Ensuring Electric Grid Reliability Under the Clean Power Plan

ADRESSING KEY THEMES FROM THE FERC TECHNICAL CONFERENCES

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Overview and Background

On June 2, 2014, the U.S. Environmental Protection Agency ("EPA") released its proposal to establish standards for carbon dioxide ("CO_2") emissions from existing power plants. The Clean Power Plan ("CPP"), as it is commonly known, proposes enforceable state-by-state CO_2 performance goals, expressed in pounds of CO_2 per megawatt hour ("lb/MWh") and developed through EPA's determination of the Best System of Emissions Reduction ("BSER"). These performance goals are phased in over the course of a decade – states must reach final targets by 2030 and an interim, average target over the period of 2020-2029.

To implement the rule, each state is required to develop, adopt, and submit a state plan (or sign on to a multi-state plan) designed to achieve the state-specific level of emission performance based on BSER for the state(s). States have significant flexibility to adopt a range of measures that may extend beyond those used to set BSER. EPA intends to release a final rule in the summer of 2015. State plans are due in 2016, although states may request a one or two year extension, for single and multi-state plans, respectively.

The Federal Energy Regulatory Commission ("FERC", or the "Commission") held a series of technical conferences in February and March, 2015, to discuss potential implications of the Clean Power Plan ("FERC CPP Technical Conferences"). Starting with the national kick-off conference held in Washington, D.C., and then with western, eastern, and central regional conferences held in Denver, Washington, D.C., and St.

Louis, respectively, these conferences focused on issues related to the intersection of the CPP and electric system reliability, wholesale electric markets and operations, and energy infrastructure. At each conference, FERC Commissioners and staff facilitated a conversation among panelists divided into three groups: (1) electric reliability considerations, (2) identifying and addressing potential infrastructure needs, and (3) implications for Commission-jurisdictional markets. Panelists were encouraged to address specific questions in their spoken comments as well as prepared statements. (See Appendix A for a list of FERC's questions).

We, like many others, closely followed the FERC CPP Technical Conferences, and two of us (Sue Tierney and Brian Parsons) participated in them.[1] We were encouraged by the serious consideration given to this matter by FERC, EPA, the Department of Energy ("DOE"), and the wide range of panelists representing electric and gas utilities, non-utility power plant owners, infrastructure and power generation developers, grid operators and managers, environmental non-profits, state policymakers, and others. Though stakeholders raised a broad range of valid and interesting points, we focus here on four main areas of discussion that were prominent in each of the conferences:

- the ability of states to meet the interim period targets, which begin in 2020;
- market and planning mechanisms to develop new infrastructure;
- maintaining a robust system to maintain reliability, particularly during and after severe events; and
- the possible role for a reliability safety valve or reliability assurance mechanism.

Below we discuss in detail each of these themes, providing an overview of representative points made at the conferences and contributing additional context, background, and, in some cases, specific response points. Our intention is to synthesize the discussion and provide recommendations for how FERC and other policymakers can respond to these conferences and continue to strengthen the Clean Power Plan.

We urge FERC to use Commission-jurisdictional grid management tools to ensure protection of grid reliability and to support the successful implementation of the Clean Power Plan. In particular, we recommend the release of an order to help clarify the scope of and assumptions to be used in up-front and ongoing reliability assessments that will inform the design and eventual implementation of states' individual or joint plans. This will ensure that the Commission upholds the Federal Power Act by preserving system reliability and ensuring that rates charged by jurisdictional entities are just and reasonable; it will also provide useful guidance to states and market participants as they continue their steps to comply with and respond to the Clean Power Plan after it is finalized by EPA.

Reliability: Integral to the Proposed CPP

The electric power system in the U.S. is designed to maintain reliability even in the event of disruptive events, such as facility outages, fuel price volatility, unexpected increases in customer demand, and severe weather events. It is also designed to ensure reliability even in the midst of dynamic economic and regulatory market transitions, such as the current transition, driven by increasing access to low-cost, domestic production of natural gas and the increased penetration of

[1] Please see Appendix C for author qualifications and contact information. Our statements presented to the National and Western Conferences are also attached to this letter.

renewables. System planners conduct long-term resource adequacy studies to ensure that there are sufficient resources available to satisfy the demand for electricity on peak demand days. The resources evaluated include: generating facilities; transmission facilities; interconnections with neighboring power systems; and demand side resources which the grid operator can dispatch or otherwise count on to balance the system's supply and demand.

Most regions observe the "one day in ten year" loss-of-load expectation ("LOLE") standard, where the objective is to experience no more than 24 hours of transmission-/generation-level involuntary service interruption (e.g., blackout) every ten years. To meet the resource adequacy standard, planners for each electrical region use probability models to determine the amount of resources needed to meet end-use demand for electric power. To assess whether additional resources are needed to meet the LOLE standard, these studies review: scheduled and unplanned/forced outage rates; availability of capacity on transmission connections to neighboring systems; on-call demand-reduction resources; weather-driven resource delivery patterns; and higher-than-expected peak-load use. The system is designed to maintain reliable, dependable service through both typical, steady-state conditions and uncommon disturbance events like loss or tripping of large transmission lines or generators. This design, including infrastructure development, market rules, planning procedures, and operations, will enable the electric system to adapt to the Clean Power Plan.

Throughout the FERC CPP Technical Conferences, some participants questioned whether, in light of CPP-driven changes in the resource mix, the grid could continue to perform, especially through high energy demand periods or during unexpected events. These participants generally cited three main factors for these concerns: (1) closure of coal-fired power plants that provide energy, capacity, and essential reliability services such as reactive power, inertia, and voltage control;[2] (2) inadequate infrastructure to support increased demand for natural gas for power generation in various parts of the country, and/or inadequate natural gas supplies;[3,4] and (3) higher reliance on renewable and demand-side resources.[5]

The evidence does not support the argument that the proposed CPP will result in a general and unavoidable decline in reliability. While we do expect significant changes to the overall mix of resources under the CPP, we believe resource planners and markets will have sufficient time and resources to respond to a realistic projection of system redispatch and facility retirements. Both FERC-jurisdictional electricity markets and state-regulated resource planning processes have provided and will continue to provide timely planning, operational, and financial signals for new resources that can help maintain reliability. With clear and transparent signals, market participants can respond in different time frames and investment cycles for different types of resources, including but not limited to new gas resources, end-use energy efficiency measures and

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2 *See* Prepared Statement of Gerry Anderson, Chairman and CEO, DTE Energy, on behalf of the Edison Electric Institute, February 19 2015, FERC Docket No AD15-4 ("EEI Statement") at p. 8. Available at http://www.ferc.gov/CalendarFiles/20150218113729-Anderson,%20EEI.pdf.

3 *See* Prepared Statement of Susan N. Kelly, President & CEO, American Public Power Association, February 192015, FERC Docket No AD15-4 ("APPA Statement") at p. 2. Available at http://www.ferc.gov/CalendarFiles/20150213081402-Kelly,%20APPA.pdf.

4 *See id.*at p. 7.

