

ESS and Electric Grid Reliability - What are the next challenges and opportunities for ESS on T&D?

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Introduction

- SCE anticipates a 60% increase in electricity demand and 40% increase in peak load by 2045. To get this carbon-free power to customers across California, the grid will need to integrate 80 GW of wind and solar and 30 GW of storage at the bulk power level. At the distribution level, the grid will need to interconnect 30 GW of customer-sited solar and 10 GW of storage
- The 2021 SB 100 Joint Agency Report found that the average 25-year renewable power build rates must be 2,800 MW solar, 900 MW wind, and 2,000 MW storage each year to meet the 2045 SB 100 carbon-free electric sector goal
- Gov. Newsom issued an emergency proclamation on July 30, 2021, to establish a new demand response program and accelerate permitting approvals for new battery storage projects to improve grid reliability for 2021 and 2022.

Key Challenges and Opportunities for ESS on T&D (1/2)

- As we plan T&D capacity expansion projects, we need to transition from conventional concepts that stop at supply and grid reliability and include customer-centric reliability and resilience, e.g., deploying behind-the-meter storage
- California is already experiencing the accelerating and compounding effects of climate change. Future investments in electric generation, storage, T&D must be designed and operated for the changing climate
- Substantial deployment of large-scale grid components such as transmission lines and utility-scale energy storage systems will be required over the next few decades, though long lead times will require early actions. We need more efficient and integrated licensing/permitting processes associated with building or modifying T&D infrastructure.

Key Challenges and Opportunities for ESS on T&D (2/2)

- ESS models provided during the Interconnection Process or as part of MOD-026 and MOD-027 do not always accurately reflect the equipment installed in the field or the normal operating mode of the plant
- Inverter-based resources (IBR), including ESS, continue to exhibit abnormal performance during system disturbances, and are challenged to meet SCE's Interconnection Handbook and NERC Reliability Standard PRC-024-3 performance requirements
- IEEE 2800-2022 can/will help unify technical minimum requirements for IBR and strengthen the interconnection process
- The growth of IBR to replace conventional generation represents a paradigm shift in how we think about providing frequency response.

PNNL-SCE Investigation of Energy Storage Support For Reduced System Inertia

