



U.S. DEPARTMENT OF ENERGY

Resource Adequacy Implications of Forthcoming EPA Air Quality Regulations

December 2011

Executive Summary



U.S. DEPARTMENT OF
ENERGY

Executive Summary

This report presents the results of an independent assessment by the U.S. Department of Energy (DOE) of the adequacy of U.S. electric generation resources under air pollution regulations being finalized by the U.S. Environmental Protection Agency (EPA). This report does not estimate the economic impacts of EPA regulations, nor does it provide detailed reliability assessments that planning authorities and other stakeholders will need to conduct to ensure deliverability of power and grid reliability during implementation of EPA rules.

This report considers two EPA regulations, the Cross-State Air Pollution Rule (CSAPR) and the Mercury and Air Toxics Standards (MATS), that are widely expected to have the greatest impact on the electric sector between now and 2015.¹ CSAPR creates multiple trading systems to control the emissions of NO_x and SO₂ from electric generators, and MATS imposes emissions rate standards on coal and oil-fired electric generators for mercury, acid gases and particulate matter. The trading systems for CSAPR begin in 2012, with the limits tightening for sources in some states in 2014. The first year of compliance for MATS is 2015, subject to potential extensions discussed in this report.

In some cases, compliance with the new rules, particularly CSAPR, may be achieved through the use of existing controls, shifts in dispatch, purchase of allowances and fuel switching. In other cases, compliance with new rules will require installation of new pollution controls and may motivate the construction of replacement generation, which can sometimes take multiple years to complete. Assuming prompt action by regulators and generators, the timelines associated with new construction and retrofit installations are generally comparable to EPA's regulatory compliance timelines. If delays occur and if it is necessary to address localized reliability concerns, the Clean Air Act provides multiple mechanisms to extend these deadlines or bring sources into compliance over time on a plant-specific basis.

This report examines a Stringent Test Case, where, in addition to CSAPR requirements, each uncontrolled electric generator is required to install both a wet flue gas desulfurization (FGD) system and a fabric filter to reduce air toxics emissions. If such installations are not economically justified, this scenario assumes that the plant must retire by 2015. In reality, power plant owners will have multiple other technology options to comply with the regulations—options that typically cost less than installations of FGDs and fabric filters. *Therefore, this scenario should not be viewed as an estimate of the expected impacts of CSAPR and MATS, but rather as a stress test used to bound resource adequacy implications of these rules under conservative assumptions.* Specifically, this report focuses on whether, under the Stringent Test Case, there would be sufficient generation

¹ Two other regulations, the Coal Combustion Residuals Rule and the 316(b) Cooling Water Intake Structures Rule, have been proposed, and the final rules may differ significantly from the proposed rules. New Source Performance Standards for greenhouse gases have not yet been proposed.

capacity to meet electricity demand in each NERC region, before constraints on deliverability are considered.² This is known as *resource adequacy*, and it is one determinant of grid reliability.

In the Stringent Test Case, a total of 29 GW of coal capacity would be retired by 2015 (21 GW over the Reference Case). DOE examined resource adequacy in this case compared to the planning reserve margins for each region. The analysis finds that target reserve margins can be met in all regions, even under these stringent assumptions. Moreover, in every region but one, the Texas Reliability Entity (TRE), no additional new capacity is needed to ensure resource adequacy in the Stringent Test Case beyond what is projected in the Reference Case. In TRE, the analysis finds that less than 1 GW of new natural gas capacity would be needed by 2015 beyond the additions already projected to occur in the Reference Case. This analysis also finds that the total amount of new capacity that would be added by 2015 is less than the amount that is already under development, only some of which is reflected in the Reference Case.

DOE's analysis also considered impacts on available generation capacity of plant outages due to pollution control retrofit activity. Once construction of a new pollution control system is completed, a plant will pause operations for a short period as the system is connected or "tied-in" to the plant. For fabric filters, this has typically been accomplished during planned outages for routine maintenance that often last about one month. The tie-in period for FGDs may extend for a few weeks beyond this typical period for maintenance outages. These planned outages are generally scheduled for the fall and spring seasons when electricity demand is well below peak. In the Stringent Test Case, taking into account projected capacity additions, DOE found that resources would be sufficient in all regions even when outages to tie-in pollution control retrofits were incorporated.

While the Stringent Test Case examined by DOE indicates that resource adequacy would not be compromised under CSAPR and MATS, retirements of power plants or other factors could lead to grid reliability challenges in some cases. Federal and state governments can use available regulatory and planning tools to address such reliability concerns as needed on a case-by-case basis. DOE is committed to providing technical assistance and working with stakeholders to ensure that the electric grid remains reliable as we strive to modernize the power sector.

In summary, this report concludes:

- Assuming prompt action by regulators and generators, the timelines associated with the construction of new generation capacity and installation of pollution control retrofits would generally be comparable to EPA's regulatory compliance timelines.

² NERC is the North American Electric Reliability Corporation. See Appendix A of this report for a map of NERC regions. See Section 1.1 in the Introduction of this report for limitations of this analysis and restrictions on its interpretation.

- A Stringent Test Case more conservative than the anticipated implementation of CSAPR and the proposed MATS rule showed the overall supply-demand balance for electric power in each region examined would be adequate; however, further iterative analysis will be warranted to assess local reliability considerations as the rules are implemented.
- Mechanisms exist to address such reliability concerns or other extenuating circumstances on a plant-specific or more local basis, and the Department of Energy is willing to provide technical assistance throughout this process.



U.S. DEPARTMENT OF
ENERGY

December 2011

Printed with a renewable-source ink on paper containing at least 50%
wastepaper, including 10% post-consumer waste.