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The EPA's Clean Power Plan: A Clear Threat to Electric Reliability

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A Report from the Electric Reliability Coordinating Council

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In Summer 2015, the U.S. Environmental Protection Agency (EPA) intends to finalize its proposed Clean Power Plan (CPP) to address carbon dioxide (CO_2) emissions from existing power plants. The CPP is staggeringly complex both in terms of its scope (the set of documents outlining the rule exceed 1200 pages) and the implications it will have for the U.S. power sector. For months, power companies, grid operators, state agencies, and academics have been trying to figure out precisely what those implications will be. Unfortunately, preliminary analyses released by qualified experts point to one inescapable conclusion: EPA's proposal puts the reliability of our nation's electricity supply at risk.

It is our hope that this report by the Electric Reliability Coordinating Council (ERCC) will serve as a starting point for the serious, in-depth conversations about reliability that must take place before the CPP is allowed to take effect.

ERCC is a group of power-generating companies serving millions of businesses and households across the United States, and dedicated to a balanced energy portfolio that ensures reliable and affordable electric power, an essential prerequisite for the protection of the environment, public health, and the economy.

What is Electric Reliability?

At its most basic, electric reliability is the concept that when a business or individual wants to use electricity, it will always be available at a reasonable cost. The notion of electric reliability requires adequate capacity to generate electricity, reserve capacity that can be tapped when problems arise, and a functioning grid to deliver electricity to users. These core attributes in turn rely on a carefully monitored network involving load, resource balance, voltage, and frequency support. The CPP endangers these critical functions by attempting to engineer infeasible outcomes using untested means.

Reliability Problems Posed by the Clean Power Plan

The CPP ambitiously seeks a 30 percent reduction in CO_2 emissions from existing power plants relative to a 2005 baseline. Furthermore, President Obama recently promised that the U.S. would achieve economy-wide emissions reductions of 26-28 percent relative to a 2005 baseline by 2025.[1] Those goalposts, it seems, were imposed for political reasons without much regard for feasibility, a problem ERCC discussed extensively in the comments we submitted to EPA.[2] Forcing power providers to adopt infeasible measures on a compressed timeline in order to reduce CO_2 emissions throws the future availability of adequate electricity supplies into doubt. For instance, the CPP advances changes in the dispatch of various power resources without fully studying the impact such changes have on reliability as incumbent baseload plants are phased out faster than market forces would otherwise dictate. As multiple grid operators have pointed out, this proposal is untested and will require a significant overhaul of the pipeline and transmission infrastructure before it can be implemented.[3]

Experts in the reliability field have come to a clear consensus about the hazards posed by the CPP. Here are a few examples:

- The North American Electric Reliability Corporation (NERC) writes:

> Essential Reliability Services (ERS) may be strained by the proposed CPP: The anticipated changes in the resource mix and new dispatching protocols will require comprehensive reliability assessments to identify changes in power flows and ERSs. ERSs are the key services and characteristics that comprise the following basic reliability services needed to maintain [bulk power system] BPS reliability: (1) load and resource balance; (2) voltage support; and (3) frequency support. New reliability challenges may

[1] White House.gov, "FACT SHEET: U.S.-China Joint Announcement on Climate Change and Clean Energy Cooperation," November 11, 2014.

[2] http://www.electricreliability.org/sites/default/files/media_files/ERCC%20Comments%20on%20CPP.pdf

[3] Cheryl LaFleur Testifying Before the House Energy & Commerce Committee's Subcommittee on Energy and Power, "FERC Perspective: Questions Concerning EPA's Proposed Clean Power Plan and other Grid Reliability Challenges," July 29, 2014.

arise with the integration of generation resources that have different ERS characteristics than the units that are projected to retire.[4]

- The Midcontinent Independent System Operator (MISO) writes:

