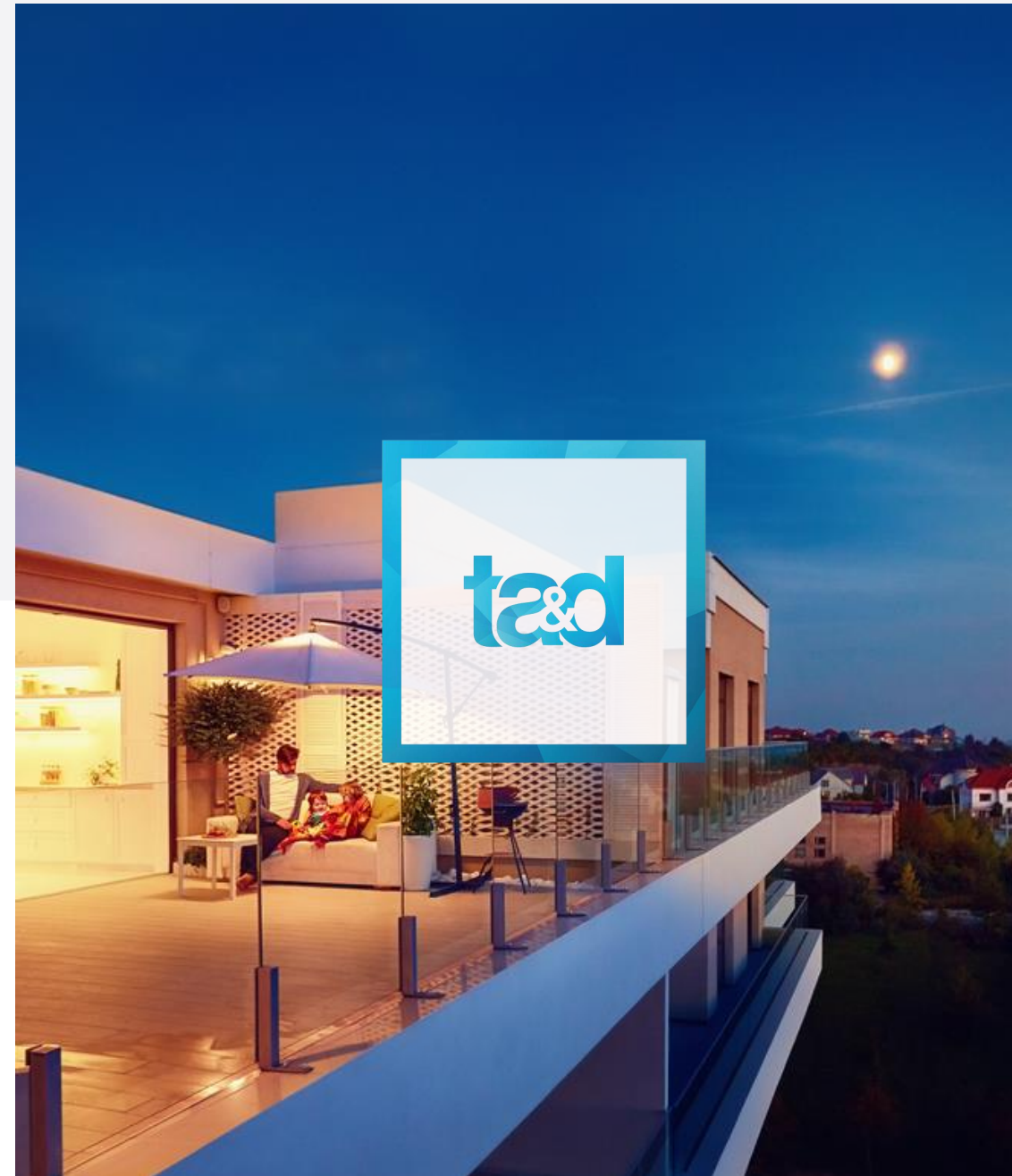


Demand Side Resource Integration Plan (DSRIP)

CEC EPC-15-075

Customer-centric Demand Management
using Load Aggregation and Data Analytics





DSRIP

Supporting California's Clean Energy Challenge



A SINGLE CONTROL POINT FOR DR PROGRAMS

Increasing customer demand for alternative energy is compelling utilities to explore how distributed energy resources (DERs) might be managed through a single control point that;

- leverages data analytics to measure and verify the impacts of various rate structures on customer behavior and;
- offers end-users value-added feedback and insights that deepen customer engagement.