5 *See* Prepared Statement of Gerry Cauley, President and CEO North American Electric Reliability Corporation, FERC Docket No AD15-4 ("NERC Statement") at p. 3. Available at http://www.ferc.gov/CalendarFiles/20150213081309-Cauley,%20NERC.pdf.

demand response, renewables, electric transmission, and natural gas pipeline infrastructure. We note that several market participants filed comments with EPA indicating their readiness to step up with solutions to these challenges.[6]

We believe that these planning processes and market mechanisms – combined with the flexibility of the CPP and the ability to maintain individual plants for local reliability needs – will help maintain reliability, even through peak events. As explained in detail here in this paper and in a wide array of comments,[7,8] FERC's electric transmission policies such as incentive and formula rates, open access, and encouragement of regional transmission organizations ("RTOs") have had a tremendous impact on reinforcing the nation's electric transmission infrastructure. We also see encouraging trends in markets and system planning to optimize gas-electric market efficiencies and develop natural gas infrastructure, transmission infrastructure, and generation resources to help incorporate variable sources of generation. RTOs and independent system operators ("ISOs") have a proven history of responding to both market- and policy-driven changes through timely revisions to market rules and system operations, successfully maintaining reliability and a stable market.

Importantly, the proposed CPP includes significant compliance flexibility that can accommodate regional differences in the structure of the electric industry, the mix of generating resources, levels of reserves, and other circumstances that influence overall grid reliability, especially in times of system constraint. First and foremost, EPA proposes to establish state-specific interim and final goals reflecting differences in each state's current mix of resources used to generate electricity, coupled with each state's potential to increase the use of lower-carbon and zero-carbon resources.[9] In addition, if a state has concerns about the reliability implications of potential temporary or permanent outages of specific units (identified potentially through modeling, testing, or experience), the state can take that into account as it designs its state plan. For example, if a state wanted to allow continued operation of specific electric generating units, the state could make deeper reductions at other units, or it could institute "outside-the-fence" options such as renewable or energy efficiency development.

States may also enter into emissions crediting/trading within their state borders or in partnership with all or portions of other states. There is already considerable dialogue regarding regional CPP compliance approaches within various RTOs and other regional grids, including the PJM Interconnection ("PJM"), Independent System Operator New England ("ISO-NE"), Midcontinent

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6 *See* Tierney *et al.,* "Electric System Reliability and EPA's Clean Power Plan: Tools and Practices," February 19 2015 ("Tierney et al. February 2015") at p. 27. Available at http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Electric_System_Reliability_and_EPAs_Clean_Power_Plan.pdf. The authors provide several examples, including the Interstate Natural Gas Association of America ("INGAA"), merchant developers such as Calpine, renewable energy organizations, such as the Clean Energy Group, and State energy and regulatory commissions, including both the National Association of State Energy Offices ("NASEO") and the National Association of Regulatory Utility Commissioners ("NARUC").

7 *See, e.g.,* Prepared Statement of Michael Kormos, Executive Vice President – Operations, PJM Interconnection, February 19 2015, FERC Docket No AD15-4 ("PJM Statement"). Available at http://www.ferc.gov/CalendarFiles/20150218113729-Kormos%20EPSA.pdf.

8 *See, e.g.,* Prepared Statement of James Hoecker, Husch Blackwell LLP, Counsel to WIRES), February 19 2015, FERC Docket No. AD15-4 ("WIRES Statement"). Available at http://www.ferc.gov/CalendarFiles/20150219125246-Hoecker,%20WIRES,%20comments%20with%20EPA%20filing.pdf.

9 *See* Prepared Statement of Janet McCabe, Acting Assistant Administrator, Office of Air and Radiation, U.S. Environmental Protection Agency, February 19 2015, FERC Docket No AD15-4 ("McCabe Statement") at p. 2. Available at http://www.ferc.gov/CalendarFiles/20150226154438-McCabeComments.pdf.

Independent System Operator ("MISO"), Southwest Power Pool ("SPP"), and Western Electricity Coordinating Council ("WECC") reliability assessment regions.[10] Additionally, numerous third-party organizations across the country have already begun developing toolkits and processes to help states develop CPP state plans that facilitate intrastate and interstate trading.[11] Though many participants from the FERC CPP Technical Conferences agree that a multi-state, mass-based trading system would optimize flexibility under the rule, states choosing to establish rate-based programs may also be able to take advantage of crediting and trading. Regardless, it is clear that the inherent flexibility in the CPP will allow individual states and regions to draw on the strengths of their systems to address potential reliability issues.

In the end, states that avail themselves of the CPP's flexibility as they design their plans will play a significant role in ensuring system reliability and lowest-cost compliance as their electric systems evolve over time. States play this import role today, and the CPP's flexibility invites them – in fact, depends upon them – to continue to design approaches that accommodate differences in electric structure, resource mix, investment patterns, and other system elements. Conversely, states that do not take advantage of the flexibility in the CPP proposal and then suggest that the federal regulations led to unreliable and uneconomic outcomes may be courting a self-fulfilling prophecy. The more states sit in the driver seat and figure out how to arrive at the emissions-reduction destination in a manner consistent with their goals and preferences, the more likely it is that they'll accomplish them.

Meeting Interim Targets: Gradual Retirements Can Ease Compliance

One of the most common themes running through the FERC CPP Technical Conferences was the concern over the CPP's proposed interim targets. Some states, panelists claimed, "essentially don't have a glide path [to reach the final 2030 targets], we have a cliff."[12] This "cliff," panelists argued, would precipitate serious compliance actions, such as retiring large portions of states' coal fleets, all in advance of the start of the interim compliance period in 2020. This, in turn, would cause "dramatic and long lasting reliability impacts."[13] Furthermore, panelists argued that there was no time to plan for such retirements: compliance must begin as soon as the start of the interim period

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10 *See, e.g.,* http://www.rtoinsider.com/epa-ferc-clean-power-plan-miso-spp-14140/.

11 The Eastern Regional FERC CPP Technical Conference included discussion on tools in development by both the Nicholas Institute for Environmental Policy Solutions and the Eastern Interconnection States' Planning Council. *See, e.g.,* http://nicholasinstitute.duke.edu/climate/publications/enhancing-compliance-flexibility-under-clean-power-plan-common-elements-approach. Similarly, the Western Interstate Energy Board has contracted with Cadmus to explore multi-state compliance options, with a report expected this month. *See* http://www.cadmusgroup.com/news/cadmus-wins-contract-support-western-interstate-energy-board-111d-compliance/.

12 Western Regional FERC Technical Conference (Denver, CO), Docket No AD15-4, Feb 25 2015, Transcript ("Western FERC CPP Technical Conference Transcript"), Hummel at p. 52. Available at http://www.ferc.gov/CalendarFiles/20150318075034-AD15-4-02-25-15.pdf.

13 Prepared Statement of Jeff Burleson, Vice President, System Planning, Southern Company, March 11 2015, FERC Docket No AD15-4 ("Southern Company Statement") at pp. 4, 8. Available at http://www.ferc.gov/CalendarFiles/20150309110946-Burleson,%20Southern.pdf.

in 2020, they claim, but before any compliance action can begin, the state planning process must be complete (and a state plan approved by EPA).[14,15]

We do not agree with the forecast of a "cliff" of retirements starting in 2020. As noted above, we believe that the proposed flexibility in the CPP's design will allow states to avoid the retirement of selected plants, especially on a short-term basis, in order to address reliability concerns. Flexibility exists over time (allowing for averaging within the hours of a single year and across the hours of the ten years of the interim period) and over space (with trading of emission reduction across generating units at a single station, across generating units within a state, across generating units in multiple states, and among units and demand-control measures that lower overall emissions from the system). Indeed, many of the above investments and planning procedures needed for new infrastructure can begin immediately and operate in parallel. There is no reason why the market will wait until 2020 to take advantage of these opportunities. This flexibility allows grid operators to manage retirements as they have in the past to ensure ongoing reliability. Because the proposed interim compliance goals are assessed on an average basis over the ten-year interim period, it would not be necessary to immediately cease operation, or retire, any individual facility that emits at a level exceeding the interim state target.

