

DEMAND RESPONSE EMERGING TECHNOLOGIES PROGRAM

SEMI-ANNUAL REPORT 2026

September 30, 2026



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Summary

The Demand Response Emerging Technologies (DR-ET) Program Semi-Annual Report for the period of Q2 and Q3 2026 is being submitted pursuant to Ordering Paragraph 59 and the discussion at pages 145-146 of Decision (D.) 12-04-045. During Q2 and Q3 2026, San Diego Gas & Electric DR-ET Program completed two (2) activities, continued to manage three (3) ongoing projects and initiated one (1) new project.

I. Completed Activities during the Reporting Period

A. *Electric Vehicle (EV) Load Detection Demonstration*

1. Overview

SDG&E conducted a demonstration to showcase how advanced load detection and analytics can identify Level 2 EV charging activity of residential customers using interval meter data. The evaluated load detection model is an example of load disaggregation, which breaks down energy consumption into estimates of how much energy is used by individual devices. Although the model can provide estimates of all building loads, the demo was focused on identifying customers who are strong candidates for a managed EV charging offering supporting Demand Response.

The demonstration provided SDG&E with valuable insights into EV charging behavior and successfully addressed key research questions, including the prevalence of detectable EV charging among customers, typical charging schedules and start/stop times, charging activity during TOU peak periods, the consistency of charging patterns over time, average charging duration, frequency, and power levels. The model is also capable of incorporating customers' rates to evaluate how charging behavior varies across rates.

The demonstration included 11,137 customers, and 2,063 sites had Level 2 EV charging activity detected. The data analysis focused on 14 demand response events in 2025. A total of 1,097 EV charging observations were detected across all events. On average, approximately 78 EVs were observed charging during each event. The average charging load per EV was relatively consistent across events, ranging from 5.91 to 7.72 kWh.

2. Collaboration

The learnings were shared with other CA IOUs during scheduled monthly Statewide DR-ET Leadership Collaboration meetings. SDG&E's ET Team also collaborated with its Clean Transportation, Load Analysis and Demand Response Program teams.

3. Status

The demonstration was completed in Q3 2026. SDG&E shared the results internally and is considering whether and how best to use the load detection model to target managed

charging offerings to customers (including cross-referencing customers across multiple programs, rates, and other learnings to ascertain energy engagement).

B. Laboratory Testing of Electric Vehicle (EV) Meter Socket Adapter (MSA)

1. Overview

SDG&E conducted laboratory testing of a Meter Socket Adapter (MSA) that can simplify the installation of an EV charger or other electric load such as a Heat Pump Water Heater for residential customers. The technology is installed between the utility meter and the meter socket, allowing customers to avoid costly electrical upgrades.

The primary objective of the testing was to validate that the installation of the MSA has no impact on meter operation. The technology successfully passed a series of tests that demonstrated normal operations, simulated outages and overcurrent protection.

Future ET research is planned to involve EV charging activities that could support demand response so this technology could facilitate equipment installations at customer sites that would otherwise need electrical upgrades for an EV charger to be installed. EV charging activities that could support demand response so this technology could facilitate equipment installations at customer sites that would otherwise need electrical upgrades for an EV charger to be installed.

2. Collaboration

The learnings were shared with other CA IOUs during scheduled monthly Statewide DR-ET Leadership Collaboration meetings. SDG&E's ET Team also collaborated with its Distributed Energy Resources, Metering, Standards, Customer Generation, Customer Project Management, Clean Transportation and Demand Response Program teams.

3. Status

Testing was completed in Q3 2026. SDG&E shared the results internally and is determining whether the device can be incorporated into a future field evaluation and installed at customer sites.

II. Ongoing Projects Through the Reporting Period

A. Evaluating Demand Response Capabilities of Connected Variable Capacity Heat Pumps

1. Overview

This study tests whether variable speeds of heat pump compressors and fans can improve comfort and overall performance as well as provide an improved resource for

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demand response. The results will help inform DR program design concerning the technology as well as customer impacts.

The primary research objective is to conduct shed events with and without pre-cooling or pre-heating strategies combined with varying levels of heating, ventilation, and air conditioning (HVAC) capacity limits; and to demonstrate functional capabilities of variable capacity systems for demand response.