Lead by the Electric Power Research Institute (EPRI), EPC Project 15-075 could provide an innovative, proof-of-concept software platform that would serve as a single point of aggregation across a wide variety of load types and products, providing an essential control point for load management planning on the electric grid of the future.



To evaluate the potential of an innovative software platform that could provide integrated control of residential demand side resources and as a result, influence consumer energy use to provide greater grid stability, reliability, and lower greenhouse gas emissions.

A successful DSRIP will achieve the following objectives:



Data aggregation between connected devices and DERs onto a central repository.



Rate understanding from utility participants is integrated to enable appropriate analysis.



Analyze/visualize data to address customer comfort, usage, and aggregate grid performance.



Supports a tiered/modular control methodology to enable a study of active controls on overall energy utilization.





Developing OpenDSRIP

1

Utility and
ISO rates
translation
engine

2

Residential
Orchestration
Module (ROM) for
end-use devices

3

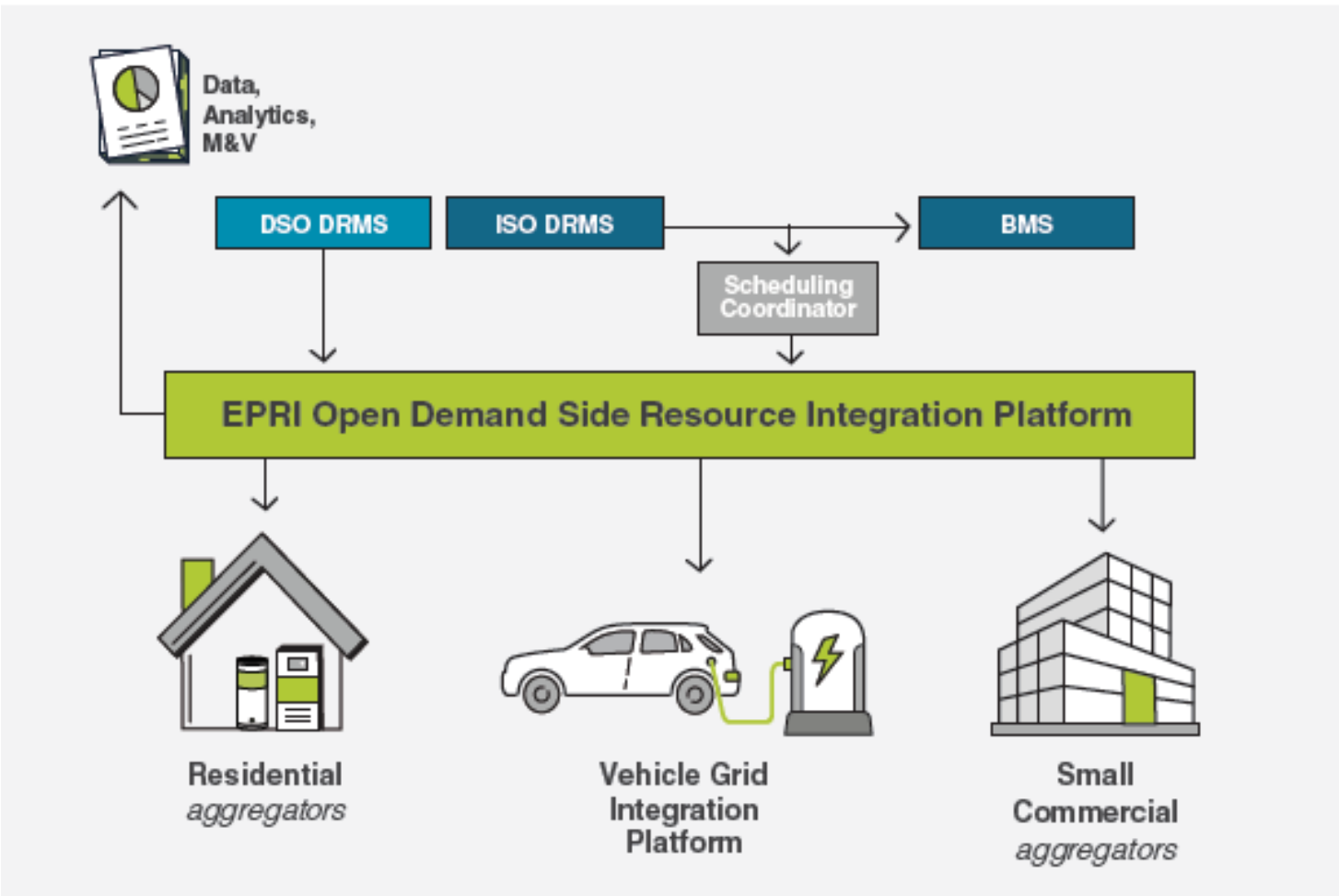
Data
aggregation
layer for
facilitate M&V