  The MISO region already faces identified reliability challenges associated with EPA's Mercury and Air Toxics Standards (MATS). The MISO region relies on coal-fired generation as the predominant electricity resource. MISO has been conducting quarterly surveys with our generation owners for three-and-a-half years to assess potential impacts of the MATS rule. The survey results show that between 10 and 12 gigawatts of coal-fired generation capacity will retire by 2016 to meet the MATS requirements. As a result, resources available to the MISO region will be at, or potentially below, the planning reserve margin starting in the summer of 2016. MISO expects that resource availability will remain close to the planning reserve margin for the foreseeable future. **This erosion of the reserve margin increases the likelihood that MISO will need to manage high electricity demand situations by use of emergency operation procedures. The probability of a loss of load event becomes greater than the MISO region has ever experienced**. Furthermore, we know that additional generation retirements needed to comply with the proposed rule are expected to require a one-for-one capacity replacement at the time of the retirement to maintain electric system reliability.[5]

- PJM Interconnection writes:

  Questions as to whether implementation of the Proposed Rule will have adverse reliability impacts have engendered much public debate and discussion. Although a variety of analyses, including those produced by the North American Electric Reliability Corporation ("NERC"), can help to identify issues and "bracket" potential reliability exposure, the true reliability impacts of the Proposed Rule cannot be fully evaluated without additional clarity as to the specifics of State Plans making definitive findings in this area difficult. However, there are preventative measures in the form of additional process provisions that should be put in place in the Final Rule to mitigate any future

[4] NERC, "Potential Reliability Impacts of EPA's Proposed Clean Power Plan," November 2014. NERC's November 2014 Long-Term Reliability Assessment also called attention to the difficulties inherent in adding a large number of renewable energy facilities to the existing grid. The CPP calls for a massive increase in renewable energy use across the U.S. The report finds, "Based on industry studies and prior NERC assessments, as the penetration of variable generation increases, maintaining system voltage stability can become more challenging."

[5] http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2013-0602-22547

potential impacts to electric system reliability and therefore be clearly available to states and entities charged with ensuring bulk power reliability.[6]

- The Southwest Power Pool (SPP) writes:

  Based on SPP's reliability impact assessment, **it is clear that the proposed CPP will impede reliable operation of the electric transmission grid in the SPP region, resulting in violations of NERC's mandatory reliability standards and exposing the power grid to significant interruption or loss of load**.

  SPP has only been able to perform an initial reliability evaluation of steady-state system response during a "normal" future summer peak condition. SPP has not evaluated the impact of the proposed EGU retirements during other potentially critical scenarios, such as drought and polar vortex conditions or times of limited wind resource availability, which have been experienced numerous times within SPP's region in recent history.

  Furthermore, there has been inadequate time to perform analysis of the technical feasibility of each of the four building blocks proposed within the CPP. **To be clear, if any or all of the four building blocks are not feasible, application of a goal that assumes they are will have untold consequences on the reliability of the bulk electric system**. For example, if the projected EGU retirements occur and a 70% capacity factor from natural gas combined cycle generating units, as assumed in CPP building block 2, is not feasible, the reliability implications of this improper assumption will be very significant and serious. Additional time to evaluate the impact of these and other potential concerns on reliability of the bulk electric system is warranted before imposing a final rule that is not properly considerate of potential threats to the reliability of the bulk electric system.[7]

- The New York Independent System Operator (NYISO) writes:

  As proposed, the Clean Power Plan presents potentially serious reliability implications for New York. A majority of the electric capacity within New York City is dual-fuel oil/ gas steam-fired EGUs. These units are critically important, both due to their location within the transmission constrained New York City area and because they possess dual fuel capability that provides a needed measure of protection against disruptions in the

[6] http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2013-0602-23222

[7] http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2013-0602-20757

natural gas supply system. Yet the EPA's Building Blocks assume that output from these very facilities could be reduced by over 99%. **Such a reduction cannot be sustained while maintaining reliable electric service to New York City**. Congress recognized in the Energy Policy Act of 2005 that the population density of the New York City area, the percentage of the population that lives or works in very tall buildings and relies upon underground transportation, and the critical importance of institutions located there intensify the need to maintain the reliability of New York's electric system. The EPA should do the same.

