ADVANCED ENERGY ECONOMY
the business voice of advanced energy

PJM Interconnection, LLC
2750 Monroe Boulevard
Audubon, PA 19403

June 8, 2018

Re: PJM Fuel Security Analysis

Dear Andy Ott and the PJM Interconnection Board,

Advanced Energy Economy (AEE, www.aee.net) appreciates the opportunity to comment on PJM's planned fuel security analysis.

AEE is a national organization of businesses making the energy we use secure, clean, and, affordable. AEE and its state and regional partner organizations, which are active in 27 states across the country, represent more than 100 companies and organizations that span the advanced energy industry and its value chains. Technologies represented include energy efficiency, demand response, natural gas, solar photovoltaics, solar thermal electric, ground-source heat pumps, wind, storage, biofuels, electric vehicles, advanced metering infrastructure, transmission and distribution efficiency, fuel cells, hydro power, nuclear power, combined heat and power, and enabling software. Used together, these technologies and services will create and maintain a higher-performing energy system—one that is reliable and resilient, diverse, cost-effective, and clean—while also improving the availability and quality of customer-facing services. AEE promotes the interests of its members by engaging in policy advocacy at the federal, state, and regulatory levels, by convening groups of CEOs to identify and address cross-industry issues, and by conducting targeted outreach to key stakeholder groups and policymakers. Many of AEE's members either participate in the PJM markets, or are significantly impacted by the outcomes in those markets.[1]

AEE believes that any fuel security risk analysis performed by PJM should be transparent and consider the full range of risks and benefits of all technologies, not just solid and liquid fuels. AEE urges PJM to account for all of the factors discussed below in its analysis, and to provide a transparent explanation of the methodologies it uses to do so. This will give stakeholders and the marketplace added confidence in the process used and the results. In addition, AEE strongly agrees with PJM that to the extent fuel security constraints are identified in its fuel security analysis (an outcome that should not be presumed), solutions to those constraints must be both market-based and fuel and resource neutral to ensure the most cost effective and reliable results for consumers.

[1] The comments provided here are reflective of the broad view of AEE's membership; however, individual members may submit their own comments to PJM that reflect different views.

I. Any "fuel security" risk analysis must consider the full range of potential risks presented by ALL generation fuels.

The white paper released by PJM ("Valuing Fuel Security")[2] reviews delivery risks associated with natural gas pipelines and focuses heavily on concerns around reliability of natural gas pipelines. While AEE recognizes the major role that natural gas plays in the fuel mix of PJM,[3] it is important that any analysis of fuel security risks must consider the supply chain and delivery infrastructure associated with all kinds of solid and liquid generation fuels. Coal-fired power plants rely on rail deliveries that have seen disruptions in the past, even as recently as summer 2017.[4] Nuclear units require lengthy and inflexible refueling outages and rely on limited delivery options. Meanwhile, oil-fired plants must rely on delivery by tanker truck in most cases, and refining capacity has become increasingly-limited in some regions.[5]

Moreover, even plants with on-site supplies of solid and liquid fuels face risks to their ability to utilize those fuels. Coal piles have become water-logged and frozen in severe weather events (including the Polar Vortex in PJM),[6] while oil and LNG stockpiles are limited by the ability to accommodate large on-site tanks or suffer from other issues, such as the leak at the Aliso Canyon facility.[7]

In addition, there are concerns further up the supply chain and with regard to other inputs to power production that must be considered in any kind of fuel security analysis. For example, there is minimal redundancy for nuclear power reactors in backup fabrication sources.[8] In addition, coal and nuclear units can face threats to their reliable operations from a lack of available cooling water capacity.

In short, PJM's fuel security risk analysis must consider the full panoply of fuel security risks and related supply and input chain risks in order to provide a full picture of the extent to which such threats may represent reliability constraints that should be modeled in RPM.

II. PJM's fuel security analysis must also consider the full range of benefits that ALL energy technologies can provide in mitigating identified fuel security risks.

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[2] http://www.pjm.com/-/media/library/reports-notices/special-reports/2018/20180430-valuing-fuel-security.ashx?la=en

[3] http://www.pjm.com/~/media/library/reports-notices/special-reports/20170330-pjms-evolving-resource-mix-and-system-reliability.ashx

[4] In 2014, FERC staff released a report titled, "Coal Delivery Issues for Electric Generation," citing the concerns around rail capacity limits while rail regulators have had issues with service problems impacting coal shipments in summer 2017.
https://www.ferc.gov/media/headlines/2014/2014-4/A-3-presentation-staff.pdf
https://www.foxbusiness.com/features/rail-regulator-tells-csx-to-fix-service-problems

[5] https://www.reuters.com/article/us-usa-refineries-oilstorage-kemp-idUSKCN0RB20Q20150911