4

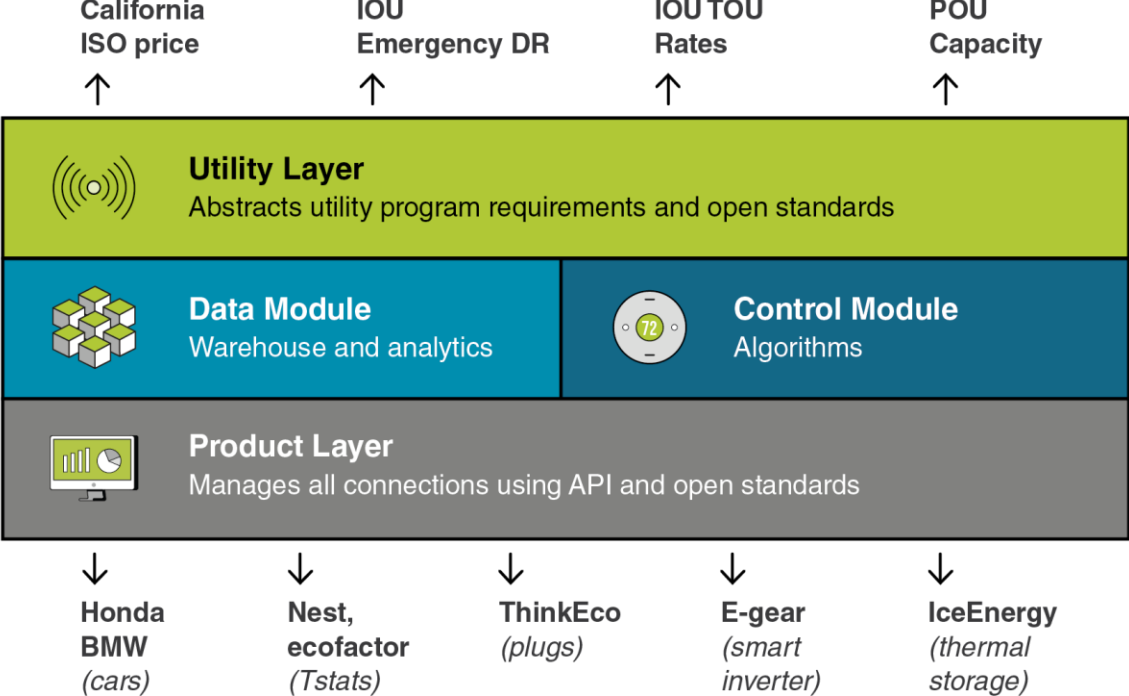
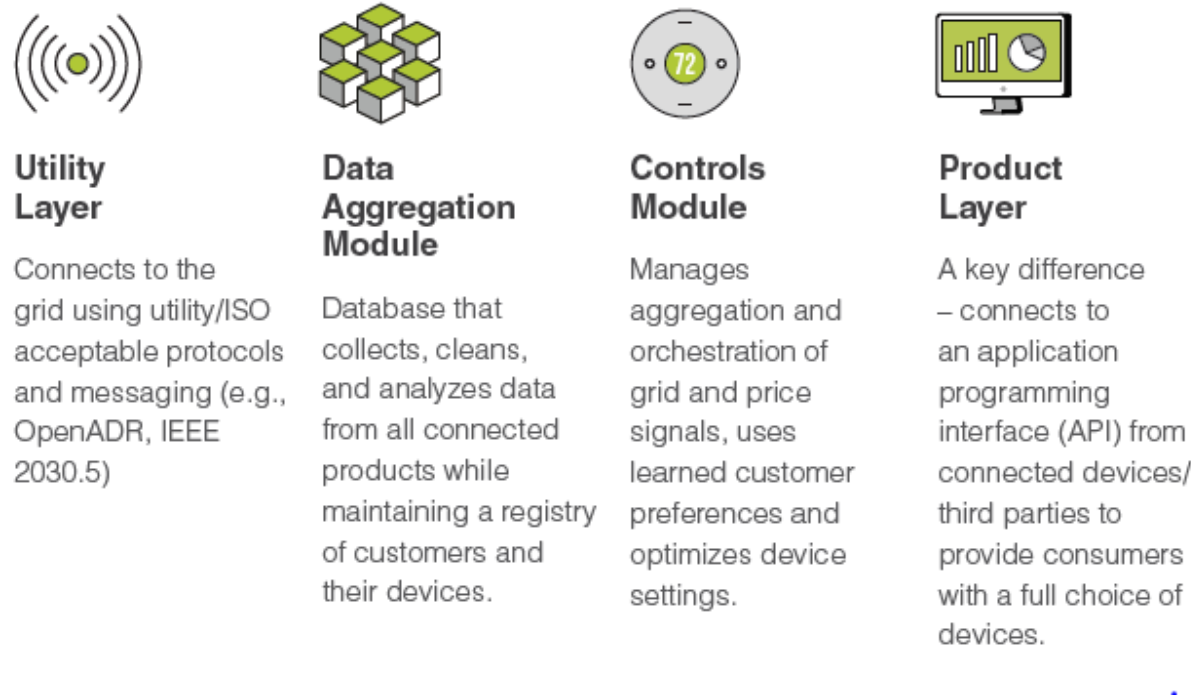
Customer App
with custom
messaging and
preferences