The flaws with the Clean Power Plan that would compromise reliability in New York stem from key assumptions within the Building Blocks that are not technically sound and result in CO_2 emissions reduction targets for New York that are unreasonable and unworkable within the timeframes provided. The assumptions upon which the Building Blocks are based must be technically and economically sound for the CO_2 emissions reductions targets derived from them to be reasonable and consistent with the requirements of a reliable electric system. **No amount of flexibility afforded in the manner in which New York State may seek to comply with the Clean Power Plan can make up for requirements that are inherently unreasonable because they are based on flawed assumptions in the Building Blocks**.[8]

- The Electric Reliability Council of Texas (ERCOT) writes:

  Based on this analysis, it is evident that implementation of the proposed Clean Power Plan will have a significant impact on the planning and operation of the ERCOT grid. The proposed CO_2 emissions limitations will result in significant retirement of coal generation capacity, could result in transmission reliability issues due to the loss of fossil fuel-fired generation resources in and around major urban centers, and will strain ERCOT's ability to integrate new intermittent renewable generation resources. If the expected retirement of coal resources were to occur over a short period of time, reserve margins in the ERCOT region could reduce considerably, leading to increased risk of rotating outages as a last resort to maintain operating balance between customer demand and available generation. The need to maintain operational reliability (i.e., insufficient ramping capability) could require the curtailment of renewable generation resources. This would limit and/or delay the integration of renewable resources, leading to possible non-compliance with the proposed rule deadlines.[9]

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[8] http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2013-0602-22967

[9] ERCOT, "ERCOT Analysis of the Impacts of the Clean Power Plan," November 17, 2014.

Clearly, the proposed CPP would pose a substantial risk to the reliability of the electricity supply throughout the U.S. What is remarkable is that EPA has not only failed to heed the substantial warnings outlined above, the agency has also unashamedly denied the possibility that anything could possibly go wrong, saying, "For 40 years, we have been able to both implement the Clean Air Act and keep the lights on. EPA's proposed Clean Power Plan will not change that."[10]

[10] U.S. EPA, "FACT SHEET: Clean Power Plan Benefits," http://www2.epa.gov/carbon-pollution-standards/fact-sheet-clean-power-plan-benefits#print

State Concerns on Reliability

States from every region have publicly stated their concern for reliability under the CPP. Because states agencies will be charged with implementing the CPP, many are already sounding the alarm to avoid being forced to undertake disastrous measures. Examples include:

The Arizona Corporation Commission writes:

> The ACC has significant concerns with EPA's Proposed Carbon Rule. **The assumptions that EPA has made about the Arizona energy market are inaccurate and lead to goals for Arizona that are unachievable unless all coal plants are shut down by 2020. It is not possible to shut down all coal plants by 2020 without impacting the reliability of electric service, jeopardizing national security by rendering energy infrastructure less resilient to natural or man-made disasters, and undermining resource portfolio planning**. Further, according to a recent National Economic Research Associates ("NERA") analysis, the cost to states to implement the Proposed Carbon Rule is much higher than projected by EPA.[11]

Nevada's Department of Conservation & Natural Resources, Public Utility Commission, and the Governor's Office of Energy jointly write:

> **As assessment of reliability is critical before extensive re-dispatching decisions are made. Yet, the Clean Power Plan's interim target does not allow sufficient time for states throughout the Western Interconnection to identify how they can comply with the proposed legislation, determine compliance plans, select resources and complete the necessary evaluations to ensure a reliable electric system**. Use of the Building Blocks in the proposed rule to meet emission targets will significantly affect balancing areas throughout the Western Interconnection. Implementation will result in resource retirements, changes in operating practices, changes in training procedures used by operators to control the electric system, changes in the capabilities of the transmission system, changes in how the transmission system is operated, a requirement for new transmission resources and transmission upgrades, changes in levels of natural gas-fired generation used across the west, changes in the level of gas transportation capacity

[11] http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2013-0602-23479

needed to support a greater use of gas-fired resources, and development of new renewable resources.[12]

The New Mexico Public Regulation Commission writes:

> With these duties in mind, I am compelled to inform EPA that its recent actions and this proposal would impede the NMPRC from performing its duties and infringe on its authority to fulfill its state constitutional responsibilities. With that said, I am particularly concerned with prematurely shuttering or limiting the production of existing, very reliable, low cost, electric generation units and how ratepayers, shareholders, state and local governments, the State's economy and system reliability will be negatively impacted if EPA's proposed rule is adopted and implemented.[13]

The Pennsylvania Public Utility Commission writes:

> EPA's proposed CAA Section 111(d) emission standards, if implemented, present potential challenges to the reliability of the electric grid impacting Pennsylvania and the PJM region. EPA's proposed Building Block framework for calculating emissions reductions targets through improved heat rates (BB1) and re-dispatch to natural gas combined cycle (NGCC) units (BB2) will require generators, public utilities, transmission operators and PJM to operate under a significantly different paradigm that emphasizes the dispatch of electricity based on environmental factors as opposed to economic factors that traditionally underlay the wholesale competitive markets. As will be addressed later, the EPA has not given sufficient consideration to the impacts its proposal will have on organized electricity markets and the challenges that the proposal presents to system reliability and the economy.[14]

Finally, the Virginia State Corporation Commission writes:

> Based on the substantial acceleration of emission reductions called for in the current draft of the Proposed Regulation, EPA's own model predicts that Virginia will experience significant retirements of power plants. These retirements are of grave concern because the power plants involved are used today to ensure reliable service to Virginia customers, have years of useful life remaining, and cannot be replaced overnight or without regard for impacts on the electric system. To meet the demands of the Proposed Regulation will

[12] http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2013-0602-22723

[13] http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2013-0602-24311

[14] http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2013-0602-24099

> require the rapid development of significant, costly new infrastructure that will need to be appropriately sized and located to ensure that customers continue to receive the same level of reliable service they currently enjoy, and which federal reliability laws require. It will be a challenge to meet federal reliability requirements during such a transition.[15]

With its poorly crafted and understudied CPP, EPA has managed to create agreement between state officials across party lines and geographic boundaries; something rarely seen in our politically charged environment. It speaks volumes. States are calling for a more thoughtful approach, and EPA should heed the call.

EPA's Willful Disregard for Reliability: The Failure to Adequately Consult FERC

EPA is unqualified to conduct its own reliability analysis; that's understandable, it's not their job. What is not understandable is the agency's persistent failure to adequately consult senior officials from the Federal Energy Regulatory Commission (FERC) to verify the workability of the CPP. Despite EPA's assertion that FERC was consulted extensively in the process of writing the proposed rule, Commissioner Tony Clark wrote to Members of Congress that he believes "it would be incorrect to suggest that FERC and its staff have had a significant or meaningful role in providing EPA the sort of detailed, technical analysis that will be required to ensure the CPP does not impact grid reliability."[16] Commissioner Philip Moeller was even more explicit in debunking EPA's assertions, saying:

> My ongoing concern is that, despite its expertise as an environmental regulatory agency, EPA lacks sufficient understanding and expertise to fully consider the reliability impacts of their proposed rules on the nation's electric and natural gas sectors. In addition, EPA appears to lack an appreciation for the complexity of energy markets, and lacks an appreciation of the challenges in financing and siting new natural gas pipelines, electric generation, and electric transmission. Without recognition and at least partial resolution of these challenges, I believe the CPP will threaten reliability given the extent to which requirements are front-loaded to 2020.[17]

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[15] http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2013-0602-20767

[16] http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=a37ae4de-e3e3-4e11-9ef3-6152573ddc1d

[17] http://www.smartenergyuniverse.com/category-blog/utility-news-blog/item/14555-epa-ferc-coordination-on-clean-power-plan

There is little doubt that FERC understands its responsibility to maintain electric reliability, even in the face of EPA regulations. FERC Chairwoman Cheryl LaFleur remarked that, "I think we're going to have to get involved in making sure that reliability is protected as the Clean Power Plan is implemented. Protecting reliability isn't optional."[18] She has specifically recognized that if all of the states do in fact file implementation plans, the result would be "is a little bit of a mind-bender when you start to think how that would work."[19]

The agency's failure to properly examine the reliability implications of its proposed rule demands a strong oversight response from Congress. FERC will be holding a series of technical conferences in the coming months to discuss the CPP's effect on reliability, but discussion is not enough. In fact, given EPA's aggressive timeline, how could any of these discussions have any impact on EPA's final drafting of the rule, which is taking place in real time, concurrent with these conversations? It is insufficient to reiterate that the CPP threatens reliability -- that fact has been clearly established by the grid operators. FERC should not be put in a position to work around EPA's regulations. Rather, it is incumbent on EPA to ensure, in advance, that its final rule will avoid the reliability concerns that have been raised thus far in the rulemaking process. Establishing a responsible "no harm" finding will require that EPA table the current proposal until real, substantive reviews can be conducted by FERC, grid operators, and state agencies. Until EPA, upon the explicit finding of reliability experts, certifies that the CPP will not harm reliability, the agency should not enact a regulatory regime that endangers public health and welfare.