For a variety of reasons, states, affected generating units and grid operators that end up with individual plants or even a system of plants "over-emitting" in particular hours or during the early years of the interim period, for example, may need to "under-emit" in the latter periods, with mechanisms that indicate forward progress toward the final target and average compliance satisfying interim requirements before then. All through the interim period, and even at the end, sources may emit above the state target rate as long as this "over-emitting" has been offset by efficiency, zero emitting resources such as renewables or nuclear, or even gas-fired power plants.[16] In theory, as long as states' plans properly accommodate this interstate balancing, there is no reason why an over-emitting plant in one region could not procure emission reduction credits in a non-contiguous state, thus accommodating both economically efficient and reliable compliance outcomes.

Furthermore, while some of the units in question may be uneconomic for providing year-round baseload energy under the CPP, past precedent has shown that grid operators have tools available to maintain certain capacity for resource adequacy reasons on an interim basis and operate them only on an as-needed basis for reliability purposes until sufficient resources are added.[17] Additionally, in many places, states may prepare plans that allow for power plants with unamortized investment in regulated utility rate bases[18] to continue in operation, as long as their emissions are offset somewhere else in the system.

14 *See* FERC Technical Conference (Washington D.C.), Docket No AD15-4, Feb 19 2015, Transcript ("National FERC CPP Technical Conference Transcript"), Anderson pp. 69:20-72:5. Available at http://www.ferc.gov/CalendarFiles/20150313072603-AD15-4-02-19-15.pdf.

15 *See* Western FERC CPP Technical Conference Transcript, Fowke at p. 73:18-22.

16 States and grid operators may even want to build in emission-reduction 'reserve' mechanisms in their plans so that any near-term over-emissions and unexpected late-period over-emissions still allow for compliance meeting the 10-year average targets.

17 For a broad discussion of these tools, including "reliability must run" contracts, *see* Tierney *et al.,* Feb 2015, at p. ES-3.

18 We use "regulated utility rate bases" to include plants owned by state-regulated and vertically integrated investor-owned utilities as well as plant owned by municipal electric utilities and cooperatives, some of whose rates are regulated by state utility commissions and others of which have rates established by elected boards.

In its February 2015 Study, The Brattle Group provided an assessment showing that a decrease in total output from or dispatch of coal units, which is expected as their marginal costs of production increase with the imposition of a carbon constraint, does not necessarily result in the retirement of all constrained coal plants. As they explained, decisions on "whether to retire coal-fired capacity do not depend solely on the hours of operation for each plant and the revenues received from generating energy; rather, retirement decisions depend on whether there are sufficient total revenues for a plant to remain profitable."[19] Similarly, PJM argued in a recent analysis that the "ordering in which new entry and retirements occur is a dynamic process whereby capacity that retires or newly enters, changes the market dynamics in future years for capacity that remains in service. These dynamics may lead some capacity resources, considered to be at risk, to remain in commercial operation while their economic prospects improve."[20]

Thus, should a facility be required to serve capacity needs (for example, to meet local or system reserve margins), we would expect this to be taken into account in designing market requirements or regional integrated resource plans. Brattle further noted that this has happened historically, with older plants maintaining operations for capacity purposes in spite of limited operation: in both New York and California, there were over 10 and 15 gigawatts of capacity with capacity factors of 8 and 12 percent, respectively.[21] Overall, the Brattle authors find that "the lowest cost coal units are likely to remain valuable capacity resources even if energy margins significantly decline, while higher cost plants remain viable only if energy margins are able to keep the plants profitable or capacity prices rise."[22]

Fossil unit retirements will likely occur gradually in response to declining CO_2 limits that incrementally create less favorable market conditions for higher-emitting resources facing increasing environmental costs.[23] The phase-in of compliance-triggered retirements, though steeper for some states, will allow for ongoing modeling and testing of a less carbon-intensive system. For example, states can immediately begin to examine down-dispatch and seasonal/low stress time decommitment of high-emitting plants that might eventually retire due to many factors including the CPP. This would both reduce total output from these facilities, which reduces emissions and can contribute to meeting interim targets, and allow for examination and adaptation of both operational and disturbance responses on a system that no longer includes higher-emitting facilities. The experience from this testing can then further help inform planning for scale and location of retirements (or market policies that can properly incentivize them) coupled with new generation, transmission, demand-side resources, and other operations and practices if necessary to replace reliability-critical units.

Additionally, most regions still maintain meaningful amounts of excess capacity,[24] which means that facility retirements may not automatically require the addition of new capacity in order to maintain

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19 Weiss *et al.,* The Brattle Group, "EPA's Clean Power Plan and Reliability: Assessing NERC's Initial Reliability Review," February 2015, at p. 29. Available at http://info.aee.net/brattle-reliability-report.

20 *See* PJM Interconnection Inc., "PJM Interconnection Economic Analysis of the EPA Clean Power Plan Proposal," March 2 2015 ("PJM March 2015"), at p. 96. Available at http://www.pjm.com/~/media/4CDA71CBEC864593BC11E7F81241E019.ashx.

21 *See* Weiss *et al.,* at p. 29.

22 *Id.,* at p. 30.

23 *See* PJM March 2015 at p. 97.

24 In its most recent assessment, NERC has identified only two of twenty reliability assessment planning regions that project prospective capacity levels (i.e., capacity that is highly probable to be available to serve load) below reference capacity margin levels. *See* North American Electric Reliability Council, "2014 Long-Term Reliability Assessment,"

reserve margins or serve demand reliably. Similarly, some areas with lower existing reserve margins have significantly under-utilized natural gas combined cycle capacity, which could be dispatched at a higher rate to either offset plant retirements in its own region or to "absorb some of the generation needed in [other] regions to comply with [the CPP]."[25]

Finally, states submitting single-state plans will have at least two and a half years before the interim compliance period begins to incorporate these strategies and market mechanisms and begin developing new supply- or demand-side capacity resources. Though some parties argue that these years will be lost in waiting for regulatory approval, we caution against assuming that action can only begin once EPA has finalized a state plan. As noted, the assumption that "policy makers, regulators, and market participants will stand on the sidelines until it is too late to act" has "no historical basis."[26] Indeed, as we show throughout this paper, market participants and regulators alike have proven a willingness to engage proactively to address projected reliability issues before they result in significant disruptions to service.

Notably, it is reasonable to assume that EPA will promptly approve state plans that provide for meeting their respective state targets. Further, states can gain access to the flexibility and cost-saving benefits of interstate credit or allowance trading without taking time to develop and submit regional plans, such as through the many regional coordination and "common elements" proposals we have already cited in this paper.[27] That approach will enable individual states to submit complete plans in the first time period (13 months under the proposal), after which they will have at least two and a half years before the interim compliance period even begins.

As elaborated throughout this section, we believe that states, utilities, and grid managers have a strong set of tools that can be used to protect electric system reliability even while complying with the CPP. This is the essential reason we dispute claims that the interim targets have been designed in a way that will unreasonably restrict this endeavor. However, we do recognize that some states are facing steeper interim reductions than others, both in terms of total reduction required and amount of reduction that must be achieved early in the program. EPA's senior officials have repeatedly made it clear that they have heard and are considering many suggestions for how to address this issue, such as changing the way the targets are calculated, how emissions reductions are distributed among states, or how the interim targets are applied.[28] This may squarely address commenters' concerns about a "cliff'," which has been tied in many of those comments to concerns that electric system reliability will be jeopardized and to rationales for why some sort of reliability safety valve (among other measures) should be incorporated into the final EPA rule. However, even without EPA addressing the glidepath issue, we disagree fundamentally with the conclusion that

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November 2014. Available at http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2014LTRA_ERATTA.pdf.