Potential research questions include:

- Can variable capacity systems respond more effectively to demand response signals compared to other types of HVAC equipment?
- How is customer comfort impacted during demand response events?
- Can the duration of a demand response event be extended prior to customer opt-out?
- Can demand response programs tailored to variable capacity systems result in higher levels of program adoption by customers given system features that may help overcome typical demand response program enrollment barriers?

2. Collaboration

The progress and results were shared with other CA IOUs during scheduled monthly Statewide DR-ET Leadership Collaboration meetings.

3. Status

Customer recruitment was concluded in Q2 2026. The vendor installed Measurement & Verification (M&V) equipment and conducted baseline analysis. A post-testing survey of enrolled customers was conducted following winter test events. The testing plan was finalized for summer events, which took place in Q2 & Q3 2026 with Manufacturer A. Preliminary analysis of summer DR performance is ongoing to assess the impacts on temperature rise and customer opt-out rates. Testing with Manufacturer B has been stalled by technical challenges with event communications and data reporting.

4. Next Steps

A survey of customers who participated in summer test events will be initiated in Q4 2026. Preliminary findings will be presented in Q4 2026, with full analysis and project results expected by Q3 2027, pending resolution of the technical issues with Manufacturer B. Upon completion, the final report will be published on the Energy Transition Coordinating Council (ETCC) web site for public review and reference.

B. Flexible Demand Response Collaborative

1. Overview

This project is designed to advance Flexible Demand Response by modeling and demonstrating its value when employed as a balancing resource to support integration of wind, solar and other variable supply.

Project structure includes a collaborative effort to demonstrate effective and sustainable demand flexibility from large pumps and other loads such as electric vehicle (EV) fleet charging and data centers. A core focus is on water or wastewater facilities to engage large pumping loads as flexibility resources and to identify viable load shift strategies.

The results will inform future demand response models for program design, operations and planning tools so Flexible Demand Response can be scheduled and dispatched for the greatest benefits.

Potential research objectives include:

- Demonstrating the capability and value of large loads to flex usage.
- Characterizing and modeling the capability and availability of large pumps and other loads for better integration in power system operations.
- Fostering industry collaboration to explore program alternatives and share best practices in sustainably engaging Flexible Demand Response to support system flexibility needs.

2. Collaboration

The progress and results were shared with other CA IOUs DR-ET Leads.

3. Status

Data center load profile analysis was completed for 13 sites including Enterprise, Multi-tenant, Crypto-mining and Hyperscale data centers. The Data Center Load Profile Analyses report was published in Q3 2026.

Enterprise Data Centers are typically privately owned and operated facilities that support the computing, storage and networking needs of a single organization. The load profiles reflect a mix of steady baseload demand and occupancy-driven activity, with higher loads during weekday business hours than nights and weekends. The magnitude of this occupancy effect varies by site, with some showing minimal variation and others experiencing significantly higher weekday peaks. One site also exhibited a distinct intraday operating pattern that reduces weekday afternoon usage while maintaining higher weekend loads during those hours.

Multi-tenant Data Centers allow multiple organizations to house IT infrastructure within a shared facility. The load profiles are dominated by a consistent baseload, with only modest increases during peak periods. Weekend and weekday usage patterns are generally similar, though loads tend to be slightly higher on weekdays. Daily and seasonal load shapes vary by site and month.

Crypto-mining Data Centers perform cryptocurrency mining operations. The demand is characterized by a highly constant, around-the-clock load profile with little distinction between weekdays and weekends. The primary deviations occur during high-price periods, when operators reduce consumption, particularly during summer peak hours.

Hyperscale Data Centers tend to be large-scale facilities operated by major cloud, technology, and/or digital service providers to support extensive computing, storage and artificial intelligence workloads. The facilities exhibit very large, stable loads driven by a substantial baseload component. Weekday demand is consistently higher than weekend demand, but overall load variation remains small, with peak demand typically occurring during summer months.

4. Next Steps

The collaborative continues to discuss the framing of long-term capacity solutions for large loads and is drafting findings. The project is expected to be completed in Q4 2026.

