SDG&E DRET Project: Voice Activated Assistant for Energy Savings (Integrated Demand Side Management Project)

Overview

Voice Assistant type products have found nearly a 30% market penetration in the US in under a year. This is an incredible rate compared to hubs for energy management that have been tried and tested over the last 15 years. Given that voice assistants have now become a gateway for many consumer products, it is critical to understand how they can advance utility customer engagement and drive energy benefits acting as the point of entry for residential customers (and potentially small commercial customers as well). EPRI research from 2017 and 2018 indicated the potential for voice assistants to enable growth in customer engagement from basic messaging to personalizing customer experiences, with varying degrees of engagement in between. From a customer programs perspective, it is important to understand how voice assistants could play a role in allowing new programs or increasing adoption of existing programs.

This project consists of the following tasks:

Task 1: Site identification. SDG&E will provide EPRI with up to five (5) qualified sites where the site owners are willing to accept proxy (or actual) TOU rates. EPRI intends to interview potential site owners to convey optimal and suboptimal scenarios with new technologies, gauging the potential site owner's interest to engage despite potential outcomes. Site owners will also be interviewed by EPRI to see if they can be adopted into SDG&E's TOU rates with bill payment protection. Selected site owners will be required to provide EPRI with access to two years of prior Advanced Metering Infrastructure (AMI) data to conduct the evaluation.

Task 2: EE cost saving measure selection for individual sites. This project will involve a total of up to five homes, with up to three of those homes with behavioral load management, providing messaging through voice assistants for higher cost periods and emergency events, and up to three of those homes with a mix of energy tools for cost savings through TOU rates. The site owners will be allowed to select from a pre-approved pool of end-use systems and devices illustrated in the table below:

Thermostats	Ecobee, Venstar, Rheem
Batteries	Sonnen
Water heater	Rheem
Blinds	Hunter Douglas

Task 3: Development of Voice Assistant Skills. EPRI will work with SDG&E to develop versions of voice assistant skills that may include:

1. Integration of voice assistants to end-use devices using cloud-based integration. This is a technically complex initiative, EPRI has prior experience with some end use devices.
2. Messaging to homeowners about upcoming high price periods.
3. Messaging a high-price period and recommend a specific set of changes for customers to make (reset thermostats, etc.).

4. Messaging a high-price period and, based on customer response, automatically adjusting settings on end-use devices.
5. Provide customers feedback using AMI data (and device data as available) on energy use during normal and high-price periods using the voice assistants.
6. Providing customers an opt-out functionality for high-price periods (a "don't bother me" command).

Task 4: Device installation and testing. This task involves working with the homeowners to install devices (voice assistants or voice assistants + energy management devices). The end-use devices selected for installation may be influenced by the time required for procurement, installation, and code official approval. Should the time for installation of end-use devices jeopardize the time schedule required by SDG&E, those devices may be omitted from the project. Homeowners will then be required to enroll in the SDG&E TOU plans. Information is expected to be delivered through the voice assistants on pricing and energy savings.

The intent is to measure customer engagement and end-use device performance over a range of weather conditions, including summertime when the potential for electric use reduction is high. If batteries are to be installed, EPRI will need to seek and obtain permits, which have a variable timeline. EPRI will notify SDG&E and seek permission (if needed) for installation contractors selected.

Task 5: DR events. This task initiates DR events through the voice assistants and measures impact through Normalized Metering Energy Consumption (NMEC) at the meter. This measurement is expected to provide a sum of both behavioral operation and automated device operation for DR. More than four events were implemented in each home during Q3 2020.

Task 6: Analysis. The project seeks to compile energy use data using both AMI data and additional monitoring points (using device level data and circuit metering). The energy data should then be correlated with pricing signals to understand cost savings over the test period. These cost savings should be extrapolated to annual savings using building energy performance models. Working with SDG&E, the resultant data is expected to be plugged into program development tools for subsequent filings.

Task 7: Reporting. The reports will include a preliminary report that outlines the costs and implementation challenges for voice assistants in a programmatic setting as well as any measured savings using real TOU rates for selected homes. A final report is anticipated in Q4 2020 that includes both EE and DR impacts over the summer. A formal project handoff to internal stakeholders through a final presentation is expected at the end of 2020.

Collaboration

The progress and results have been shared with other CA IOUs ET-DR Leads. SDG&E's ET team is also collaborating with its Residential Program Advisors to keep them informed of potential measure value as the project yields positive cost-effectiveness.

Results/Status

Testing phases 1 (rate notification) & 2 (rate notification + recommendations) have been completed. Phase 3 (actual rate notification based on usage + recommendation) testing is under way, and the fourth (auto thermostat control) phase is expected to be initiated in Q3 2020.

Next Steps

The next steps for this project are to complete testing by Q4 2020. Once testing is complete, post trending data will be analyzed. The final report is expected to be prepared by the end of 2020.