Logic Model

Demand Side Resource Integration Platform (DSRIP)

CEC EPC Project 15-075

Customer-centric Demand Management using Load Aggregation and Data Analytics

EPRI ELECTRIC POWER RESEARCH INSTITUTE

Project Overview

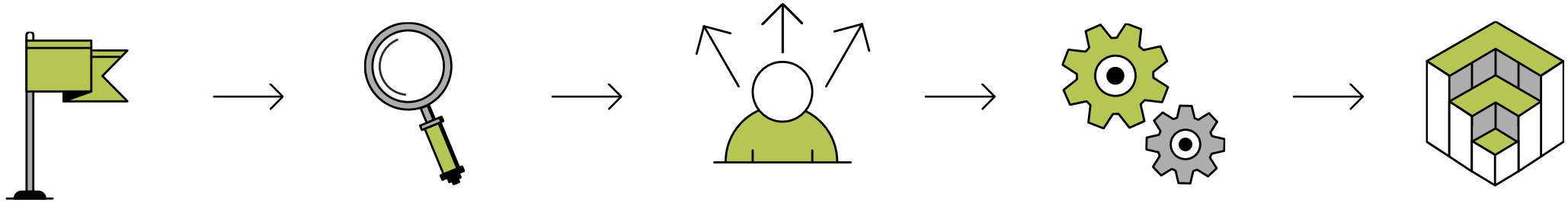
This project is dedicated to the development and implementation of an innovative software platform that would serve as a single point of aggregation for a wide variety of load types and end use devices.

This platform will leverage connected technologies and data feedback mechanisms to provide a better customer experience and help utilities measure the impacts of various rate structures on customer behaviors.

Vision:
Enabling least cost flexibility of energy end uses while providing complete customer choice on their appliances to insure a shared, integrated grid.

DSRIP Logic Model Framework

Updated: April 2019



PROJECT GOALS
Goals of this EPIC research and development project

KEY FINDINGS
Successes, challenges and learnings identified.

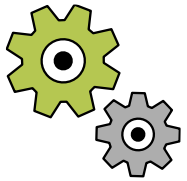
OPPORTUNITIES TO EXPLORE
Activities or circumstances that could fill in the gaps to enable further development.

EXPECTED OUTCOMES
Near and longer term possibilities identified by the TA&D project team.

NEXT STEPS TO FOLLOW UP
Knowing what we know now, these are the suggested next steps.

RESEARCH QUESTION

Could an innovative software platform serve as a single point of aggregation for a wide variety of load types, providing a better customer experience while helping utilities measure the impacts of various rate structures on customer behaviors?



DSRIP ESSENTIAL FUNCTIONS

1. Data aggregation between connected devices and DERs onto a central repository.
2. Rate understanding from utility participants is integrated to enable appropriate analysis.
3. Analyze/visualize data to address customer comfort, usage, and aggregate grid performance.
4. Supports a tiered/modular control methodology to enable a study of active controls on overall energy utilization.

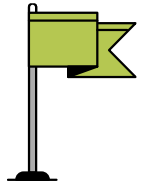
Project Overview

GOAL

To evaluate the potential of customer energy systems to provide grid responsiveness, reduce end-user energy costs, and incorporate customer behaviors.

DSRIP KEY ELEMENTS & FEATURES

- Utility Layer - connects to the grid using utility/ISO acceptable protocols and messaging (e.g., OpenADR, IEEE 2030.5)
- Data Aggregation Module - database that collects, cleans, and analyzes data from all connected products whiles maintaining a registry of customers and their devices.
- Controls Module - manages aggregation and orchestration of grid and price signals, uses learned customer preferences and optimizes device settings.
- Product Layer - a key difference – connects to API from connected devices/third parties to provide consumers with a full choice of devices.



OBJECTIVES

- Develop a research platform for aggregating end-use distributed energy resources/data
- Create a unified end-use device and DER (OEM) aggregation layer
- Understand how rate structures/utility stimuli impact customer energy use and aggregate grid performance
- Study effects of various rate structures on end-user energy use and comfort preferences
- Research active control approaches as an incentive to reduce/shift energy utilization patterns while achieving customer comfort and grid benefits

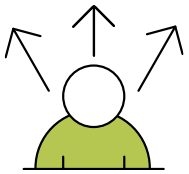
KEY FINDINGS

SUCCESSES

- Development of DER-vendor agnostic data models to support data aggregation and control.
- Lab setup demonstrated orchestrated response (water heater, battery, and smart thermostat) to respond to a single load shed signal.

CHALLENGES

- Control strategies for water heaters
- A layered control strategy that maintains customer's comfort/energy goals and overall grid benefits.
- Understanding customer's tolerance for automated controls of customer-sited end-devices.



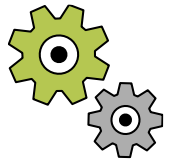
OPPORTUNITIES

MISSING PIECES

- Customer behavior
- Integration with EV/PV aggregation platforms
- Full-scale integration
- Final data analytics

LEVERAGE POINTS

- Overall DSRIP platform architecture
- Transactive Incentive Signals developed via (TIME) project
- Open Vehicle to Grid Integration Platform (OVGIP)
- Manufacturing partners
- Partner IOUs



EXPECTED OUTCOMES

NEAR-TERM OUTCOMES

- Control signals for water heaters designed
- Low and full pricing signals developed
- Field testing deployed to add the behavioral factor.
- Integration with OVGIP for data on EV charging and for controlling EV charging based on price

LONGER-TERM OUTCOMES

- A single point of control
- Integration of multiple customer DERs
- Understand how rate structures influence consumer behavior

NEXT STEPS

NEXT STEPS

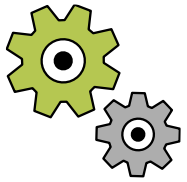
1. Test control strategies for water heaters
2. Develop customer behavior influence through messaging
3. Develop low priced event signals
4. Test full price signals
5. Deploy and test in the field

ACTIVITY/ OWNERS

1. EPRI
2. IOUs
3. Smart home technologies vendors and contractors, e.g., ecobee, Rheem, SolarEdge, GE, Curb, Sonnen

SUCCESSES

- Development of DER-vendor agnostic data models support data aggregation and control.
- Lab setup demonstrated an orchestrated response (water heater, battery, smart thermostat) to respond to a single load shed signal.



CHALLENGES

1. Control strategies for water heaters
2. A layered control strategy that maintains customer's comfort/energy goals and overall grid benefits.
3. Understanding customer's tolerance for automated controls of customer-sited end-devices.

Opportunities

MISSING PIECES (OUT OF SCOPE)

- Understand impact of customer behavior
- Integration with EV/PV aggregation platforms
- Full-scale integration
- Final data analytics

LEVERAGE POINTS

- Overall DSRIP platform architecture
- Transactive Incentive Signals (TIME) project
- Open Vehicle to Grid Integration Platform (OVGIP)
- Manufacturing partners, e.g. ecobee, Rheem, SolarEdge, GE, Curb, Sonnen
- Partner IOUs, SCE, SDG&E, PG&E

DSRIP Next Steps

SUGGESTED NEXT STEPS

- Test control strategies for water heaters
- Develop customer behavior influencing mechanism through messaging
- Develop low priced event signals
- Test full price signals
- Deploy and test in the field

ACTIVITY OWNERS

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Thank you for coming

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