August 23, 2019

U.S. Department of Energy
Mailstop OE-20
1000 Independence Avenue, SW
Washington, DC 20585

Attn: Office of Electricity, Guidance for Enhancing Grid Resilience

COMMENTS OF THE ELECTRICITY CONSUMERS RESOURCE COUNCIL (ELCON)
ON THE DEPARTMENT OF ENERGY (DOE)
NOTICE OF REQUEST FOR INFORMATION (RFI)
ON CODES, STANDARDS, SPECIFICATIONS, AND OTHER GUIDANCE FOR
ENHANCING THE RESILIENCE OF ELECTRIC INFRASTRUCTURE SYSTEMS
AGAINST SEVERE WEATHER EVENTS,
84 FED. REG. 32730 (JULY 9, 2019)

ELCON appreciates the opportunity to comment on the above-referenced DOE notice on enhancing the physical and operational resilience of electric grid systems and their components against severe weather events.

INTRODUCTION AND BACKGROUND

ELCON is the national association representing large industrial consumers of electricity. ELCON member companies produce a wide range of products from virtually every segment of the manufacturing community. ELCON members operate hundreds of major facilities and are consumers of electricity in the footprints of all organized markets and other regions throughout the United States. Reliable electricity supply at just and reasonable rates is essential to our members' operations.

ELCON's members are industrial consumers that place a particularly high value on electric reliability. Accordingly, ELCON has a strong interest in mitigating Bulk Electric System (BES) reliability and resilience threats provided that the corresponding costs are prudently incurred and represent a proper balancing of costs and benefits. Industrial consumers

also place a high value on procurement flexibility and are very sensitive to cost impacts. As such, industrial consumers seek to ensure that reliability and resilience policy has demonstrated reliability benefits that justify any added costs, rely on incentives instead of standards where appropriate, and preserve procurement flexibility throughout the supply chain.

ELCON appreciates DOE's diligence in evaluating the risks to BES reliability and resilience. In particular, ELCON emphasizes the RFI's objective to identify cost-effective means to enhance weather-related grid resilience. Specifically, the RFI requests information pertaining to 1) specific technical design standards or requirements for physical system components; 2) relevant corporate business practices; and 3) analytic methods and tools for estimating the possible economic benefits of enhancing power system resilience. Consistent with these areas, ELCON recommends that DOE launch an effort to reduce barriers to industrial self-supply and assist in developing an economic framework for evaluating grid resilience to ensure any added costs are justified by benefits.

I. TECHNICAL DESIGN STANDARDS OR REQUIREMENTS

Industry-wide physical design standards may be practicable where the benefits uniformly outweigh the costs across the country and no better alternative exists. Standardization often lowers the per unit cost of production, but it restricts procurement flexibility and service customization. In cases where the latter outweighs the former, the preferred policy practice is to improve information, analytic frameworks, and guidance that are most appropriate to allow regulators to better weigh the costs and benefits of different alternatives.

It is important to consider the variance in costs and benefits of weather resilience practices across regions. For example, infrastructure in hurricane-prone areas may warrant a higher wind rating than areas with more docile storm patterns. Whether the incremental benefits

outweigh the costs to weatherize equipment often depends on other regional variables. In other words, context matters. For example, a system requiring 100 GW of winter resources to maintain operating reserves and 150 GW of nominal capacity does not need tens of GWs of capacity to incur extra costs in order to meet system reliability needs. In this case, uniform performance across the fleet would be inefficient and a poor fit for uniform requirements. This highlights why extending physical standards into the weatherization space should avoid restrictions to procurement flexibility and intruding upon regionally-tailored responses in the form of wholesale market design and/or state procurement processes.

The states and regional reliability coordinators would benefit from DOE tools that provide better awareness and inform weather-based improvements to procurement processes. Alignment of state procurement processes with future regional operating conditions is becoming increasingly challenging, especially with more weather-dependent resources in the generation mix. Arming states with better information on how their procurement decisions affect regional capabilities should enhance the prudency of procurement decisions made. For example, DOE's focus on better modeling of electricity-natural gas system interfaces could identify how weather conditions affect the coincident output profiles of wind and solar resources and the ability of gas generators to provide associated balancing services, which is a function of demand on pipeline systems both in aggregate and in rate (*e.g.*, rapid gas generator ramps can induce challenging pipeline pressure changes even if demand is well below pipeline capacity).

Any new or modifications to existing standards or requirements should be justified by cost-benefit analysis. ELCON elaborates later in these comments on methodology, but stresses here the shortcomings of current standards processes in scrutinizing costs and benefits. Generally, reliability standards under the auspices of Federal Energy Regulatory Commission

(FERC) and the North American Electric Reliability Corporation (NERC) are developed independent of cost-benefit considerations. A clear example is a pending FERC notice of proposed rulemaking on NERC's transmission planning standard TPL-001-5.[1] Stakeholders in NERC's standard development process believe the probability of the event the standard intends to mitigate is too low, the mitigation costs too high, and the benefits too uncertain to justify a change to the standard as FERC proposes.

