

DR18.13 RESIDENTIAL DEMAND RESPONSE:

Emerging Opportunities in Southern California

OPPORTUNITY

How can SCE grow its residential DR in the next 2 to 5 years?

The purpose of this project was to investigate how SCE can develop their demand response (DR) programs and identify the opportunities and barriers over the next two to five years. This project focuses on mass market residential DR opportunities and ways to enhance customer engagement through communication and coordination.

EVALUATION

What aspects did this research consider?

This project reviewed a few key areas to evaluate the residential DR.

- SCE residential market characteristics
- Enabling technologies (e.g., smart home platforms, OpenADR, CTA-2045)
- Emerging markets for DR
- Public policy, legislative, and regulatory impacts

LANDSCAPE

How is the landscape changing?

Several conditions are changing that affect the residential DR landscape:

- Increased adoption of intermittent renewables has shifted the timing of grid peaks towards the timing of residential activities (early morning and late evening).
- New devices include increased communication abilities that enable "smart home" features that can optimize energy use versus comfort.
- Advanced communication abilities of new technology may enable aggregation of smaller loads into larger loads.
- Customers prefer coordinating with a third-party rather than the Utility.
- Electrification trends mean that space heat and DHW load profiles become more relevant.
- Behind-the-meter storage (e.g., residential batteries, solar PV) is increasing.

RESULTS

What were the key findings and recommendations?



Finding: Residential DR potential is limited by lower power use or inflexible times of use. HVAC, ventilation fans, pool pumps, and appliances are the loads likely to provide the most substantial DR.



Finding: SCE's residential customer base spans multiple climates zones and includes customers with a range of characteristics (internet connectedness, tech literacy, and income).
Recommendation: Provide different solutions to enable participation from different customer groups.



Finding: Interoperability of smart home products (smart thermostats, Amazon's Alexa, etc.) presents barriers in the form of consumer confusion and interoperability (i.e., can this work with that?).

Recommendation: Remain brand agnostic and favor architectures that use Wi-Fi or cellular connections rather than local, short-range protocols.



Finding: Cloud-based systems are lower cost but can lead to stranded assets.



Finding: Electric vehicles are a growing load, but not currently attractive as a DR load due to timing of the load.



Finding: Customers may not be ready for some TOU rate structures.

Recommendation: SCE should consider staging the rate structures in a progression so that one tariff provides a foundation for another (e.g., traditional → TOU → CPP).