

**DEMAND RESPONSE
EMERGING
TECHNOLOGIES
PROGRAM**

**SEMI-ANNUAL REPORT
2024**

March 29, 2024



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Summary

The Demand Response Emerging Technologies (DR-ET) Program Semi-Annual Report for the period of Q4 2023 and Q1 2024 is being submitted pursuant to Ordering Paragraph 59 and the discussion at pages 145-146 of Decision (D.) 12-04-045. During Q4 2023 and Q1 2024, San Diego Gas & Electric DR-ET Program completed three (3) projects, and initiated two new projects and one (1) new activity.

I. Completed Projects during the Reporting Period

A. *Dehumidification & Water Purification Demand Response Project*

1. Overview

This project evaluated the electric load and demand response capabilities of two (2) types of dehumidification drinking water systems. Ten (10) dehumidification units from two different vendors were installed in buildings around the SDG&E service territory. These units cool air below the dew point to produce water. The collected water is filtered, ozone is injected, then chilled or heated to use as an office “water dispenser” for drinking water.

The primary purpose of the assessment was to:

- Determine the load profile, baseline energy use, and peak demand of the units.
- Determine the available peak load reduction of the units for a demand response event. Multiple reduction strategies may be analyzed, including but not limited to turning the unit off or adjusting the water delivery temperature set points.

The secondary purpose of the assessment was to:

- Understand the added load (load growth potential) to the SDG&E territory assuming a reasonable penetration rate.
- Use the micro data to theorize what impact these products could have on the embedded energy in water distribution throughout SDG&E service territory.

2. Collaboration

The progress and results were shared with other CA IOUs during scheduled monthly DR-ET Leadership conference calls. SDG&E's ET Team also collaborated with its facilities by placing two units for comparison study at its Energy Innovation Center (EIC) and Company office.

3. Status

The final report was completed in Q1 2024 and published to the ETCC website for public review and reference.

B. Electric Vehicle (EV) Charging Impact Study

1. Overview

This study was conducted to test the real-world impact of Electric Vehicle (EV) charging on a commercial office building located in the SDG&E service territory.

The study examined the impact of introducing EV level 2 charging on a 57,000 sq. ft. commercial office building. The site is equipped with a 90 kW (AC) solar PV system, a 30 kW / 40 kWh Battery Energy Storage (BES), and four level 2 charging stations (8 ports).

The overriding goal of this study was to identify and quantify solar over-generation mitigation as a benefit of interconnected workplace EV charging. The results provide insight into the potential for mass EV adoptions ability to achieve this goal.

Below are some of the key questions examined in the study:

- Can EV charging help mitigate the impact of solar over-generation on the grid?
- Can a BES system be utilized to help flatten the usage curves, and is daytime EV charging counterproductive to shifting of demand?
- What charging utilization threshold must be achieved to demonstrate reasonable impact, and how long does it take from launch to achieve this level of usage?
- Is workplace charging cost effective for site hosts?
- What impact will EV charging have on solar sizing for a facility?

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- Are current tariff structures amenable to the promotion of EV charging and load shifting?

2. Collaboration

The progress and results were shared with other CA IOUs ET-DR Leads. SDG&E's ET Team also collaborated with its Demand Response Program and Clean Transportation team on this study.

3. Status

The final report was completed in Q1 2024 and published to the ETCC website for public review and reference.

C. Shelter Valley Virtual Power Plant Project

1. Overview

The Shelter Valley Virtual Power Plant (VPP) project evaluated the control, dispatch and real-time signaling of behind the meter resources installed throughout a vulnerable community in the SDG&E service territory.

Shelter Valley is a small, unincorporated community located in an area of East San Diego County that is more prone to outages and Public Safety Power Shutoff (PSPS) events. The project sought to help build a smart, resilient community while boosting energy reliability and emergency preparedness. The project evaluated the impact the VPP can have during peak energy consumption periods and when load might need to be shifted or curtailed due to severe weather or other grid conditions.

The VPP includes a variety of resources including battery storage, smart thermostats, and other smart devices. New battery storage systems were prioritized to customers with existing solar who are on medical baseline and/or those with access & functional needs.

SDG&E contracted with a vendor to assist with administration of the project including the recruitment of customers to participate in the study and installation of devices inside participating customers' homes. A separate vendor was contracted to enable a cloud-based platform that can control multiple resources integrated into the VPP.

2. Collaboration

The progress and results are shared with other CA IOUs ET-DR Leads. SDG&E's ET Team is also collaborating with its Advanced Clean Technology, Sustainability, Marketing & Communications and Demand Response Program teams on this study.

3. Status

The final report was completed in Q4 2023 and published to the ETCC website for public review and reference.

II. Ongoing Projects thru the Reporting Period

There are no ongoing projects this reporting period.

III. New Projects and Activity Initiated during the Reporting Period

A. *Managed Electric Vehicle (EV) Charging Demonstration*

1. Overview

The Managed Electric Vehicle (EV) Charging Demonstration will monitor charging behavior of a group of customers who register through a web portal and connect their vehicle(s) to the managed charging platform.

The demonstration will include active and behavioral managed charging functionality and provide telematics data to quantify the impact of potential managed charging offerings.

Participating customers will be surveyed about the impact managed charging events have on their day-to-day EV use and charging behavior.

2. Collaboration

Although this demonstraton is primarily for SDG&E teams to gain familiarity with Managed EV Charging functionality and data collection, the progress and results will be shared with other CA IOUs ET-DR Leads. SDG&E's ET Team is also collaborating with its Clean Transportation and Demand Response Program teams on this study.

3. Status

The contract with the vendor was executed in Q4 2023. The vendor has created the customer enrollment interface and initiated test enrollments with SDG&E's ET Team.

4. Next Steps

A group of customers will be recruited to participate. Managed charging events are expected to take place in Q2 2024, and the demonstration is expected to be completed by Q3 2024.

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

1. Overview

This study is testing whether variable speeds of heat pump compressors and fans can improve comfort and overall performance as well as provide an improved resource for demand response.

The primary research objective is to conduct shed events with and without pre-cooling or pre-heating strategies combined with response varying levels of HVAC capacity limiting; 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 will be shared with other CA IOUs ET-DR Leads.

3. Status

The contract with the vendor was executed in Q4 2023. Use cases, metrics and functional testing protocol are under development with manufacturer collaboration.

4. Next Steps

The project is expected to continue thru 2025. Upon completion, the final report will be published to the ETCC web site for public review and reference.

C. 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. 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 demand response models for operations and planning tools so Flexible Demand Response can be scheduled and dispatched.

Potential research objectives include:

- Demonstrating the capability and value of large pumping 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 will be shared with other CA IOUs ET-DR Leads.

3. Status

The contract with the vendor was executed in Q4 2023. The Flexible Demand Response model and simulation are under development.

4. Next Steps

The project is expected to continue thru Q1 2026.

IV. Budget

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Program Approved Budget 2024-2027¹

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

¹ Approved Budget per D.23-12-005 (dated December 14, 2023)