A weather-focused application is the July 2019 joint FERC/NERC report on the January 2018 Southern cold weather event that recommended the development of weatherization standards without calculating the cost or the effect on loss of load probability.[2] As such, consumers do not know if the recommendation will leave them better or worse off. Physical procurement standards would intrude upon merchants' market-driven responses to cold weather preparation and encroach upon state prudency reviews of weatherization costs. However, cost-benefit and other information could enhance market participant and state regulatory decision-making.

Any requirement that generation owners develop weatherization plans must emphasize that uniform practices across the fleet are not necessary, but rather the portfolio of assets should be optimized to maximize the benefits less costs of weatherization practices. Information from DOE, FERC, and NERC about the incremental effect of weatherization on loss of load probability would at least help states and other actors understand the benefits that they can compare against the cost of more robust weatherization.

[1] https://www.ferc.gov/whats-new/comm-meet/2019/062019/E-3.pdf.
[2] 2019 FERC and NERC Staff Report, The South Central United States Cold Weather Bulk Electric System Event of January 17, 2018 (July 2019) (available at https://www.ferc.gov/legal/staff-reports/2019/07-18-19-ferc-nerc-report.pdf).

II. CORPORATE BUSINESS PRACTICES

Technological changes are rapidly altering the prospects to align resilience policy with individual customer preferences. Relevant technology advancements have largely come in two categories: expanding capabilities for self-supply and enabling differentiated reliability services.

Self-sufficiency is the most robust pathway to enhancing resilience but faces major artificial barriers to development. Industrial consumers aggressively seek to self-supply and see a growing number of physical capabilities to do so, as well as financial opportunities to mitigate reliability risk. For example, ELCON members are actively considering cogeneration expansion, as well as newer forms of self-supply including fuel cells, flywheels, industrial-tailored renewables, natural gas-fired microturbines, and various additional microgrid technologies. Industrials are exploring modular applications that protect their critical system elements.

Various improvements at the federal level would improve prospects for industrial self-supply. Paradoxically, reliability standards sometimes stunt development of resilience-enhancing industrial self-supply. For example, some industrials are foregoing investments or inefficiently downsizing investments in microgrids because of NERC compliance concerns. As the influence of distributed behind the meter generation becomes more apparent on bulk system reliability, it is imperative that the regulatory response reduce, rather than create, barriers (*e.g.*, excessive deliverability requirements) to adoption while enhancing operational visibility for balancing authorities.

Federal policy also alters the allocation and mechanism for transmission and capacity costs, which affects the avoided costs for self-supply considerably (*e.g.*, coincident demand charges). Improved integration of demand-side resources into market constructs would also bolster system resilience and tap into flexible industrial loads, which have helped CAISO and

ERCOT manage heatwaves and aided MISO, PJM, NYISO, and ISO-NE during cold spells in recent years. Reducing barriers to integrating industrial customer generation and demand-side services, such as operating reserves and black start services, would also benefit system resilience at lower total cost. Right-sizing transmission charges to reflect net load instead of gross load, especially in footprints like SPP, align with cost-causation principles and would reduce self-supply barriers and cross-subsidies across consumer classes. Above all else, the most important FERC consideration for self-supply is robust implementation of the Public Utility Regulatory Policies Act (PURPA), which provides essential protections for industrial cogeneration and other forms of self-supply from discriminatory utility practices.

Industrial consumers have long faced systematic discrimination from incumbent utilities for cogeneration, such as excessive transmission charges and flawed or absent rates for supplemental and standby power. Industrial consumers see the same emerging for other forms of self-supply, especially as the diversity of partial-requirements customers exceeds the regulated paradigm's customer class designations. This is most evident in regulated monopoly states, where cost-of-service utilities have a strong disincentive to let consumers provide for themselves. As a result, an industrial coalition consisting of ELCON, the American Forest and Paper Association, and the American Chemistry Council backed a NARUC resolution that passed in February 2019 to reduce state regulatory barriers to cogeneration development for partial requirements customers.[3]

States should follow this resolution and apply its spirit broadly to reduce self-supply barriers to all technologies. States can also enable large consumers to have direct access to market services, which allows consumers to optimize their market and self-supply decisions.

[3] https://pubs.naruc.org/pub/758747DC-F64E-BFD7-D411-817D44D3E571.

