

**Emerging Markets & Technology  
Demand Response Projects  
2025 Q4 – 2026 Q1 Semi-Annual Report**

**March 31, 2026**

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## **I. Summary**

Pacific Gas and Electric Company (PG&E) submits this semiannual report as directed in *Decision Adopting Demand Response Activities and Budgets for 2012 through 2014*, Decision (D.) 12-04-045, Ordering Paragraph (OP) 59 and continued per D.14-05-025 and D.16-06-029 adopting Bridge Funding for 2015-16 and 2017, respectively. The Demand Response Emerging Technologies (DRET) Program was also approved in the *Decision Adopting Demand Response Activities and Budgets for 2018 through 2022*, D.17-12-003.

PG&E's DRET program continues to explore new technologies and applications that have the potential to enable or enhance demand response (DR) capabilities and can include hardware, software, design tools, strategies, and services. Examples of some of the types of enabling technologies that have been investigated are advanced energy management control systems (EMCS), direct load controls, and advanced heating, ventilation, and air conditioning (HVAC) controls.

PG&E's DR Portfolio Strategy centers on addressing both customer and grid needs today and, in the future, taking into account Rule 24, and the enablement of DR integration into the ISO wholesale markets. In addition, PG&E acknowledges the rapid development of "smart" devices, storage, and other technologies that are seeing increasing customer adoption across sectors and have the potential to help customers better perform in DR programs and or dynamic rates.

PG&E, Southern California Edison Company (SCE) and San Diego Gas & Electric Company (SDG&E), collectively referred to as the Investor Owned Utilities (IOUs), share updates on individual projects, including project status and findings, at monthly DRET conference calls as well as via participation in the Emerging Technologies Coordinating Council (ETCC) quarterly meetings.

## **II. Projects Completed in Q4 2025 and Q1 2026**

### **A. Smart Electric Panel Lab Test**

#### **1. Overview**

In recent years, electric panel manufacturers have started to add connected technologies to traditional electric panels. These technologies include integrated or add-on software controls that provide customers with additional information, control and capabilities beyond a traditional panel.

Below are the objectives of the study:

- Evaluate smart panel installation difficulty
- Evaluate smart panel customer app functions
- Evaluate smart panel utility app functions
- Validate that the smart panel is safe to operate for field demonstrations

## **2. Collaboration**

PG&E's DR Emerging Technology and PG&E's Applied Technology Service (ATS) teams jointly designed and will implement the test cases and procedures for the lab tests.

## **3. Results/Status**

The ATS team installed two smart panels at its San Ramon location. The panels are connected to a load simulator, which may expand to real residential electric loads such as air conditioning, electric vehicles, and water heaters in the future. The team is currently developing test cases for the customer and utility apps.

## **4. Next Steps**

The SPAN PowerUp, SPAN Dynamic Service Rating and SPAN Drive were tested for its functionalities. Generally, all functions are found to work as intended and no major deficiencies were discovered during testing. The final report was developed and soon to be available for public to download.

# **B. Field Test OpenADR 3.0 for dynamic rate**

## **1. Overview**

This DRET Study will contract with an Automated Service Provider (ASP) to bring small medium business customers into the dynamic rate using the recently developed Open Automated Demand Response ("OpenADR") 3.0 specification. The DRET Study is intended to assist in accessing the cost and benefits of day ahead hourly rates, including required infrastructure, manufacturer interest, and customer impacts when using this new open standard.

## **2. Collaboration**

The DRET study will partner with internal pricing product team since they will be leading the development and implementation of the expanded RTP Pilots.

### **3. Results/Status**

The ASP have enrolled two customers into the study, and is in the process of developing a OpenADR 3.0 VEN. The project have completed the OpenADR3.0 Integration and have also integrated the flex pricing feed into operations at both sites.

### **4. Next Steps**

The ASP have successfully send dynamic rate to the two customers during the pilot and control their HVAC based on the Hourly Flexible Pricing Pilot price. The Energy Management system also optimize the HVAC systems with the price and customer comfort preferences. The final report was in the process of development and soon to be available for public to download.

