SMART PANEL FIELD STUDY

Low- & Moderate-Income Residential Field Testing

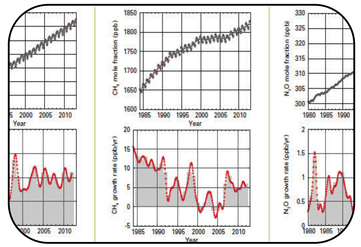
SOUTHERN CALIFORNIA EDISON

RESEARCH PURPOSE

All-electric homes can spike peak demand and often need costly service upgrades- this limits equitable electrification at scale. Smart panels have the *potential to cap main amperage, prioritize circuits, and coordinate on-site DERs* to defer upgrades while enabling electrification and demand flexibility.

Improved bill management for customers

Reduced service upgrade costs



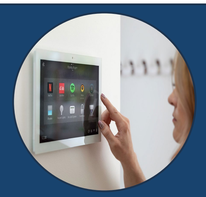
Utility-integrated control signals for reliability

STUDY DESIGN

24-month SCE field study to specify, permit, install, & evaluate smart panels in LMI homes, with circuit-level monitoring to quantify load limiting & DR potential.

KEY RESEARCH QUESTIONS

What are the permitting, installation, & training pathways and barriers for broader deployment?



How do customer telemetry and insights from smart panels affect usage behavior & program engagement?

To what extent can smart panels defer utility service upgrades by enforcing main amperage limits with circuit prioritization?

SMART PANEL TECHNOLOGY

Smart panels combine circuit-level sensing, controllable breakers, and embedded software to actively manage household demand, shifting the panel from passive hardware to an adaptive energy management platform.

Promote low-effort customer pathway to optimize energy consumption.

METHODOLOGY

1. Install up to ~18 smart panels at SCE's Low Income ESA homes with new electric appliances and/or DERs
2. Specify models, coordinate breaker/circuit mapping, and support AHJ permitting (UL, prior permits)
3. Facilitate OEM virtual inspections & installer training.
4. Attribute energy/peak by end use and verify field performance.
5. Compile feedback from customers, contractors, and manufacturers.

PROJECT TEAM

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Funded by the **Demand Response Emerging Technologies (DRET) Collaborative** which facilitates *deployment of innovative new DR technologies, software, & system applications* that may enable cost-effective customer participation and performance in California's DR programs & wholesale market.

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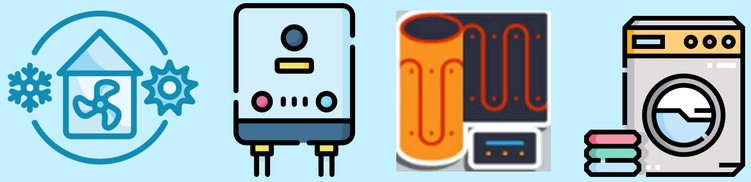
The DRET Collaborative benefits electricity ratepayers from the state's three largest investor-owned utilities and is authorized by the California Public Utilities Commission (CPUC) through 2027.

DATA METRICS

- Pre-install review: AMI history, existing panel/breakers, end-use technologies
- Primary data: Circuit-level power/energy for ≥12months



- Operational events: Load limiting occurrences and circuit prioritization outcomes.
- Process data: Permit timelines, installation challenges, installer training feedback, customer engagement notes.

PROJECT DEVELOPMENTS

- Screened candidates from SCE BE pipeline & external DER contractors
- Reviewed commercial-ready products and installation solutions with stakeholders
- Contracted with a 3rd-party installer for 9 panel installs since Jan

BARRIERS ENCOUNTERED

- Product readiness (e.g. meter-main combo, firmware delays)
- Manufacturer changes (product line took a different direction)
- Stakeholder coordination (program, contractor, manufacturer)

INSTALLATION PROGRESS

Examples of the smart panel installs

We seek to characterize the unique installation and commissioning process for smart panels. Installer surveys assess:

- Differences in installation/commissioning vs. standard panel replacements/upgrades
- Procurement challenges for smart panels vs. regular panels

EXPECTED OUTCOMES

Customer value: Information to understand usage and enable energy-saving actions (e.g., shifting EV charging, coordinating HVAC).

Utility frameworks for product specification, AHJ approval, installer training, and DR enrollment pathways.

Reliability & affordability: Smart panels facilitate dynamic demand management, supporting grid reliability while helping customers avoid upgrade costs & optimize bills.