[6] NERC, "Polar Vortex Review," September 2014.
https://www.nerc.com/pa/rrm/January%202014%20Polar%20Vortex%20Review/Polar_Vortex_Review_29_Sept_2014_Final.pdf

[7] http://www.cpuc.ca.gov/aliso/

[8] https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-20861.pdf

Similarly, any fuel security analysis must consider the full range of benefits that all available energy technologies provide in mitigating those risks. For example, advanced energy technologies that do not rely solely on solid or liquid fuels delivered via transportation infrastructure are uniquely resilient to fuel disruption. Renewable energy resources make up an ever-increasing portion of PJM's generation mix, and do not rely on any fuel delivery infrastructure that is subject to potential disruption. These resources are increasingly utilizing advanced inverter technologies and pairing with energy storage and other resources to provide around-the-clock capacity and dispatchable energy. In addition, demand response, energy efficiency resources, and energy storage all help reduce reliance on solid and liquid fuels because they require no immediate fuel input to provide service to the market.

Furthermore, we anticipate that technological innovation will continue to develop new advanced energy resources that provide additional benefits that help mitigate real or perceived fuel security risks. For that reason, and as discussed in more detail below, PJM should consider a broader range of potential future resource portfolio scenarios, and transparently update those scenarios as needed.

III. PJM must account for fuel security benefits from behind-the-meter resources and resources that have not cleared the RPM.

AEE believes that PJM should make efforts to ensure that its analysis accounts for contributions to fuel security by resources that have not cleared in RPM and resources that are located on the distribution grid or behind the meter. For example, many distribution utilities and their customers have invested in advanced energy technologies (including distributed generation, demand response, and energy efficiency investments) to address needs for continuous high-quality power supplies, other local reliability needs, and customer preferences. Ignoring those resources and incorporating an additional constraint and accompanying cost in RPM could unreasonably diminish the value and utility of these investments. Since there is not yet a way for the wholesale markets to incorporate behind-the-meter resources (pending the implementation of FERC Order No. 841 and the likely forthcoming Final Rule on aggregated distributed energy resources, neither of which will be completed in time to be incorporated into this fuel security study), PJM must find a way to ensure that it models and consider the fuel security benefits that these technologies provide to the region.

IV. To capture all of the factors discussed above, PJM should include additional scenarios provide transparent assumptions in its fuel security analysis.

To accurately account for all of the potential fuel security risks and potential benefits provided by existing and emerging technologies (including those located behind the meter) in mitigating those risks, as outlined above, PJM should ensure that it's analysis consider a sufficiently robust set of possible future scenarios.

For example, the analysis scenarios that PJM describes in its white paper appear to incorporate the assumption that renewable energy resources will not play a more significant role in the fuel mix moving forward. However, recent trends suggest that renewable resources and other advanced energy technologies (including storage and distributed energy resources) will only continue to grow. For this reason, AEE recommends that PJM consider additional

scenarios wherein renewable energy resources replace planned retirements, and scenarios where a combination of technologies, including renewables, storage, distributed energy resources, and demand-side management technologies, play a greater role in replacing traditional generation technologies.

Another important component of any analysis will be transparent and accurate modeling with reasonable assumptions regarding generator and non-generating resource availability. PJM states that it will base its study on generator forced outage rates consistent with recent winters, and include the loads and wind chill of the 2014 Polar Vortex as one scenario. AEE believes that PJM should not include the extraordinary generator forced outage rates from the 2014 Polar Vortex in these studies, as experience since then shows that many of the root causes have been remediated. It may be that the fuel disruption scenarios result in similar outage rates, but such outages should be an outcome of the model rather than an assumption.

V. All identified solutions should be both market-based and fuel-neutral.

As a threshold matter, AEE respectfully submits that there should be no predetermined outcome of the study process it is undertaking now. PJM should not presume that it will ultimately need to model "fuel security constraints" in RPM or elsewhere. As noted above, the system has long been subject to a range of "fuel security risks," as PJM defines that term. As a result, the process of reviewing potential fuel security risks that may be present under a range of likely future scenarios (expanded as requested above) could reasonably conclude that existing planning and operating standards (including, e.g., the maintenance of reserve margins and operating reserves) are adequate, and no intervention in the market is necessary.

Having said that, to the extent that "fuel security constraints" are ultimately determined to be required in RPM, AEE strongly agrees with PJM that solutions for any identified fuel security constraints must be both (1) market-based, and (2) fuel neutral. In this regard, AEE agrees with PJM that fuel security constraints should "be defined in a fuel-neutral manner, such that all resources are able to compete to meet them." Allowing a broad range of technologies to satisfy these constraints, including advanced energy technologies, will provide the most cost-effective outcome for consumers and also ensure continued fuel and resource diversity in PJM, which is critical to ensuring that fuel security concerns do not arise again in the future.