe to [GenerationHub](#) call 1.800.823.6277 or follow the link.

© 2013 PennWell Corporation. All rights reserved.