## **III. Project Initiated since Q4 2026**

### **A. Lab testing new generation of grid enabled heat pump**

#### **1. Overview**

California aims to install 6 million electric heat pumps by 2030 to accelerate building decarbonization and achieve carbon neutrality by 2045. With the increase of heat pump adoption in CA, different manufacturers have started to introduce new heat pump technology that provides new load flexibility functions. This new DRET study aims to lab test one of these technologies in PG&E lab to evaluate its load flexibility functions and capabilities.

#### **2. Collaboration**

The DRET study is a partnership with the PG&E Applied Technology Service Lab.

#### **3. Results/Status**

The lab has received the indoor unit from the manufacture, and the outdoor unit is expected to be delivered in the second quarter of 2026.

#### **4. Next Steps**

PG&E will start testing the technology in second quarter of 2026.

## **IV. Ongoing DRET Projects**

### **A. Residential load management software platform**

#### **1. Overview**

Home Energy Management system provides the functions and capabilities for residential customers to manage their energy use by behavior changes and/or automation through different energy end uses. The Study will assess residential customers' receptiveness and ability to perform load management with the support of a load management app, which serves as a home energy management system.

1. What is the effectiveness of emissions reductions messaging in:
  - Reducing household emissions
  - Shifting energy usage to off-peak periods
  - Engaging customers in load management awareness and education
2. What are the incremental load impacts of emissions reductions messaging to existing DR participants.
3. Can new communication protocol (e.g., Matter) be leveraged to automate load management measures.

#### **2. Results/Status**

The DRET team have contracted with a 3<sup>rd</sup> party software company to develop an advanced API to enable the residential load management software platform and app last quarter. The DRET team successfully developed the advanced API with the software company and a partnership agreement with the residential load management software platform company.

#### **3. Next Steps**

The DRET team will continue to work with the residential load management software platform company to evaluate its GHG impact and develop new LM functions in 2026. PG&E have contracted with a M&E company to start evaluating the effectiveness of this software in 2026. We expect the study will be completed by the end of 2026.

## **B. Voice Automation Technology for Load Management Study Phase 2**

### **1. Overview**

PG&E started to default residential customers to TOU rates in April 2021. Therefore, PG&E continue to expand the existing tools and technologies offered on its website to help customers understand new time varying rates. Similar to Phase 1 the objective of this DRET study is to leverage residential voice assistant technology (such as Amazon Alexa) and mobile app to educate residential customers on energy usage and bill forecasts, rates, TOU and RTP automation/optimization, and notification of utility events.

Customer engagement through Voice Assistants require the customer to have access to Amazon Alexa via speakers, display, and/or mobile app. Information was collected and processed from PG&E's internal rate engine and Share My Data (SMD) to a third-party system. The customer would then interact with a third-party system (Energy Expert) through their smart speakers, smart display, and mobile devices. The Energy Expert advised the customers to optimize their energy use based on the customer's rate schedule. In addition, the app provided customer notification such as Smart Days and PSPS events.

### **2. Collaboration**

The DRET team will partner with the internal customer care Pricing Product and Marketing teams to develop frequently asked questions (FAQs) that relate to TOU and load management. In addition, this mobile app has the capability to support the recently approved expanded RTP pilot. The DRET team will work with the pilot team on such collaboration when appropriate. PG&E hired the same third party to continue the development of the mobile app for this study.

### **3. Results/Status**

A contract was developed for this study and the DRET team is working with internal customers experience team to enhance the look and few of this application.

### **4. Next Steps**

PG&E continues to work with internal marketing team to expand the user base of this mobile app in 2026. The team enhanced the Terms and conditions for the mobile app and also worked on ensuring the app is compliant to the American Disability Act.

## **C. Flexible Demand Response Collaborative**

### **1. Overview**

The objectives of the project are to: 1) demonstrate the capability and value of large loads like water pumping, EV fleets, and data centers to flex usage; 2) characterize and model the capability and availability of large pumps and other loads for better integration in power system operations; and 3) foster industry collaboration to explore program alternatives and share best practices in sustainably engaging Flex DR to support system flexibility needs.

### **2. Collaboration**

The DRET study is a partnership with the Electric Power Research Institute (EPRI).

### **3. Results/Status**

PG&E contracted with EPRI and started to engage with this project. There was a meeting with other participating utilities in February, which PG&E participated remotely.

