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Comments on DER Interoperability and Cybersecurity Research Priorities for EPIC 5

The California Lighting Technology Center encourages the California Energy Commission to prioritize research focused on cybersecurity and interoperability of customer-sited distributed energy resources, particularly as California increasingly relies on these resources to support demand response, flexible load management, virtual power plants, and resource adequacy objectives.

California's energy programs continue to incentivize adoption of DER technologies including batteries, electric vehicle supply equipment, heat pump water heaters, smart thermostats, smart electrical panels, and home energy management systems. At the same time, utilities, aggregators, and automated service providers are developing mechanisms to coordinate and dispatch these resources in response to grid conditions. These systems are increasingly interconnected through a diverse collection of communications protocols, cloud services, APIs, gateways, and third-party platforms. While this connectivity enables valuable grid services, it also expands the potential cybersecurity attack surface associated with customer-sited energy systems.

Research is needed to better understand the communications architectures and protocols currently deployed across California's DER ecosystem, particularly for devices that serve as aggregation and control points such as smart inverters, smart panels, energy management systems, and DER gateways. These systems often possess visibility into and control over multiple behind-the-meter loads and resources and may serve as critical interfaces between customer equipment and utility or aggregator platforms.

Future research should evaluate potential cybersecurity vulnerabilities associated with these architectures and assess how compromised devices, communications pathways, or control platforms could affect both customer systems and grid operations. In addition to direct impacts on individual devices, cybersecurity events could result in inaccurate reporting of DER availability, load status, or dispatch capability. Such conditions could affect utility and aggregator understanding of available flexible load resources during demand response events, emergency load reduction events, or other grid support operations.

As California increasingly depends on customer-sited DERs as grid resources, cybersecurity incidents may also create significant economic consequences. Successful attacks or vulnerabilities that undermine confidence in DER platforms could reduce participation in demand response and virtual power plant programs, diminish the value of prior public and private investments, increase program administration costs, and slow future DER adoption. Given the substantial ratepayer-funded investments that have supported deployment of DER technologies throughout California, research that identifies and mitigates cybersecurity risks can help protect both grid reliability and the long-term value of these investments.

Research should also examine strategies for improving interoperability while reducing

cybersecurity risks, including secure communications architectures, authentication and credential management, device onboarding, protocol translation, anomaly detection, and methods for validating DER status and availability. Particular attention should be given to systems that coordinate multiple behind-the-meter devices, as these platforms may become increasingly important components of California's future grid infrastructure.