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A Reliability Assessment of EPA's Proposed Transport Rule and Forthcoming Utility MACT – Executive Summary

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December 16, 2010

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Executive Summary

In this report, we:[1] (1) predict incremental coal plant retirements and pollution control retrofits resulting from US Environmental Protection Agency (EPA) proposed and forthcoming air regulations;[2] and (2) assess their impact on electric system reliability. The specific air regulations we considered in our analysis are the EPA's proposed Clean Air Transport Rule regulating SO_2/NO_x interstate pollution transport (Transport Rule) and forthcoming hazardous air pollutants regulations (utility MACT) described more fully in the Introduction section of this paper. Implementing these regulations will require some coal generators to install pollution control equipment in order to continue operations. However, given the recent discoveries of abundant, domestic natural gas supplies, a competing fuel for electric generation, as well as reduced electricity demand, coal plant owners may elect to retire some existing plants rather than investing the capital necessary to install pollution controls. Nonetheless, we conclude that electric system reliability can be maintained while the industry complies with EPA's air regulations.

The number of projected coal plant retirements nationwide is relatively small compared to historical US net additions of generation capacity, and the electric sector has demonstrated repeatedly the ability to expand the generation fleet at a rate well in excess of projected capacity needs. Although we predict that a handful of areas will have de minimis or modest shortfalls due to predicted retirements, adequate reserve margins can be maintained by better utilizing existing supply capacity, installing new generation, and increasing load management. Additionally, existing federal statutory, state regulatory, and regional transmission organization (RTO) market safeguards can be utilized to maintain a reliable electric system.

Some observers have expressed concern that accelerated coal unit retirements might adversely impact electric system reliability. To evaluate that concern, we:

1. Forecasted coal retirements in the US under an aggressive policy representation consistent with the Transport Rule and utility MACT (utility MACT/CAIR NO_x).[3]

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[1] This report was prepared by Charles River Associates (CRA) for Exelon Corporation.

[2] Notably, approximately 6 GW of retirements are already planned, driven by low power prices which are due to low natural gas prices and low electricity demand.

[3] EPA has indicated that the Transport Rule's NO_x cap will be tightened in the near future ("Transport Rule II"), so we modeled the Clean Air Interstate Rule (CAIR) NO_x policy instead of the current Transport Rule's NO_x policy because it is more stringent and likely a better representation of Transport Rule II.

2. Provided a reliability analysis for the Eastern Interconnection[4] based on expected load growth, likely new generation additions, and projected coal retirements at the RTO level,[5] North American Electric Reliability Corporation (NERC) regional level, and NERC subregional level.

3. Identified actions that can be taken to maintain system reliability.

Our conclusion that EPA air regulations can be implemented without adversely impacting electric system reliability comports with other industry reports that have been released in the past several months.[6] Most recently, NERC published its assessment of possible impacts of four EPA regulations, including the air regulations examined in this paper. NERC concluded that of the four regulations assessed, EPA's potential 316(b) water regulations would have the greatest impact on reliability, and further urged coordinating implementation of EPA's various regulations to mitigate reliability impacts.

When considering EPA's air regulations alone, NERC actually predicts fewer retirements than we do, even under its "strict case" scenario. Additionally, NERC, as well as the M.J. Bradley & Associates/Analysis Group report, identify a suite of industry tools, some of which are discussed in this paper, that can be utilized to mitigate any reliability impact of the EPA air regulations.[7]

Specifically, our analysis reaches the following conclusions:

- **Coal plant retirements will not adversely impact reliability**. The existing US coal fleet has about 314 GW of capacity, about 265 GW of which is located in the Eastern Interconnection. When considering both the currently planned 6 GW of retirements, plus those driven by an aggressive utility MACT/CAIR NO_x policy, we project a total of 35 GW of coal retirements in the Eastern Interconnection and 39 GW nationwide

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[4] See definition of Eastern Interconnection in the main body of the report. The US portion of the Eastern Interconnection contains about 73% of the electric generation capacity in the US.

[5] The RTOs in the Eastern Interconnection are: Independent System Operator (ISO) New England, the New York ISO, the PJM Interconnection, the Midwest ISO, and the Southwest Power Pool.

[6] M. J. Bradley & Associates/Analysis Group, "Ensuring a Clean, Modern Electric Generation Fleet while Maintaining Electric System Reliability," August 2010 (http://www.mjbradley.com/documents/MJBAandAnalysisGroupReliabilityReportAugust2010.pdf); North American Electric Reliability Corporation, "2010 Special Reliability Scenario Assessment: Resource Adequacy Impacts of Potential US Environmental Regulations," August 2010 (http://www.nerc.com/files/EPA_Scenario_Final_20101026.pdf); and ICF International, "EEI Preliminary Reference Case and Scenario Results," May 21, 2010.

[7] NERC 2010 Special Reliability Scenario Assessment Report, p. 40 and M. J. Bradley/Analysis Group Report, pp. 22-23.

by 2015. To put that in perspective, the 35 GW represents less than 5% of the Eastern Interconnection's more than 730 GW of total capacity.

- These projected retirements are relatively small in comparison to historical US net additions of generation capacity. For example, during the five-year period between 1999 and 2004, the net increase in US generating capacity was 177 GW, more than four times what is projected to retire in the US by 2015.

- Notably, the average age of the projected retiring units in the Eastern Interconnection is 55 years.[8] Many of these older units are already nearing the end of their design life expectancy.

- **After projected coal retirements, all five eastern RTOs have sufficient capacity to maintain reliability without any new resources beyond those that are already under construction.** Even excluding planned new generation in the permitting and site preparation stage, and after accounting for coal retirements resulting from the aggressive utility MACT/CAIR NO_x policy, all of the eastern RTOs have more than sufficient total resources to meet overall RTO reserve margin requirements in 2015. Although we project a few localized resource needs within the RTOs, these can be addressed through existing capacity markets and other tools discussed in this paper.