### **4. Next Steps**

PG&E will continue to participate in this collaborative and identify if there is any best practice and lessons learned that can apply to PG&E's programs.

## **D. CEC Industrial, Agricultural, Water (IAW) Flex Hub**

### **1. Overview**

The goals of the IAW Flex Hub is to demonstrate demand-flexible technologies in the industrial, agricultural and water sectors, to validate technologies and business cases for industry that will accelerate technology options, gather and share data to support innovative rates that unlock the potential of demand flexibility in these critical industries, and to provide benefits to disadvantaged communities across the state. The proposed Industrial Flex Hub will target four (4) demonstration projects in PG&E's service territory across a diverse set of industries that will enroll in PG&E's demand response or dynamic pricing programs or pilots. Information gathered and generated through the Industrial Flex Hub will be shared to help inform PG&E about opportunities to optimize the benefits of demand flexibility across its service territory.

## **2. Collaboration**

IAW Flex Hub partner includes the Electric Power Research Institute (EPRI), University of California, Davis (UC Davis), Lawrence Berkeley National Laboratory (LBNL), Stanford University, Fresno State University, DNV, community partner PSE Healthy Energy, and IAW Flex Hub lead Momentum.

## **3. Results/Status**

Momentum has completed the contracting process with CEC.

## **4. Next Steps**

The DRET team participated in the kick off meeting and is in the process of contracting with Momentum to participate in the IAW hub.

# **E. Field Test residential EMS with Matter standard**

## **1. Overview**

The goal of this project is to demonstrate the feasibility of optimizing off-the-shelf Matter devices, such as thermostats, through direct communication with grid signals. The demonstration will explore how and whether Matter, the new smart home connectivity standard, can enhance interoperability, improve user experience, and enable optimized energy usage through seamless integration with a smart home automation hub. The grid signals may come from different sources such as OpenADR 3.0, showcasing how Matter devices can be paired with a Matter enabled central smart home automation hub to establish seamless interaction between devices from different manufacturers within the local area network (LAN).

## **2. Collaboration**

The DRET study will partner and two third party vendors to implement this study. One providing Matter certified technologies and the other one providing OpenADR 3.0 Virtual Top Node.

## **3. Results/Status**

PG&E completed the contracting process with the two vendors.

## **4. Next Steps**

The team developed technology integration between the Demand Response Automation Server and the Matter Hub system, and recruited

close to a dozen of customers (PG&E employees and contractors) in the 4<sup>th</sup> quarter of 2025. Field testing will start in the second quarter of 2026.

## **F. Flexible Interoperable Technologies Initiative (FLEXIT)**

### **1. Overview**

Given the expected growth of DER, such as smart appliances, EVs, and battery storage, it can be beneficial for energy companies to more easily integrate with DER aggregators to increase flexibility and reliability. FLEXIT increases the ease of integration by establishing awareness of available resources, maximizing service while operating safely, and unifying technical protocols.

Under FLEXIT, EPRI is facilitating a working group to understand all perspectives and develop consensus in support of its workstreams. By harmonizing existing standard services, communication protocols, and cybersecurity requirements, findings can enable stakeholders to leverage and integrate reliable, accurate, timely, and actionable DER services into grid operations without compromising safety or security.

### **2. Collaboration**

The DRET study is a partnership with the Electric Power Research Institute (EPRI).

### **3. Results/Status**

PG&E contracted with EPRI and started to engage with this project. There were weekly meetings with other participating utilities, which PG&E participated remotely.

### **4. Next Steps**

PG&E will continue to participate in this collaborative and identify if there is any best practice and lessons learned that can apply to PG&E's programs and its DERMS.

## **V. Budget**

2024-2027 DRET Budget (Excluding VCE Pilot)



The following is a breakdown of the total expenditures for PG&E's 2024-2027 DRET budget. These values are based on accruals made each month. Values do not reflect commitments for projects, including those described in this report, which have been scoped and contracted for, but not yet executed.

Approved 2024-2027 Budget	\$5,784,000
<u>Budget Spent as of February 2026</u>	<u>\$1,308,778</u>
2024-2027 Budget Remaining	\$4,475,222