UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Reliability Technical Conference	)	Docket Nos. AD16-15-000,
	)	ER16-1085-000
	)	ER16-1649-000

STATEMENT OF ALLEN MOSHER
ON BEHALF OF
THE AMERICAN PUBLIC POWER ASSOCIATION

PANEL II: EMERGING ISSUES – PART II

On behalf of the American Public Power Association ("APPA") and the nation's 2000 public power utilities, I want to thank the Commission for holding this reliability technical conference. While the Commission, NERC and the industry face a daunting set of emerging reliability challenges, the current state of reliability is robust, with positive trends pretty much across the board. Moreover, the emerging reliability challenges we face look manageable, if the Commission and other regulatory authorities focus on adopting policies that properly balance public policy goals, electric reliability, costs to consumers and the flexibility for industry participants to develop solutions that respond to customer needs and local facts on the ground. One can easily envision a combination of state and federal energy and environmental policies that could jeopardize electric reliability, but we have not reached that threshold yet. In sum, we are still planning on a future that falls within a "safe zone" of workable public policies and private sector activities.

My primary messages to the Commission are first to continue its vigilance against threats and vulnerabilities to electric reliability that may be beyond the current design basis for the bulk power system. Aliso Canyon is one case in point, where a gas infrastructure failure poses large but previously underappreciated risks to reliable electric service. However, there are other risks as well, due to electric market participant actions that may stress the industry's ability to respond. In particular, larger, more rapid than expected retirements of nuclear and coal generation will increase the dependence on natural gas infrastructure, and may require substantial new electric transmission infrastructure to integrate utility-scale renewables. Volatility and even step increases in wholesale prices are likely to return as well, as natural gas supplies tighten in coming years. At the distribution level, customers, public officials and utilities are increasingly focused on infrastructure resiliency against extreme events.

Second, the Commission should continue to look closely at the interaction between federal environmental policies, such as but not limited to the EPA Clean Power Plan, and various state policies such as renewable portfolio standards, that may in combination put electric reliability at risk. For example, NERC's Phase II Clean Power Plan Assessment does not indicate any imminent risks to adequacy and operational reliability. However, the interaction between state RPS requirements, competitive pressures, CPP deadlines, and other environmental regulations could place utilities in an operational box. The environmental pressures APPA members face also include mercury and air toxics standards, effluent limitation guidelines, coal combustion residuals, national ambient air quality standards for ozone and particulate matter, and national emission standards for hazardous air pollutants for reciprocating internal combustion engines (RICE MACT). The timing of these rules could place added pressure on reliability and costs.

Third, the Commission should reassess how its electric reliability and market policies work together, to ensure that the Commission's promotion of wholesale competition and bulk power reliability do not work at cross purposes or create unnecessary barriers to state and local policy decisions. APPA remains concerned that mandatory RTO capacity markets increasingly do not accommodate the long term contractual arrangements and infrastructure planning required to meet public policy goals, ensure reliability, and keep costs to consumers as low as possible. With respect to the Commission's recent rulemaking proposals to address essential reliability services, APPA fully supports the Commission's direction, even as we caution that additional technical research and industry standard development are needed prior to finalizing new pro forma large and small generator interconnection agreements.

The Commission asked this panel to address the following questions:

a. Discuss the potential effects that a projected increase in renewables and distributed energy resources will have on reliability. How is NERC tracking these effects as they develop? What strategies has NERC developed to maintain reliability as the deployment of distributed energy resources increases?

b. How can system operators maximize/leverage potential reliability benefits associated with the increase in renewables and distributed energy resources?

c. The Aliso Canyon natural gas leak highlights the value of grid planning that considers the possible loss of a major natural gas facility or pipeline. How is industry considering and addressing this risk in various regions? Should the Commission or NERC take additional actions to encourage or assist performance of such studies?

d. What are the reliability considerations for microgrids? Are they significant for purposes of the Bulk-Power System?

Renewables and DERs

Renewables and DERs can have manageable and even positive impacts on reliable operations if they are integrated into utility operations on a basis comparable to conventional resources. The key is a set of operational practices, tariffs and business rules that are consistent – but not necessarily uniform – between the bulk power and distribution system levels.

System operators are learning how to reliably integrate increasing quantities of renewable generation, including both wind and solar, into bulk power and distribution system operations. This includes significant but smaller quantities of distributed energy resources, including DERs on the customer-side of the meter. APPA supports continuing efforts by NERC to study, characterize and measure the need for essential reliability services. At current levels of variable generation penetration, we have time to study frequency, voltage and ramping requirements, develop reasonable metrics, and then develop a combination of reliability standards, markets and tariff rules to ensure adequate resource capabilities to provide essential reliability services and the ability of system operators to dispatch such resources to ensure reliability. In the short term, regional approaches should be allowed, to ensure that immediate risks to reliability are addressed. NERC assessment reports, EIA data and news reports indicate that wind is now and will become an even more dominant source of generation in the MISO, SPP and ERCOT ISO regions. As recently as February 2016, on some days nearly 50% of the net energy dispatched within the SPP RTO came from wind. In California, renewable portfolio standards have created the operational challenges of the so-called "duck curve" for the California ISO and other California utilities. California's decisions are clearly having a profound impact on neighboring states. APPA members are actively considering proposals for a further expansion of the western energy imbalance market and the possible expansion of the California ISO itself, with the goal of providing benefits to all consumers in the west.

In contrast, at current levels of penetration, distributed energy resources do not pose a material risk to bulk electric system reliability within the lower 48 states. While the growth of rooftop solar has been rapid and is likely to continue, particularly in California and other southwestern states, these DERs start from an extremely small base. Even today solar PV is less than 2% of total U.S. generating capacity and rooftop PV is still a relatively small share of that total.