C. *Smart Panel Demand Response and Load Management Study*

1. Overview

The Smart Panel Demand Response and Load Management Study is examining the load shed and shift potential of smart panel devices. The study leverages a field demonstration that has been initiated through CalNEXT, the statewide electric energy efficiency emerging technologies program¹.

Smart panels will be installed at residential customer sites that replace or augment typical residential electrical panels. Smart panel features allow homeowners to monitor and understand their energy usage similar to dedicated energy monitoring services; and throttle or manage circuit-level power through software or programming. The circuit-level control of the smart panel allows the system to shut off dynamic combinations of non-critical loads during demand response events. The smart panels may also be able to help control the flow of renewable and stored energy for resiliency or load flex purposes.

The study will identify host sites to demonstrate smart panel capabilities, gather occupant and installer feedback, quantify costs, and assess benefits. Tested configurations will depend on the selected sites, but each will include accompanying measures enabled by the smart panel, such as a heat pump water heater, heat pump

¹ For more detail on CalNEXT see: <https://calnext.com>.

HVAC system, and/or EV charger. Site recruitment will focus on sites that include photovoltaics (PV), energy storage, and/or smart loads to evaluate the ability to control the Distributed Energy Resources (DERs) using the smart panel, if possible.

A final report will outline the qualitative and quantitative findings in support of market adoption, future research directions, and/or program design.

Potential research questions include:

- Can smart panels allow dynamic control of critical loads by controlling circuit ampacity?
- Do smart panels allow unwanted circuits to be turned off during an event or outage?
- Can smart panels allow for dynamic control of certain non-critical loads during a demand response event?
- Can smart panels manage PV and/or energy storage systems?

2. Collaboration

The progress and results will be shared with other CA IOUs DR-ET Leads. SDG&E's ET Team is collaborating with its Demand Response Team on this study.

3. Status

The vendor has prepared the installation plans for each customer site and is onboarding an installation contractor. The study has been extended through 2027 so testing can take place during the 2027 demand response season.

4. Next Steps

Equipment installations are expected to begin in Q4 2026 once the installation contractor is contracted. Upon completion, the final report will be published on the Energy Transition Coordinating Council (ETCC) web site for public review and reference. The study is expected to be completed in Q4 2027.

III. New Projects Initiated during the Reporting Period

A. Pool Control System Study

1. Overview

The Pool Control System Study aims to show how residential pool systems can be used as flexibility assets and signaled to provide load reduction benefits during demand response events. The study will include pool pump controls, heating systems, water features, lighting, chlorination systems and any other components that are controlled by the same master controller (i.e. the pool automation system).

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The study will be offered to residential customers who have the compatible pool automation system installed with their pools. The technology provider is leading the recruitment of customers. Participating customers will be trained on the energy management platform that will be used for this study.

The vendor will monitor and report on the performance of the enrolled pool systems and assess customers' interactions with the platform, such as noting how many households opt out of events.

Potential research questions include:

- What is the current saturation of connected pool systems in the SDG&E service area?
- How large are the end use loads for each pool system component, and how coincident are they with system peak loads?
- What are the incremental demand and energy changes delivered by the intervention over the analysis period by various pool components?
- How do demand changes vary by home type, geographical region, and pool characteristics?
- What is the total system benefit of a connected pool system?
- What is the benefit provided by event-based demand response?

2. Collaboration

The progress and results will be shared with other CA IOUs DR-ET Leads. SDG&E's ET Team is collaborating with its Demand Response Team on this study.

3. Status

The study was contracted in Q2 2026. Customer recruitment began in Q3 2026 and is expected to continue in Q4 2026.

4. Next Steps

Testing is expected to begin during demand response season in Q4 2026. Upon completion, the final report will be published on the Energy Transition Coordinating Council (ETCC) web site for public review and reference. The study is expected to be completed in Q2 2027.

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IV. Budget

Program Approved Budget 2024-2027²

DR-ET	2024	2025	2026	2027
	\$774,000	\$774,000	\$774,000	\$774,000

² Approved Budget per D.23-12-005 (dated December 14, 2023)
September 30, 2026