Reliability is Not Optional

Putting electric reliability at risk entails serious legal and public policy consequences. Electrical outages endanger economic growth, and have a demonstrable negative effect on public health. As ISO New England has stated:

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[18] http://www.basinelectric.com/Miscellaneous/pdf/Energy-Producing-States/11-11-14-LeFleur-article.pdf.

[19] Id.

> A reliable supply of electricity is a foundation of our prosperity and quality of life. Without it, our world literally grinds to a halt—businesses cannot plan and operate productively, hospitals and schools cannot provide their essential services, and residents cannot depend on the electricity they need simply to live their daily lives. Without reliable electricity, the financial and societal costs would be enormous.[20]

The Institute of Electrical and Electronics Engineers of the U.S. (IEE-USA) has further observed that even minor disruptions in the electric power grid can sometimes lead to catastrophic 'cascading' blackouts, and that the loss of a single generator can result in an imbalance between load and generation. The resulting blackouts cause incalculable economic damage. For example, the direct costs to high-technology manufacturing in the San Francisco Bay Area alone during the California blackouts alone ran as high as one million dollars a minute due to lost production, and the relatively brief Northeast blackout of 2003 cost business about $13 billion in lost productivity.[21]

Last winter, the cold weather phenomenon known as the "polar vortex" made it clear that coal-fired generation, much of which is currently scheduled to be retired as a result of EPA rules, is vital to the reliability of our electricity supply. In some areas, coal-fired plants thought to be obsolete were discovered to be essential to reliability, and one of the nation's largest electricity generators reported that 89 percent of the coal-fired generation slated for retirement by 2015 as a result of EPA rules was needed to supply electricity during the cold weather. These events were not isolated, as electricity generators in Texas and the Southeast faced extreme demands and had to take measures to ensure that coal-fired generation was available, even as those plants faced retirement in the coming years.[22] More recently, winter storm Juno resulted in approximately 13,000 electrical outages in New England, reiterating the precariousness of an electrical power supply that is dependent on rosy assumptions to function smoothly.[23]

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[20] http://www.iso-ne.com/nwsiss/grid_mkts/elec_works/oview_brochure.pdf (Accessed June 20, 2012)

[21] G.F. McClure, Electric Power Transmission Reliability Not Keeping Pace with Conservation Efforts, Today's Engineer (Feb. 2005) available at: http://www.todaysengineer.org/2005/Feb/reliability.asp (accessed June 20, 2012).

[22] New York Times, "Coal to the Rescue, but Maybe Not Next Winter," March 10, 2014.

[23] Associated Press, "Thousands without power during snowstorm in Massachusetts," January 27, 2015.

Conclusion

Experts agree: EPA's proposed CPP would place electrical reliability at risk. It is unconscionable for EPA to finalize a rule that jeopardizes the availability of reliable, affordable electricity to American households and businesses. But, that is exactly what the agency is poised to do absent significant modifications to the proposed rule. EPA should establish, via external expertise, that there will be "no harm" to reliability before the agency finalizes and implements the CPP. Otherwise, nothing will be done to ameliorate the risk until a major shortfall occurs, with all the attendant consequences. By then, it will be too late to guarantee safeguards are put in place to regulate CO_2 responsibly.

As noted above, the entities responsible for grid reliability all maintain the proposed rule jeopardizes grid reliability. It begs the question, "What are we getting in exchange?" Certainly not a reduction in global temperatures---EPA admits this fact.[24] Rather, policymakers believe it is important for America to "lead" on this issue in order to convince other nations to follow. ERCC submits that this rule, if implemented in its current form, will send the exact opposite message to the world when the predicted reliability problems come to pass. In short, our "leadership" will lead other countries to conclude that following America on this issue will have disastrous implications for the reliability of their systems and they will wisely choose not to follow America's lead.

[24] Gina McCarthy before the House Committee on Science, Space, and Technology, September 17, 2014. See also Janet McCabe before the House Energy & Commerce Committee, June 19, 2014.