25 Tierney, Analysis Group, "Greenhouse Gas Emission Reductions From Existing Power Plants: Options to Ensure Electric System Reliability," May 2014, at p. 42. Available at http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Tierney_Report_Electric_Reliability_and_GHG_Emissions.pdf.

26 *See* Tierney *et al*., Analysis Group, "Electric System Reliability and EPA's Clean Power Plan: The Case of PJM," March 16 2015 ("Tierney *et al.,* March 2015"), at pp. 1-2. Available at http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Electric_System_Reliability_and_EPAs_Clean_Power_Plan_Case_of_PJM.pdf.

27 *See* Footnote 11.

28 *See, e.g.,* Testimony and Comments of Janet McCabe, Acting Assistant Administrator for Air and Radiation, U.S. EPA, before the House Energy and Commerce Committee, Subcommittee on Energy and Power, Hearing to Examine EPA's Proposed 111(d) Rule for Existing Power Plants and the proposed Ratepayer Protection Act, April 14 2015. Available at http://democrats.energycommerce.house.gov/index.php?q=hearing/hearing-on-epa-s-proposed-111d-rule-for-existing-power-plants-and-hr-ratepayer-protection-ac.

the CPP will compromise reliability due to its inherent flexibility, which we have described here. This flexibility should be the unpinning for confidence from FERC that the industry can adapt to the CPP's requirements in creative and successful ways that do not conflict with the agency's responsibilities under the Federal Power Act.

Markets and Planning: Developing New Infrastructure to Respond to Retirements

Though the CPP establishes a flexible transition to a lower-carbon energy system that allows for the temporary maintenance of many existing fossil plants, the proposed regulation would require that states ultimately develop new low-emitting resources to serve energy demand. Such changes in the composition of generation fleets would have to be matched by significant outlays in infrastructure, especially in new electric transmission to connect new electric generation and natural gas pipelines to serve an increased demand for new and existing natural gas-fired generation. Parties to the FERC CPP Technical Conferences expressed concern over the scope and scale of such investments, indicating that electric transmission expansion (assuming entirely new transmission lines) can take eight years or more,[29] and natural gas pipeline development would take at least five years (and sometimes up to fifteen, again assuming entirely new gas transmission facilities). They say this makes the existing compliance timelines partially or completely infeasible.[30,31,32,33] Panelists also wondered whether markets were sending appropriate signals for the development of new infrastructure, especially natural gas pipelines.[34]

We recognize that infrastructure requires multi-year periods for planning, processing, and construction, though we dispute the more exaggerated, decade-long development timelines indicated by some participants. We have noted previously the dynamic ability of system regulators to site and approve infrastructure projects on timelines much faster than those suggested earlier. For example, emergency 21-day, four-month, and six-month permitting and construction approvals were used to add thousands of megawatts of capacity during the California Energy Crisis in the early 2000s.[35] As noted above, many of these investments and planning procedures can begin immediately and operate in parallel. There is no reason why grid entities and market participants will wait until 2020 to take advantage of these opportunities. Importantly, and as explained in more detail below, we also believe that pipeline capacity and transmission line expansions that are already planned or in process, as supported by proactive policies and market structures, will be adequate for initial compliance with the CPP. Final stages of compliance are late enough to allow time to put not-yet identified infrastructure in place. Additionally, we note that many new resources that have not historically provided energy services (e.g., renewables) can further help ease the transition under the CPP as new infrastructure comes online.

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29 *See* Prepared Statement of Lanny Nickell, Vice President, Southwest Power Pool, Inc, March 11 2015, FERC Docket No AD15-4 ("SPP Statement") at p. 4. Available at http://www.ferc.gov/CalendarFiles/20150327134005-Nickell,%20SPP.pdf .

30 *See* Western FERC CPP Technical Conference Transcript, Burtenshaw at p. 111:16-23.

31 *See id.*, Fowke at pp. 56:20-57:5.

32 *See* National FERC CPP Technical Conference Transcript, McMahon at pp. 180:22-181:24.

33 *See* Prepared Statement of Jay Morrison, National Rural Electric Cooperative Association, February 18 2015, FERC Docket No AD15-4 "NRECA Statement") at p. 10. Available at http://www.ferc.gov/CalendarFiles/20150218154745-Morrison,%20NRECA.pdf.

34 *See* Prepared Statement of Asim Haque, Commissioner and Vice Chairman, Public Utilities Commission of Ohio, March 6 2015, FERC Docket No AD15-4 ("OPUC Statement") at pp. 20-21. Available at http://www.ferc.gov/CalendarFiles/20150309112528-Hawue,%20PUCO.pdf.

35 *See* Tierney et *al.*, February 2015, at p. 19.

Grid regions have implemented many successful market-based approaches to rapidly adapt to emerging reliability challenges resulting from the incorporation of new technologies, fuel mix trends, and other drivers, providing strong evidence that these regions can do the same in preparation for interim compliance with the CPP. Some of these new approaches might include investment responses from the market; others may come in the form of revising rules regarding grid operations and practices (or renegotiating existing power contracts) to accommodate the new types of resources entering the market.

For example, in 2014 the California ISO received approval to implement capacity requirements intended to ensure the availability of ramping-capable flexible resources sufficient to allow integration of high levels of wind and solar power into its balancing area.[36] FERC has also approved changes to ISO-NE's capacity market, coupled with a winter fuel assurance program, to improve reliability and resource adequacy in a very gas-dominant market, where it is projected that gas supply will be particularly tight, especially during cold weather.[37] As mentioned above, PJM has proposed similar structural changes to its capacity market in an effort to address its concerns about generator performance, fuel assurance, and related issues. MISO is also exploring additional strategies to align state resource planning decisions in its footprint with grid reliability requirements,[38] including its "Multi Value Project" program designed to "develop a comprehensive expansion plan that meets the reliability, policy, and economic needs of the system" that "delivers regional value while meeting near-term system needs;" the most recent review of this program shows that it has provided benefits in excess of costs.[39] Finally, we note that temporary, out-of-market options, such as Reliability Must Run ("RMR") contracts are also available in many regions in cases when local authorities are concerned that market forces will not provide strong enough signals to specific capacity-providers. Notably, these RMR contracts are limited in duration until an identified reliability solution can be implemented. In the case of PJM, we found that the vast majority of units that wished to deactivate were allowed to do so on time due to the effectiveness of the deactivation process and identified reliability upgrades.[40]

New natural gas infrastructure development is of particular interest to many participants in the FERC CPP Technical Conferences, as the three- or four-year timeline to expand delivery capability of an existing pipeline or to develop a new one is often viewed as out of alignment with the compliance timeline of the CPP. We agree that the CPP will almost certainly spur additional pipeline development; indeed, it appears already to be occurring in some regions such as the Midwest. However, as we have explained above, it is not necessary that all infrastructure be in place immediately upon the beginning of the interim compliance period.

Additionally, we agree with the DOE Gas Infrastructure Study that diverse sources of natural gas supply and demand, combined with a strong existing pipeline network that has been significantly

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36 *See* 149 FERC ¶ 61,042, "Order on Tariff Revisions", issued October 16 2014 in Docket No. ER14-2574. Available at http://www.caiso.com/Documents/Oct16_2014_OrderConditionallyAcceptingTariffRevisions-FRAC-MOO_ER14-2574.pdf.