Granting industrial consumers increased procurement autonomy is the surest path to drive innovation in self-sufficiency and, by connection, weather-related resilience. DOE could assist in enhancing the visibility of federal and state barriers to industrial self-supply and highlight why PURPA remains critical in today's context to achieve this end.

DOE leadership could also greatly benefit the advancement of differentiated reliability services. The literature reports that advanced load controls combined with "advances in sensors and monitoring at the higher voltage level, ISOs are close to having the technology to distinguish the supply contributions of individual control areas and perhaps individual retailers."[4] This creates the ability to isolate consequences of resource shortfalls to the responsible parties.[5] In concert with advanced flow controls that mitigate network externalities, abilities to redefine property rights may exist. For example, this may fundamentally change the economic designation of resource adequacy from a "common good" to a pure private good.[6]

This opens the door to differentiated reliability services, where service curtailment is aligned with individual consumers' willingness to pay for reliability. This will require an overhaul of current practices, such as liberalizing procurement practices and balancing authority operating procedures, which today generally treats all firm load evenly as most consumers pay and receive a uniform level of reliability. This contrasts sharply with how consumers value reliability. Economic studies have shown that the value of lost load (VOLL) varies by orders of magnitude across consumers,[7] which does not even account for variations among specific end uses for individual consumers.

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[4] James Bushnell, *et al*., "Capacity Markets at a Crossroads," Energy Institute at Hass WP No. 278, April 2017, at p. 52 (available at https://hepg.hks.harvard.edu/files/hepg/files/wp278updated.pdf).
[5] *Id*.
[6] D. Hartman, "Enhancing Market Signals for Electric Resource Adequacy," R Street Institute Policy Study No. 123, at p. 2 (available at http://2o9ub0417chl2lg6m43em6psi2i.wpengine.netdna-cdn.com/wp-content/uploads/2017/12/Final-123.pdf).
[7] *E.g*., see various studies by London Economics or the Brattle Group.

The prospect of differentiating reliability services is very important to industrial consumers. For example, a brief service curtailment may be viewed indifferently by an arc furnace operator but cause tens of millions of dollars in damages to a refiner. Even holding the number and duration of total firm load curtailments constant, but reallocating customer outages under a differentiated versus undifferentiated reliability construct could easily lower the aggregate economic damages by over an order of magnitude.

With respect to weather resilience, advancing differentiated reliability concepts will decrease the probability of curtailment to critical loads, such as mission-critical facilities and high-VOLL industrials. For example, a differentiated reliability concept would permit prioritization of a utility supply stacking order when load curtailment is necessary under some conditions. A premium service opt-in program for high-VOLL loads would be especially valuable in areas like the West, where service curtailments may be necessary for wildfire prevention. DOE could help facilitate the technical capabilities and dialogue needed to pilot such an effort. To encourage broader recognition, DOE could encourage NERC, which is exploring how to develop resilience metrics, to segment firm load in its metrics based on the value those end-uses place on reliability.

Ideally, DOE would encourage NERC to evaluate new technologies and reliability concepts through an economic lens. As Bushnell *et al.* (2017) note, NERC "should consider the impact of new technologies on both planning and operational standards in a way that better accommodates economically efficient reductions or curtailments in load."[8] Reliability organizations, including NERC, must play an active role in order to increase the diversity in

[8] J. Bushnell, et al., "Capacity Markets at a Crossroads," Energy Institute at HAAS (April 2017), at p. 5 (available at https://hepg.hks.harvard.edu/files/hepg/files/wp278updated.pdf).

approaches to resource adequacy and reliability, as some of these activities would violate existing NERC standards.[9]

III. ANALYTIC METHODS FOR EVALUATING BENEFITS

ELCON appreciates DOE's inquiry into improving analytic methods and tools for estimating the benefits of system resilience, which ELCON has called for in other forums as part of a holistic economic framework to evaluate grid resilience.[10] Consumers incur the costs and benefits of a resilient grid, but resilience policy to-date has generally failed to adopt the consumer perspective. This generally boils down to problems with ensuring resilience policy results in consumer benefits that exceed costs because verification of benefits is highly speculative and often unquantified.

This has led ELCON and some other consumer groups to express intense skepticism of certain federal electricity policies over the last several years promoted in the name of grid resilience.[11] Some of these proposals could amount to tens of billions of dollars in cost increases with little or no benefit.[12] Some ELCON members estimated that their company-specific costs would increase by over $20 million under some resilience proposals.

