



Department of Energy
Washington, DC 20585

June 7, 2019

ELECTRICITY ADVISORY COMMITTEE

FROM: Bruce Walker, Assistant Secretary
Office of Electricity (OE)

SUBJECT: DOE Response Electricity Advisory Committee paper. "Policy and Research Opportunities for Grid Resilience"

A handwritten signature in blue ink, appearing to be "B. Walker", written over the "FROM:" line of the memo.

I want to thank all members of the Department of Energy's Electricity Advisory Committee for their thoughtful recommendations concerning the Office of Electricity's efforts to strengthen grid resilience. The paper offers four recommendations, and we will address them individually below.

1. DOE should develop a comparison of bulk power and distribution resiliency standards and methodologies utilized across the country and, if appropriate, a list of best practices.

Response: This recommendation meshes well with the intent of a major resilience project that OE's Transmission Planning and Technical Assistance Division (TPTA) is now initiating. The objective of this project is to draw on the work that has already been done on grid resilience by others (e.g., proposals for decision frameworks, definitions, metrics, best practices, codes and standards, case studies of actual or hypothetical events, etc.) to synthesize an approach that utilities and regulators can use to integrate resilience as an objective into the processes now used for generation resource adequacy planning, transmission planning, and distribution planning. TPTA expects that this will be a multi-year effort because of the breadth and complexity of the subject, and because important gaps in our collective knowledge about resilience remain to be addressed. Best practices will be a topic of major interest. The Committee's continuing interest in this subject will be helpful and welcome.

2. DOE should direct Lawrence Berkeley National Laboratory (LBNL) to modify its Interruption Cost Estimate (ICE) Calculator tool to evaluate costs of power outages beyond 24 hours and make evaluation of alternative resiliency investments more appropriate.

Response: We agree on the desirability of better methods and tools for evaluating resilience investment options. However, in our view it is very uncertain whether modifying the ICE



Calculator to make it applicable to potential resilience events would yield worthwhile results. It is important to distinguish between tools for estimating the impacts of reliability events (local outages lasting less than 24 hours) and tools or methods for estimating the impacts of resilience events (wider-scale outages lasting longer than 24 hours). It is much more difficult to gauge with confidence the impacts of resilience events than reliability events. There are several reasons for this, such as: 1) to date, our collective experience, data, and expert knowledge regarding resilience events is much more limited than is the case with respect to reliability events; 2) customers' lack of experience in coping with resilience events would cause researchers to have to rely on customers' opinions about how they would be affected by hypothetical events; and 3) as outage duration and geographic scope increase, the number of variables and uncertainties to be considered increases dramatically.

In the past two years, in response to feedback from users, DOE has supported extensive work at LBNL to improve the ICE calculator significantly as it applies to reliability events. LBNL has fully reprogrammed the tool to increase its accuracy and make it easier to use, but the model is still limited to events of up to 16 hours in duration. At the same time, DOE has tasked LBNL with developing an analytic process that could be used to gather the data needed to enable the model (or perhaps a sister model) to estimate the impacts of resilience events. To develop the proposed process LBNL has contracted with a team of resilience experts at Carnegie Mellon University, and with Nexant Inc. to tap its expertise in the design of questionnaires and the use of regional economic models.

This project is still in progress, but it is already apparent to the analytic team that very different analytic approaches would be needed to obtain accurate and balanced information from residential, commercial, and industrial customers. We estimate expansion of the ICE calculator would exceed \$10 million for all sectors. Execution of the work would also require extensive support and collaboration from state regulators, the utilities' trade associations, many utilities, and affected stakeholder groups. We look forward to discussions with the EAC and with the electricity community generally about how best to proceed after the current document has been completed.

3. DOE should make certain that tools (including the ICE Calculator) appropriate for grid decision-making are known to state utility commissions, consumer advocate offices, and legislatures nationwide.

Response: We agree fully. Our practice is to work closely in the early stages with the National Association of Regulatory Utility Commissioners (NARUC), the National Association of State Utility Consumer Advocates (NASUCA), and other state-related organizations, and also with the utilities' trade associations and their members to develop and refine such tools. At a later stage we work with these organizations to facilitate adoption of the tools and keep to them up-

to-date as lessons are learned and as grid conditions change. The ICE Calculator, for example, has over 6500 U.S. users, and more than 1000 users in other countries.

4. DOE should develop a resiliency framework handbook.

Response: We agree a handbook may be useful to many interested parties, and could be one of the products resulting from the project described in our response to the EAC's first recommendation. As we move forward with that project, we will ask stakeholders what information would be usefully presented in handbook form. It would be helpful if the EAC developed a basic framework for the handbook. The Department would then tailor this framework to reflect work currently underway to address resiliency.

I look forward to continued discussions on the path of our programs and am committed to ensuring a strong and fruitful working relationship between the Committee and this office. If you wish to discuss this matter further, my staff is available to meet with the Committee, as needed.

Thank you.