37 *See* ISO-NE Forward Capacity Market Performance Incentives: http://www.iso-ne.com/committees/key-projects/fcm-performance-incentives.

38 *See* MISO Staff, "Issues Statement on Facilitating Resource Adequacy in the MISO Region," March 2015. Available at https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/SAWG/2015/20150305/20150305%20SAWG%20Item%2002%20Resource%20Adequacy%20Issues%20Statement.pdf.

39 *See* "MTEP14 MVP Triennial Review: A 2014 review of the public policy, economic, and qualitative benefits of the Multi-Value Project Portfolio," September 2014. Available at https://www.misoenergy.org/Library/Repository/Study/Candidate%20MVP%20Analysis/MTEP14%20MVP%20Triennial%20Review%20Report.pdf.

40 *See, e.g.*, Tierney *et al.,* March 2015.

expanded over the past decade, will result in reduced additional infrastructure needs in the coming fifteen years, even under the CPP.[41] The DOE Gas Infrastructure Study also maintains that increased natural gas interstate infrastructure needs between 2015 and 2030 will be primarily driven by already-planned coal-fired plant retirements, and that incremental infrastructure needs due to an (illustrative) carbon price increase only slightly compared to the base case. While this study may not capture all future required upgrades, it reflects a robust and experienced pipeline development industry and an active marketplace that is primed to respond to new market drivers such as the CPP. This strong foundation of interstate pipelines will also likely make incremental intrastate, regional, and local development less of a burden on regulators, utilities, and developers.

We also highlight other options to utilize existing infrastructure more efficiently in order to maintain reliability before new infrastructure can be developed. At the FERC CPP Technical Conferences, utility power managers and pipeline developers alike pointed to options in their "toolboxes" that address "performance shortfalls of infrastructure" and updating planning to more accurately address peak loads and areas of congestion.[42,43] Concerning electric transmission, efforts such as BGE's Electric Reliability Investment Initiative exemplify utility efforts to continuously improve the electric grid to improve reliability.[44] Finally, in considering natural gas infrastructure development, we anticipate that the way that natural gas infrastructure is developed will increasingly focus on firm requirements for power generators. Brattle highlights relatively low historical capacity factors and markets that emphasize short-term marginal costs as two factors that have kept natural gas-fired generation from securing long-term contracts for natural gas. Already, as these factors change, there are indications that generation is more likely to sign firm contracts which will in turn provide much stronger price signals for increased pipeline development that will improve reliability,[45] with some developers already displaying a "solid track record" of entering into these agreements.[46]

Lastly, markets and planning have recognized that sources of reliability services are already in transition. New gas-fired, renewable, energy storage, and demand response resources have the capability to provide essential reliability services historically provided by coal-fired and other existing conventional generating sources. Peer- and stakeholder-reviewed studies show that integration of higher penetrations of renewables can maintain or even increase both operational and disturbance response reliability performance,[47] and transmission areas across the country are already responding to higher levels of renewable penetration with no adverse impact on reliability. For example, panelists at the FERC CPP Technical Conferences noted the success of California's energy imbalance market, which Nevada is soon joining, in facilitating inter-regional transfers of renewables and successful incorporation of higher levels of variable resources into the system,[48] Colorado's significant proactive planning to reduce emissions levels and increase renewables

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41 *See* U.S. Department of Energy, "Natural Gas Infrastructure Implications of Increased Demand from the Electric Power Sector," February 2015 ("US DOE 2015"). Available at http://energy.gov/sites/prod/files/2015/02/f19/DOE%20Report%20Natural%20Gas%20Infrastructure%20V_02-02.pdf.

42 Western FERC CPP Technical Conference Transcript, Westhoff at p. 121:4-15.

43 *See id.*, Morter at p. 93:8-21.

44 *See* http://www.bge.com/safetyreliability/reliability/GasAndElectricInvestments/Documents/ERI-Fact-Sheet.pdf.

45 *See* Weiss *et al.,* at pp. 36-37.

46 Western FERC CPP Technical Conference Transcript, Westhoff at p. 120:7-10.

47 *See* Appendix B for a partial list of studies addressing renewable integration.

48 Western FERC CPP Technical Conference Transcript, Gallagher at p. 127:9-15.

penetration,[49] and numerous additional assessments that indicate a grid that can incorporate significantly higher levels of non-fossil resources.[50]

Similarly, Kara Clark of the National Renewable Energy Lab ("NREL") explained at the Western FERC CPP Technical Conference work assessing how “very high renewable penetration and the displacement of coal…has shown that you can maintain reliability, you can maintain stability, you can meet the WECC-wide frequency response…to quite an extent.”[51] NREL's recent renewable integration assessment of the Western Interconnection “did not identify any fundamental reasons why the Western Interconnection cannot meet transient stability and [frequency response] objectives with high levels of wind and solar generation.” They noted, however, that “good system planning and power system engineering practices must be followed,”[52] supporting our recommendation to conduct proper planning and studies in order to continue to maintain reliability. On a related note, in some cases, renewables can enhance reliability by helping to maintain fossil-fired plants that would otherwise be at risk for retirement. PJM showed in a recent analysis that as renewable energy (as well as energy efficiency) levels increase, CO_2 prices decrease, which in turn reduces costs, and retirement risks, for existing coal plants.[53]

Maintaining Reliability During and After Severe Events

Panelists at the FERC CPP Technical Conferences emphasized that threats to reliability often come not through predictable conditions but during peak load times driven by external factors (such as weather) or a sudden unanticipated event (such as a large facility tripping offline).[54] They argue that, in addition to precipitating the retirement of capacity such that areas might fall below reserve margins, the CPP will make the electricity system less “flexible” and more “unforgiving” to the unexpected reliability event or “severe” grid conditions.[55,56] Additionally, parties who view the system this way dismiss studies, such as the recently released DOE Gas Infrastructure Study, which take a high-level view of the grid’s resources and conclude that a more granular, utility- or region-specific assessment is needed to determine the true threats to reliability.[57]

We agree that such localized assessments must be conducted to identify specific and more generalized potential threats to electric system reliability. This is true independent of the implementation of CPP, as utilities and operators across the country deal with the wave of coal retirements that are currently underway, driven in part by the dramatic increase and access to low-cost, domestic natural gas, the strong growth in energy efficiency and distributed energy resources, and other air regulations. Indeed, as discussed in the final section of this paper, we strongly recommend that FERC help parties shape these assessments to maximize their effectiveness. We

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49 Prepared Statement of Brian Parsons, Director Western Grid Group, and John Jimison, Managing Director Energy Future Coalition (“Parsons and Jimison Statement”), March 11 2015, FERC Docket No AD15-4 at pp. 8-10. Available at http://www.ferc.gov/CalendarFiles/20150224084400-Parsons,%20Jimison%20joint%20comments.pdf.

50 Parsons and Jimison Statement at pp. 7-8.

51 Western FERC CPP Technical Conference Transcript, Clark at pp. 91:25-92:8.

52 Miller *et al.*, GE Energy Management, (*prepared for* NREL), “Western Wind and Solar Integration Study Phase 3 – Frequency Response and Transient Stability,” December 2014, at p. 136. Available at http://www.nrel.gov/electricity/transmission/western_wind.html.

53 *See* PJM March 2015 at p. 97.