Industrial consumer concern is also very evident at the state level, where legislators and regulators lack a prudency gauge for resilience investments without reliable benefits estimates. Utilities have often seized the opportunity to expand rate base by "grid hardening" and other

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[9] Id. at p. 53.
[10] *E.g.*, ELCON's May 24, 2019 Comments to FERC (available at https://elcon.org/comments-of-elcon-docket-no-ad19-12-000-security-investments-for-energy-infrastructure-technical-conference/).
[11] Hartman and Marquis, "Consumers shouldn't pay for bureaucratic thinking on electricity," Utility Dive, Mar. 8, 2019 (available at https://www.utilitydive.com/news/consumers-shouldnt-pay-for-bureaucratic-thinking-on-electricity/550013/).
[12] *See, e.g.*, Celebi, *et al*., The Brattle Group, "The Cost of Preventing Baseload Retirements: A Preliminary Examination of the DOE Memorandum," July2018 (available at https://info.aee.net/hubfs/Brattle_AEE_Final_Embargoed_7.19.18.pdf).

initiatives, often with skepticism or outright opposition from consumers. For example, the Florida Industrial Power Users Group and AARP opposed a Florida bill passed this summer that requires utilities to file storm protection plans and expedites ratepayer charges to bury power lines.[13]

Methodological advancement of resilience benefits valuation would greatly improve the information available to inform federal and state policymakers and create an opportunity to alleviate consumer concerns. A 2018 expert workshop co-organized by current ELCON staff examined these and other economic issues associated with bulk power system resilience.[14] The experts concluded that cost-benefit analysis should guide grid resilience decisions and that the RTO/ISOs and DOE should target improved estimates of VOLL in this context.[15]

In this forum and others, economists have flagged a need to differentiate between VOLL methodology for short-duration versus extended-duration outages. A productive start was the January 2019 expert workshop on the economics of widespread, long-duration power interruptions.[16] ELCON suggests that next steps incorporate more field experience, especially in light of evolving technologies where revealed consumer preferences are more readily available and bulk system VOLL varies as a function of consumer self-supply abilities. ELCON members welcome the opportunity to discuss the industrial perspective on valuing the avoidance of long-duration outages as well as expediting recovery times.

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[13] R. Walton, "Florida mandates 10-year storm protection plans for utilities, sparking cost concerns," Utility Dive, June 28, 2019 (available at https://www.utilitydive.com/news/florida-mandates-10-year-storm-protection-plans-for-utilities-sparking-cos/557863/).

[14] K. Palmer, *et al*., "Economic Approaches to Understanding and Addressing Resilience in the Bulk Power System: A Workshop Summary," Resources for the Future, June 2018 (available at https://media.rff.org/documents/RFF_workshop_summary_final_0.pdf).

[15] *Id.*

[16] P. Larsen, *et al*., "Frontiers in the Economics of Widespread, Long Duration Power Interruptions: Proceedings from an Expert Workshop," Lawrence Berkeley National Laboratory, Jan. 4, 2019 (available at https://escholarship.org/content/qt8c8280md/qt8c8280md.pdf).

Consumers value the pace of service restoration very differently. For example, the damage to many manufacturing processes from an outage requires a considerable period of repair time during which the manufacturer places little to no value on service restoration. Other end-uses of electricity are often not sensitive to brief service curtailments but place much more value on rapid recovery (e.g., refrigeration services). This suggests the policy response should explore voluntary expedited service restoration programs where practicable or, at the least, allocate costs for service restoration to those that value the additional expense. DOE could help target research towards these relevant regulatory contexts, such as transmission and distribution cost allocation mechanisms for spare equipment and assistance.

ELCON encourages DOE efforts to seek not only better aggregate estimates of resilience benefits, but also the benefits distribution across consumers. Granular estimates at the ratepayer class or sub-class level would better inform beneficiary-pays approaches to cost allocation. This may also reveal that if a large proportion of resilience benefits accrue to certain end-uses, such as mission-critical facilities, it may be more prudent to invest in targeted localized investments like redundant on-site backups. The alternative -- socializing larger costs of bulk system hardening across all ratepayers -- might yield lower net benefits.

Resilience benefits for weather applications should have known probabilities, such as the frequency of storms or severe cold, which makes an expected values approach to VOLL achievable. The probability of some other types of events (*e.g.*, a terrorist attack on critical infrastructure) may be very difficult, if not impossible, to assign a probability to. If DOE seeks to expand resilience benefits quantification beyond weather, an uncertainty analysis framework may be more applicable because expected benefits are unquantifiable. Application of break-even analysis or robust decision making analysis can still inform the conditions under which the

benefits would outweigh the costs.[17] This still provides policymakers, regulators, and consumers with much better information to consider resilience policy trade-offs

CONCLUSION

For the reasons discussed in these comments, ELCON urges DOE to launch an effort to reduce barriers to industrial self-supply and assist in developing an economic framework for evaluating grid resilience to ensure any added costs are justified by benefits.

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[17] *E.g.*, Rand Corp., "Robust Decision Making," https://www.rand.org/topics/robust-decision-making.html.