PJM's Clean Power Plan Preliminary Analysis

Introduction

The Organization of PJM States, Inc., which represents state utility regulators in the PJM Interconnection footprint, requested PJM analyze some of the potential economic impacts of the U.S. Environmental Protection Agency's proposed Clean Power Plan to reduce carbon dioxide emissions from existing fossil fuel-fired power plants ("the carbon rule") under Section 111(d) of the Clean Air Act.

PJM is an independent source of expert information. It does not advocate particular energy or environmental policies and is not forecasting market outcomes. The purpose of this preliminary analysis is to provide information regarding the potential effects of the proposed carbon rule on PJM's energy market under specific sets of assumptions, including potential changes in the generation mix and levels of energy efficiency. Different assumptions will result in different market effects related to the carbon rule. The states can use the preliminary analysis to ascertain how various carbon reduction techniques interplay with one another, achieving different emission level reductions and resulting in different costs.

EPA's Proposed Rule

The EPA's proposed rule sets a carbon dioxide emission rate target for each state (in pounds per megawatt-hour) for electricity from existing fossil fuel-fired generators, defined as fossil fuel generators in service or under construction as of January 8, 2014. Power produced by renewable energy resources and energy efficiency would count toward a reduction in a state's emission rate. States may elect to convert their emission rate targets to a mass-based target, expressed as a limit on total tons of CO_2 that can be emitted per year. Interim goals begin in 2020, and states would be allowed to average emissions during a "glide path" to full compliance, required by 2030.

Each state has flexibility in how to meet its specific emission rate target calculated by EPA. Choices include retiring or restricting operation of existing fossil fuel generators, adding zero or lower carbon-emitting generation, or reducing carbon emissions from existing fossil fuel resources through switching fuel from coal or oil to natural gas. States also could achieve compliance by adding renewable energy resources, such as wind and solar, or energy efficiency to reduce demand growth. Finally, states can effectively take credit for reductions in the emission rate, or total tons of emissions which will occur anyway due to coal plants retirements as a result of economics or other clean air regulations between 2012 and 2020. States may also elect, but are not required to include new fossil fuel generation resources regulated under Section 111(b) New Source Performance Standards of the Clean Air Act to the extent such sources may assist in meeting emission rate targets or total mass-based reduction targets required by EPA.

PJM Analysis Methodology

PJM performed analyses using both a regional approach to compliance and a state-by-state approach to compliance for both a mass-based approach limiting total tons of CO_2 and achieving emission rate targets. The regional approach combines the mass-based reduction or emission rate targets for states within PJM into a single, regional goal. The modeling assumes PJM would operate the system dispatching the least-cost mix of resources to meet the PJM load requirement while satisfying the regional emissions target and ensuring reliability. Such a modeling methodology results in a price on CO_2 emissions that applies across the entire footprint. The state-by-state approach also assumes PJM operates the system dispatching the least-cost mix of resources to meet the PJM load requirement, requiring each state to meet its individual mass-based reduction target and resulting in state-specific CO_2 prices. Relative to the regional approach to compliance, enforcing each individual state reduction target affects

the mix of resources that is relied upon to reliably meet the PJM load requirement and the cost of the regional dispatch. PJM plans to perform the state-by-state analysis using emission rate targets in the near future.

Additionally, PJM is performing a reliability analysis to complement the analysis of market impacts, which should be available by early December.

PJM modeled 15 scenarios – eight proposed by OPSI and seven by PJM – that considered differing levels of new generation, energy efficiency, potential coal and nuclear retirements and natural gas prices to test the effects of the proposed carbon rule on PJM's energy market.

For each of the 15 regional scenarios PJM modeled two different mass-based target conversions from the emission rate targets proposed on June 2, 2014. The first was based on a straight conversion account for all energy efficiency and all generation regardless of the type based on the emission rate formula published by EPA on June 2. The second was based on the rate to mass conversion guidance issued by EPA on November 6. Regional compliance solutions were obtained for each of the 15 scenarios for each mass-based target for the years 2020, 2025, and 2029.

PJM chose three of the scenarios to obtain state-by-state compliance solutions for 2020 to provide a comparison to the regional mass-based compliance solutions for the same year, and two scenarios to obtain regional emission-rate target compliance solutions.

PJM first ran the model to determine whether the assumptions in the scenario would result in exceeding the PJM-calculated regional emissions target. If that target was exceeded, then PJM determined a CO_2 emissions price (to be applied regionally or on a state-by-state basis depending on the scenario) to each fossil fuel-fired generator to cause lower-emitting or emission-free generation to replace the higher-emitting generation to achieve the regional or state-by-state target, i.e., as higher-cost generation, it would become less economical to run, would operate less and emit less.

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