54 National FERC CPP Technical Conference Transcript, Cmmr Moeller, at pp. 157:18-158:5.

55 *Id.*, Anderson, at pp. 103:19-105:10.

56 *Id.*, Cauley, at p. 66:14-20.

57 *See* National FERC CPP Technical Conference Transcript, Mahon, at p. 182:10-16.

also stress the numerous activities that stakeholders have already begun that address issues of local and peak event reliability – in part in response to FERC's own interests in assuring reliability outcomes in the face of changing conditions on the system.

An excellent example of ongoing growth and responsiveness in the face of "peak event" pressures is seen in PJM's actions in the past year. The winter of 2013-2014 – especially the "Polar Vortex" period – strained natural gas and other fossil-fueled plants and infrastructure across the country, especially in the Northeast and Mid-Atlantic states. Since then, PJM has taken numerous actions to prevent under-performance in the future, such as winter testing requirements, maintenance and weatherization standards, and gas commitment and coordination improvements. PJM also has proposed significant changes to its forward capacity market (as addressed above), in part to "provide investment signals for natural gas infrastructure necessary to support reliable and flexible gas-fired generation development."[58] Indeed, during the harsh winter conditions of 2015, when the system experienced new record-breaking peak loads, this and other policies allowed PJM to maintain reliable operations.[59]

In addition to market actions, grid operators, developers, and utilities have proposed innovative infrastructure development programs that can improve reliability under both normal operations and peak events. For example, the Northeast's primary natural gas utilities, Eversource Energy and National Grid, have partnered with Spectra Energy, a prominent pipeline company, to form a program called Access Northeast. Through upgrades of existing pipelines and gas storage facilities, they aim to ensure energy reliability for New England.[60] Under its plan, Access Northeast would "ensure delivery of approximately 1 [billion cubic feet per] day of natural gas to 70 percent of the region's power plants on the coldest winter days starting as early as 2018," meeting the requirements of quick start facilities, integrating renewables, guaranteeing natural gas supplies on peak days, and limiting interruptions to residential and commercial heating natural gas deliveries.[61] This proactive business-focused model highlights just one of a multitude of options available to states and utilities in focusing on reliability when preparing for CPP compliance.

While systems must be designed to maintain reliability during all conditions, it would be misleading to claim that any deviation from normal market operations during times of crisis is a bellwether of system failure or underlying weakness in the CPP. Even now, without the CPP, peak load times and unanticipated events cause our grid managers to use tools and take actions that depart from typical market or system activities – such as the otherwise uneconomical short-term ramping of specific units, or calls for demand reduction from willing customers. This will continue as the CPP is implemented but, as markets and states adjust to new market conditions, the need to rely on these measures may temporarily and marginally increase.

This neither spells the failure of markets nor the inability to reach overall CPP goals. Instead, we are of the view that it represents the strength of the grid – the tools and practices that currently

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58 PJM Interconnection, LLC, "PJM Capacity Performance Updated Proposal," October 7 2014, Docket Nos. ER15-623 and EL15-29, at p. 4. Available at http://www.pjm.com/~/media/documents/reports/20141007-pjm-capacity-performance-proposal.ashx.

59 *See* Tierney *et al*. February 2015, at p. ES-2.

60 *See* http://accessnortheastenergy.com for more details. This is one of a number of competing proposals to serve the area.

61 Prepared Statement of Richard Kruse, Vice President of Regulatory and FERC Compliance Officer, Spectra Energy, March 11 2015, FERC Docket No AD15-4 ("Spectra Statement") at p. 3. Available at http://www.ferc.gov/CalendarFiles/20150310141602-Kruse,%20Spectra.pdf.

exist to maintain system reliability at all times. It is our belief that states can continue to reduce the emissions intensity (or the total emissions under a mass-based plan) of the state-wide generating fleet while still relying on high-emitting resources to support reliability and provide energy services as needed.

FERC's Role: Guidance On Reliability Assurance Planning

Many parties have indicated an interest in a "reliability safety valve" or "reliability assurance mechanism" that would provide compliance entities or states an opportunity to request a waiver of compliance upon a threat to reliability.[62] However, while there is significant support for *something*, there is very little consensus around *what*; as Commissioner LaFleur noted, parties have proposed many "different flavors" of reliability relief,[63] including:

- up-front requirements that state plans consider reliability impacts;[64]
- temporary or permanent waivers of interim and/or final compliance targets in the face of reliability challenges;[65]
- adjustments in targets if they threaten reliability;[66]
- alternative compliance payments (presented as a "dispatch safe harbor," wherein a state may impose a carbon price on an interim basis, regardless of resulting emissions reductions);[67] and
- relief from compliance if costs exceed a predetermined level.[68]

Among these options, we are not convinced that any "reliability safety valve" – i.e., a mechanism to allow some sort of relief from compliance – is needed. Many of these mechanisms to address "reliability" are either too lenient, constituting an escape clause from compliance, or are investment cost avoidance measures masquerading as reliability protections.[69] However, we strongly support FERC's involvement in helping to guide proactive regional and local reliability assessments.

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62 In environmental regulatory frameworks, responses to concerns about reliability have come in a number of different forms. For example, some market-based programs that use tradable compliance credits include a "price ceiling" mechanism, while others allow "alternative compliance payments" that would allow a compliance entity, in certain situations, to pay a fee to the regulating agency rather than come into compliance with a regulation. Alternatively, some programs allow additional time for a compliance obligations under specific situations; for example, under the Mercury and Air Toxics Standards (MATS), EPA allows states to provide an additional year for compliance for facilities that could not install controls, and EPA outlined its authority to provide an additional year for compliance through administrative orders (AOs) for sources that must operate in noncompliance with the MATS to address a "specific and documented reliability concern."

63 National FERC CPP Technical Conference Transcript, Cmmr LaFleur at pp. 86:20-89:11.

64 *See* Prepared Statement of Craig Glazer, representing the ISO/RTO Council, February 19 2015, FERC Docket No AD15-4. Available at http://www.ferc.gov/CalendarFiles/20150213081343-Glazer,%20ISO-RTO%20Council.pdf.

65 *See* APPA Statement at p. 13.

66 *See* National FERC CPP Technical Conference Transcript, Morrison at p. 97:3-6.

67 *See* Prepared Statement of Prepared Testimony of Kathleen L. Barrón, Senior Vice President, Federal Regulatory Affairs and Wholesale Market Policy for Exelon Corporation, February 19 2015, FERC Docket No AD15-4, at pp. 7-9. Available at http://www.ferc.gov/CalendarFiles/20150218113754-Barron,%20Exelon.pdf.

68 *See* NRECA Statement at p. 12.

69 In mentioning the latter point, we are not suggesting that states, electric companies and other market participants should not avail themselves of program designs and compliance strategies that minimize costs to suppliers and consumers. Clearly, they should. But we point out that too often, stakeholders use reliability-related arguments when the issue is really a cost-minimization one, and being clear about the distinction is important for designing policy tools and appropriate incentives.

Reliability Safety Valve: Should Not Disincentivize Proactive Planning

As explained in detail above, we believe that grid managers already have a broad set of tools to both plan a reliable system and respond in real time to address unanticipated reliability events. We are concerned that a reliability safety valve could reduce the incentive for states to conduct the proactive planning that would otherwise result in successful implementation of the CPP.