- **Modest capacity needs projected in the NERC regions and subregions can be easily met**. At the NERC regional level our analysis shows the utility MACT/CAIR NO_x policy drives only de minimis capacity shortfalls in two regions and a modest shortfall in another. At the NERC subregional level, one larger – but still manageable – shortfall is expected.[9] Two other subregional shortfalls are de minimis and modest. We believe that all of these shortfalls can be met with existing industry tools, such as:

  - **New Gas Generation Construction** – Our economic modeling shows that when new capacity is required, gas-fired generation is often the most economic alternative. In fact, the existence of abundant, inexpensive domestic natural gas resources not only is a driver of retirements but also will facilitate the transition to a cleaner generation fleet. History has shown that new gas units can be planned, permitted, and constructed in short periods of time. For example, in the Virginia-Carolina NERC subregion (VACAR), which our analysis indicates has the greatest need, almost 12 GW of gas-fired capacity

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[8] CRA calculated the capacity-weighted average age of the coal units that retire by 2015 in the Eastern Interconnection in its simulation of the utility MACT/CAIR NO_x policy. The result of the calculation was 55 years.

[9] This larger projected subregional shortfall would mostly exist in the absence of the forthcoming air pollution regulations assessed in this paper.

came online between 2000 and 2004, which is significantly more than its projected capacity shortfall of 6.3 GW.

- **Load Management** – Load management tools, such as demand response and energy efficiency programs, are growing rapidly and have the capability to offset some of the projected coal retirements. Some of the NERC subregions with larger capacity shortfalls also have the greatest untapped potential for substantially increasing load management resources. For example, in the VACAR region, load management accounts for 3.4% of resources at peak, while in the New England region, load management accounts for close to 10% of peak resources.

- **Coal to Gas Conversion -** Depending on the local availability of natural gas, existing coal units can be converted to natural gas for a relatively modest cost.[10] For example, in the Southeast Reliability Corporation (SERC) region, which has a de minimis projected capacity shortfall of 0.6 GW, about 11 GW of coal plants already have natural gas pipeline service and have natural gas as a secondary fuel option.

- **Alternative Technologies and Tools** - Application of alternative and lower cost pollution control technologies and other regulatory tools could realistically result in even less coal plant retirements than we predict by 2015.[11]

- **Additional regulatory safeguards exist to protect reliability.** To address any remaining reliability concerns, the EPA Administrator, the Secretary of Energy, and the President each have authority under the Clean Air Act to extend compliance by one to two years under specific circumstances. For example, in August 2005, to protect reliability, the Secretary of Energy used his authority to prohibit Mirant from retiring its Potomac River plant. Mirant subsequently retrofitted the Potomac River plant, which is still in service today.[12] Additionally, RTOs have market rules and

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[10] In its December 20, 2000 regulatory finding, EPA decided that natural gas-fired electric steam generation units are not subject to HAPs regulation (65 FR 79826). This finding did not apply to combustion turbines.

[11] The Institute of Clean Air Companies (ICAC) stated in recently filed comments, "ICAC would like to emphasize that the competition in the [air pollution control] industry in the last decade has matured and diversified the industry and has led to the development of many emission reduction technologies that are not as capital-intensive as the 'big-ticket' items of SCR, FGD, and baghouses. However, these less capital-intensive technologies can obtain significant reductions that, depending on the regulatory requirements, may allow a much more economical approach in the short-term." ICAC comments in *National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers (ICI) and Process Heaters;* 75 FR 32006-32073 (June 4, 2010), filed on August 23, 2010, p. 2.

[12] In 2005, Mirant Corporation ceased operations at its Potomac River Generating Station in Alexandria, Virginia, after learning the plant's operations were causing exceedances of the National Ambient Air Quality Standards (NAAQS). In response, the Secretary of Energy responded to a petition and issued an

procedures under the Federal Energy Regulatory Commission's (FERC) jurisdiction that will serve to mitigate reliability impacts, as do state regulatory commissions in traditional cost-of-service states. Current EPA, Department of Energy (DOE), and FERC coordination should also considerably mitigate any reliability concerns.[13]

In summary, modeling an aggressive policy implementation of EPA's proposed and forthcoming air regulations, we demonstrate, consistent with other industry reports, that with prompt action and industry coordination, electric system reliability can be maintained. Of the areas we analyzed - 5 RTOs, 6 NERC Regions, and 7 NERC subregions - we project that after predicted coal retirements, most still have capacity surpluses. At the NERC regional level, we predict that two regions will have de minimis shortfalls (relative to resource adequacy requirements) and another region will have a modest shortfall. At the NERC subregional level, there are three subregions that emerge as having shortfalls – one is de minimis, one is modest, and the other is larger, but still manageable. Notably, the larger shortfall would exist even in the absence of the forthcoming EPA regulations and planning processes, new gas-fired plants, and incremental load management can easily address this shortfall.

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emergency order under Federal Power Act section 202(c) directing Mirant to operate the coal-fired plant only under certain, limited circumstances tailored to relieve the reliability risk while also mitigating the air quality issues.

[13]An interagency task force among FERC, EPA, and the White House Council on Environmental Quality already exists and has been meeting for months to consider and model solutions to address the impact of the various EPA regulations. In an October 26 *Electric Light & Power* article, FERC Chairman Jon Wellinghoff responded to the NERC 2010 Special Reliability Scenario Assessment Report by saying, "We are aware of the potential problems, and we are working in an interagency way to solve them….it doesn't raise any concerns that I wasn't already aware were there." http://www.elp.com/index/from-the-wires/wire_news_display/1290063498.html