Customer-owned generation and other new customer-side technologies do pose major planning, financial and operational challenges to distribution utilities, including public power systems. In fact, APPA has launched a new strategic initiative, called Public Power Forward, to help its members address changing retail customer needs and expectations. The initiative addresses grid modernization, enhanced retail services, distributed energy resources, new business partnerships, and new rate designs that properly reflect costs and send good price signals to consumers. You can put me in the electric rate design camp that thinks that Net Energy Metering of residential solar sends a really bad price signal to retail consumers, particularly when combined with a flat energy charge. There are lots of unintended consequences with NEM – as well as reasonable alternatives that are fair to all classes of retail customers and to utilities.

For the purposes of this technical conference, the key issues raised by customer-sited DERs revolve around the degree of system operator visibility, control and integration. Distribution utilities will be able to integrate greater quantities of customer generation into their local distribution networks, with larger total benefits to customers and utility system operations, if they have operational control over the dispatch of these DERS. Operational control will also help ensure that the hosting capability limits of specific distribution circuits is observed.

APPA also believes that community-scale solar and other utility-sponsored DERS are a largely untapped opportunity to better manage the impact of distribution system load on the bulk system and capture the environmental benefits of renewable energy sources. Community-scale solar projects ranging from 1 to 20 MW or more have many of the cost advantages of utility-scale projects, while avoiding the costs of transmission and line losses. Moreover, community-scale projects appear to have a two-to-one cost advantage over residential projects, due to economies of scale, lower shared costs for inverters and other equipment, and project development savings. Again, these community-scale projects start from a very small base, with little to no material impact on bulk power reliability to date.

Micro-Grids

APPA does not believe that micro-grids pose significant operational, financial or reliability risks to either the bulk power system or wholesale markets. After all, public power distribution utilities are the original micro-grids and we've been around for a hundred years or more. During the 2003 northeast blackout, a number of municipal utilities kept their lights on when the surrounding regions were blacked out for extended periods. So we've seen the reliability benefits of distributed generation. The real question today is whether there are significant benefits from creating widespread new micro-grids? In general, I would say no; the benefits of continuous interconnection and integration with wholesale markets and bulk power system operations are large. The resources and network costs to develop and operate a micro-grid in isolation from the main grid are significant. Widespread adoption of micro-grids is likely to increase total system costs without providing offsetting benefits.

There are a couple of very significant exceptions to this general rule. First, some end-use customers have very specific supply resiliency needs, including server farms with five 9's power quality needs, industrial facilities with cogeneration heat requirements and continuous process requirements, and U.S. military facilities for which mission assurance demands resiliency across multiple critical infrastructure sectors. For example, military mission assurance may require service continuity not just to the base, but to the surrounding community as well.

Second, micro-grids may be used to identify and provide integrated energy solutions for retail customers. The traditional example is combined heat and power for large buildings. Similarly, micro-grids can be used to manage the integration and shaping of customer energy loads and resources, such as electric vehicles, heating/cooling systems, water heaters, and smart appliances. Micro-grids with significant on-site electric or thermal energy storage capabilities may change net distribution system demands on the bulk power system, to take advantage of low off-peak power prices, which could come from a variety of prime movers, including wind and utility-scale solar. These micro-grids could operate in isolation during extreme events, but the more likely business case would be to better manage the net energy and capacity load the micro-grid presents to the distribution system.

Aliso Canyon and Infrastructure Resiliency

I will defer to others on the operational and planning challenges raised by Aliso Canyon. However, Aliso Canyon may highlight a common phenomenon about High Impact Low Frequency ("HILF") events. The bulk power system is designed to withstand a design basis event, generally equal to the largest single contingency within an interconnection, without resulting in cascading, instability or uncontrolled separation of the bulk power system that in turn could result in loss of load. This is colloquially known as "the big three." After any large contingency occurs, system operators are supposed to quickly restore system frequency and voltage to within normal limits, such that if another major event should occur, reliable operation is maintained. The NERC State of Reliability Report shows that we're doing a pretty good job meeting the challenge of electric reliability. The Aliso Canyon event did not occur over a real time operation timeframe – but it does represent a loss of gas storage capability to serve nearly 10,000 MW of electric generation, which is roughly three times the largest single contingency used to plan the western interconnection. All of this shows that it takes a really large event to truly rattle the electric reliability cage. But it may be prudent to look around us, both within the sector and at other interdependent sectors, to game out other infrastructure interdependencies that place reliable service at risk. The public increasingly shows little patience for electric infrastructure failures, even in the face of extreme events. A new public discourse on infrastructure resiliency may be emerging.

To repeat points I've made before, we need to have a broader conversation about infrastructure resilience. As the NERC State of Reliability Report points out, the ten most severe bulk power system events in 2015 (as measured by the NERC Severity Risk Index) were all weather-related. Even so, these BPS-level events were much less severe than the corresponding impact of storms and aging infrastructure on distribution system reliability. At least in wealthier, urban communities, the public may be gravitating toward an expectation of five 9's reliability – which implies one hour of cumulative service interruptions every ten years. Anything less indicates room for improvement. At the bulk power level, we need to address wide-area resilience, meaning: Are there additional design improvements we can make to ensure the bulk power system has sufficient redundancy to support post-event distribution system restoration? What level of electric infrastructure resilience does the nation need to protect the public interest and safeguard national security? These questions raise broader concerns about the impacts of electric infrastructure security and resilience on other infrastructure sectors that are critical to the nation's economic and national security.

Thank you the opportunity to participate in this Technical Conference. I look forward to your questions.