Accordingly, if FERC does intend to recommend that EPA incorporate a reliability safety valve, it is important that it maintain incentives for reliance upon normal reliability tools and thus makes it unlikely that a waiver will need to be called upon. To avoid unintended consequences, any such back-stop reliability waiver or mechanism should include a requirement to offset any emissions associated with implementation of the reliability mechanism. This ensures that the integrity of *both* emissions reduction and reliability are jointly maintained, rather than satisfaction of one goal subverting the other. They need not be in tension, especially in light of how much emissions-reduction and power-system operational flexibility is accommodated by the CPP.[70] If included, we support the following additional principles in the design of a reliability assurance mechanism:[71]

- Appropriate: The need for the waiver is demonstrated through standard industry tools, and alternatives are comprehensively reviewed;
- Transparent: Compliance waiver requests are evaluated through public processes with stakeholder input;
- Equitable: The waiver mechanism should not create advantages to asset owners, and should apply equally across asset owners and across states;
- Cost-Effective: Mitigation solutions should receive full credit for the value of incremental and/or avoided carbon pollution.

Such relief should only be allowed in the interim period, when states are still transitioning their generating fleets and have an opportunity to maintain equivalency. We further agree with parties recommending that the burden of proof be on the party requesting relief under the mechanism.[72]

Reliability Assurance Planning: FERC's Crucial Role

We strongly support up-front and ongoing reliability assessments since, as noted throughout this paper, this can be a crucial step in proactively managing for reliable operations under the CPP. We have heard throughout the FERC CPP Technical Conferences calls for increased coordination among states, RTOs, ISOs, and other regional planning organizations in developing and assessing state plans and compliance activities. As a representative from SPP pointed out, this planning will be crucial for taking advantage of the flexibility built in to the CPP; [73] procrastination or avoidance will merely serve to limit compliance options and ability to respond to reliability issues.

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70 Again, the CPP as designed allows any units to run for reliability reasons so long as the units' emissions are covered by credits (in a rate-based system) or by allowances (in a mass-based system). The most that could be needed to accommodate emissions that result from running a plant for reliability purposes is a carry-over or borrowing provision that allows sources to cover excess emissions in the next compliance period at a 1-for-1 basis (rather than the 3-to-1 penalty that would apply to noncompliance). If an RSV is adopted, EPA should specify conditions for access to this 1-1 carryover, such as what sort of event would apply (e.g., severe winter weather or long-term plant outage) and when the timing of the applicable event (such that it could not be addressed through typical interim period averaging).

71 These principles were first proposed in Tierney *et al.,* March 2015, previously cited in this paper.

72 *See* National FERC CPP Technical Conference Transcript, Glazer at p. 90:12-17.

73 SPP Statement at p. 5.

It is here where we believe FERC can play a vital and entirely constructive role in supporting system reliability and effective compliance with the CPP. Commission-jurisdictional grid management tools can support the successful implementation of the CPP while protecting grid reliability. In particular, FERC should use its expertise and authority, in partnership with NERC and regional reliability organizations, to define standards and periodically update best practices for states' reliability assessments to ensure that the state compliance plans incorporate up-front and ongoing considerations of reliability issues and that the CPP is implemented equitably and reliably.

The Federal Power Act requires that FERC ensure that rates charged by jurisdictional entities are just and reasonable while preserving bulk system reliability.[74] Advanced system planning and modeling will be required to maintain reliability in implementing the CPP. Furthermore, without consistent assumptions across assessments, this planning and modeling could result in unjust and unreasonable rates as inaccurate assessment results lead to overbuilt systems, undermined markets, or other unequal competitive factors. Therefore, we believe it is within the clear bounds of FERC's jurisdiction to issue an order in this Docket a finding that each jurisdictional entity (i.e., RTO, ISO, or regional planning and reliability authority) be required to provide an assessment, following basic common assumptions and/or methodologies, of their relevant states' CPP plans.

The purpose of these assessments would be to inform ongoing development of draft state plans to ensure that those plans incorporate technically sound reliability assumptions and assessments. The timing of the assessment should be such that, should it reveal a significant reliability concern, a state will have an opportunity to revise the elements of a state plan prior to final submission for EPA approval. Each state plan should build in a mechanism that continues to assume and/or call for reliability assessments to be conducted (as they normally are, when there is a change in system configuration, e.g., a proposed generating unit addition or proposed interconnection of a new unit). The state plan could devise various means to address situations in which the results of the assessment indicate a reliability problem, such as a "next-best" plan element that will go into effect to offset the emissions reductions, or a requirement to submit a revision to the plan.

We recommend that the Commission order ongoing reviews of reliability that will occur as states begin to implement their plans. FERC could provide useful guidance about assumptions that could be used in such assessments, so that these analyses add value to the types of assessment that NERC typically performs for the nation and for regional reliability organizations. An iterative process can ensure that states and reliability coordinators can incorporate lessons from their experiences into their CPP compliance activities, and take advantage of the CPP's flexibility to optimize emissions-reductions measures to strengthen reliability. This will also allow states to address more minor reliability concerns identified in previous assessments without needing to stop compliance activities; only in the most severe – and, in our view, unlikely – case should a reliability assessment of this type result in a request to EPA to temporarily relieve compliance obligations.

Such an order would be consistent with recent FERC actions in Dockets AD13-7 and AD14-8, addressing Centralized Capacity Markets and Winter 2013-2014 Operations and Market Performance.[75] In a recent Order in those dockets, FERC identified that "in light of these potential risks to reliability and just and reasonable rates, the Commission believes it is appropriate at this time to initiate a review of how each RTO/ISO is addressing fuel assurance." Further, FERC

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74 16 U.S.C. §§ 824d and 824e.

75 149 FERC ¶ 61,145, "Order on Technical Conferences," issued November 20 2014 in Docket Nos. AD13-7 and AD14-8 ("Fuel Assurance Order). Available at https://www.ferc.gov/whats-new/comm-meet/2014/112014/E-2.pdf.

"provide[s] guidance to assist RTOs/ISOs in those efforts" but indicates that "significant differences in the nature and scope of the fuel assurance issues among the RTOs/ISOs… may [mean] that there is more than one right answer for addressing fuel assurance. Therefore, we allow each RTO/ISO the opportunity to identify the fuel assurance issues most relevant to its markets and comprehensively describe the set of actions it has already undertaken or proposes to undertake to address these issues."

Similarly, an order in this docket should preserve the flexibility afforded states under the CPP and allow for each jurisdictional entity to conduct its own reliability assessment in accordance with local considerations and proposed compliance plans. However, to facilitate the preparation and review of these assessments, and to ensure that all jurisdictions are treated equally under the Federal Power Act, the Commission should further provide guidance on modeling and planning best practices, common assumptions, and stakeholder review and transparency. This would not only produce a more cohesive view of the interconnected grid and provide for a more consistent and streamlined review of the final reports, it will help maintain just and reasonable rates and protect against a state seeking a "backdoor" out of the CPP by exaggerating reliability concerns through manipulating study assumptions.

Conclusions

We are confident that we can achieve a lower-emissions electricity grid while maintaining reliability. Our electric system is designed to maintain reliable, dependable service through both typical, steady-state conditions and uncommon, unanticipated events. This design – the combination of infrastructure elements, policies, and operations – is what enables the system to adapt to the market transitions already under way, and will also allow the system to adapt to the long term goals as envisioned under the proposed Clean Power Plan. As highlighted throughout this paper, we point to the following as key indicators of this ability:

- significant flexibility built into the CPP that allows for state-by-state and resource-specific decision-making;
- encouraging trends in electric transmission policies and ongoing efforts to optimize gas-electric market efficiencies;
- robust planning requirements in place to evaluate the effects of retiring units and market mechanisms that help to ensure new resource development, while also maintaining those facilities needed to provide local or regional reliability;
- existing incentives for a robust natural gas pipeline system to make efficient use of existing unused capacity, to better coordinate gas and electric market operations, and innovative and proactive approaches to add new local capacity where needed;
- ongoing activities on the part of regional grid managers to identify regional strengths and weakness, as well as an increasing consensus that integrating renewables can be done without harming reliability, and may in some cases help maintain fossil resources that can provide other energy services; and
- strong recent experience responding to reliability events during constrained times, as well as prompt reactions in order to further build up capabilities to prepare for the next event.

We encourage system planners to continue the ongoing regional and localized assessments to identify potential threats to electric system reliability. It is here where we believe FERC can play a vital role in developing the CPP. We urge FERC to help shape these proactive and ongoing reliability studies by issuing an order requiring each jurisdictional reliability entity to provide an assessment of their relevant states' CPP plans and provide follow-up assessments as necessary. This will ensure that FERC upholds the Federal Power Act by preserving system reliability and ensuring that rates charged by jurisdictional entities are just and reasonable, and will provide useful guidance to states and market participants as they continue their steps to comply with and respond to the CPP after it is finalized by EPA.

Appendix A - FERC CPP Technical Conferences: Questions for Discussion

Each of the FERC CPP Technical Conferences was divided into three panels. Below are listed the questions provided as a basis for panelists' prepared statements and the subsequent discussions.

Panel 1: Electric reliability considerations

1. What operational issues could arise under different compliance approaches? Are there operational issues that could arise if neighboring states adopt different methods of compliance?
2. What tools are available to address these potential issues and ensure that electric reliability is maintained as states and regions comply with the proposed rule?
3. How will entities responsible for electric system planning (e.g., reliability entities, state public utility commissions, grid operators) coordinate with entities responsible for developing state and regional plans to comply with the proposed rule?
4. Are additional tools or processes needed to address any potential operational issues or ensure coordination between relevant entities?

Panel 2: Identifying and addressing infrastructure needs

1. What mechanisms can be used to identify potential infrastructure needs and ensure that adequate infrastructure will be built in sufficient time to comply with the proposed rule? Are additional mechanisms needed?
2. What are the primary challenges, if any, in coordinating planning processes to evaluate energy infrastructure needs?
3. How could various compliance approaches impact the need for additional infrastructure?
4. Are adaptations to current Commission policies needed to facilitate the infrastructure needed for compliance with the proposed Clean Power Plan?

Panel 3: Potential implications for Commission-jurisdictional markets

1. Are there specific features of Commission-jurisdictional markets that can be utilized to facilitate the implementation of state or regional compliance plans?
2. What unique market issues could arise under specific compliance approaches (e.g., individual state compliance plans, regional compliance approaches, etc.)?
3. What adaptations in the current markets could be necessary as state or regional compliance plans are developed?

Appendix B – Selection of Cited and Relevant Studies

Energy and Environmental Economics, Inc, "Investigating a Higher Renewables Portfolio Standard in California," January 2014. Available at https://www.ethree.com/documents/E3_Final_RPS_Report_2014_01_06_with_appendices.pdf.

General Electric International (*prepared for* PJM Interconnection), "PJM Renewable Integration Study," March 31 2014. Available at http://www.pjm.com/committees-and-groups/subcommittees/irs/pris.aspx.

General Electric International (*prepared for* Minnesota Utilities and Transmission Companies *and* The Minnesota Department of Commerce *and in collaboration with* MISO), "Minnesota Renewable Energy Integration and Transmission Study: Final Report," October 31 2014. Available at http://www.minnelectrans.com/documents/MRITS-report.pdf.

Miller, N.W., Shao, M., Pajic, S., and D'Aquila, R., GE Energy Management, (*prepared for* National Renewable Energy Laboratory), "Western Wind and Solar Integration Study Phase 3 – Frequency Response and Transient Stability," December 2014. Available at http://www.nrel.gov/electricity/transmission/western_wind.html

North American Electric Reliability Council, "2014 Long-Term Reliability Assessment," November 2014. Available at http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2014LTRA_ERATTA.pdf

PJM Interconnection, "PJM Interconnection Economic Analysis of the EPA Clean Power Plan Proposal," March 2, 2015 ("PJM March 2015"), at p. 97. Available at http://www.pjm.com/~/media/4CDA71CBEC864593BC11E7F81241E019.ashx.

Tierney, S., Analysis Group, "Greenhouse Gas Emission Reductions From Existing Power Plants: Options to Ensure Electric System Reliability," May 2014, at p. 42. Available at http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Tierney_Report_Electric_Reliability_and_GHG_Emissions.pdf.

Tierney, S., Hibbard, P., & Aubuchon, C., Analysis Group, "Electric System Reliability and EPA's Clean Power Plan: The Case of PJM," March 16 2015. Available at http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Electric_System_Reliability_and_EPAs_Clean_Power_Plan_Case_of_PJM.pdf.

U.S. Department of Energy, "Natural Gas Infrastructure Implications of Increased Demand from the Electric Power Sector," February 2015. Available at http://energy.gov/sites/prod/files/2015/02/f19/DOE%20Report%20Natural%20Gas%20Infrastructure%20V_02-02.pdf.

Weiss, J., Tsuchida, B., Hagerty, M., Gorman, W., The Brattle Group, "EPA's Clean Power Plan and Reliability: Assessing NERC's Initial Reliability Review," February 2015, at p. 31. Available at http://info.aee.net/brattle-reliability-report.

Appendix C – Author Qualifications and Contact

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Dr. Tierney is an expert on energy policy and economics, specializing in the electric and gas industries. She has consulted to electric and gas companies, grid operators, large customers, governments, non-profits, tribes, and other organizations on energy markets, as well as economic and environmental regulation and strategy. Her expert witness and business consulting services have involved industry restructuring, market analyses, clean energy regulatory policies, transmission issues, wholesale and retail market design, and resource planning and procurement. Dr. Tierney is a former Assistant Secretary for Policy at the U.S. Department of Energy, state cabinet officer for environmental affairs, and state public utility commissioner. She chairs the External Advisory Board of the National Renewable Energy Laboratory, is a director of the World Resources Institute and Resources for the Future, and serves on other boards. She has published widely, and frequently speaks at industry conferences.

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Eric Svenson has over 39 years of experience in many aspects of the industry including: electric power plant operations, engineering and construction, strategic planning, electric and gas transmission and distribution systems, energy efficiency and renewable energy projects, environmental permitting, and environmental remediation of utility legacy operations. His previous roles include Vice President for Environment, Health and Safety for Public Service Enterprise Group (PSEG), co-chair of EPA's Greenhouse Gas (GHG) Best Available Control Technology (BACT) committee, and co-author with the Natural Resources Defense Council of several reports benchmarking electric power industry emissions.

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Brian Parsons worked as an engineer and manager at the National Renewable Energy Lab, and its predecessor, the Solar Energy Research Institute for over 30 years. His work included technology development, systems analysis, and electrical grid integration topics. He led the Transmission and Grid Integration Group at NREL from its formation in 2007 until early 2013. During that time, his team led ground breaking, high renewable penetration, grid operational analyses including the Western Wind and Solar Integration studies. Brian was also an advisor to the Wind Powering America program, and contributed to the DOE "20% Wind Energy by 2030 – Increasing Wind Energy's Contribution to U.S. Electric Supply". He currently works with Western Grid Group to expand the awareness and knowledge of transmission's key role in a clean electric future and to promote grid integration system solutions.