DSRIP The Vision

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



DSRIP Key Elements and Features



OpenDSRIP Provides Orchestration and Personalization



Message

Behavioral orchestration – providing customers tools (apps, alerts, etc.).



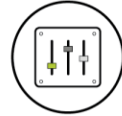
Opt-in/Opt out

Customers opt-in/opt out of participation based on fixed set of controls by end-use.



Control: Level 1

Customer sets priority by end use.



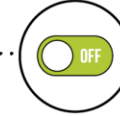
Personalize

Provide varying levels of orchestration. Leads to personalization.



Optimize

Use gained knowledge of user preference and building characteristics to optimize energy use.

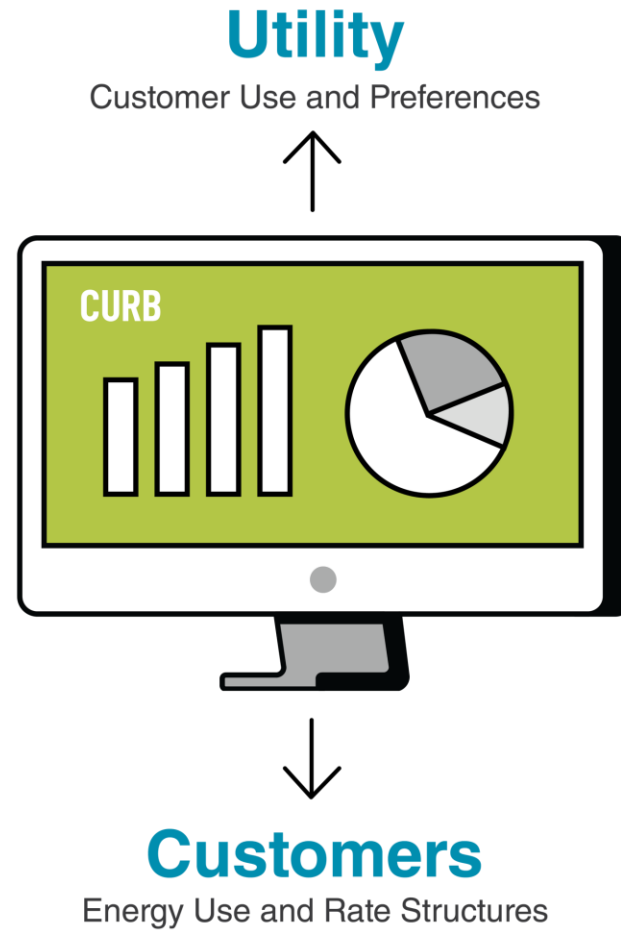


Control: Level 2

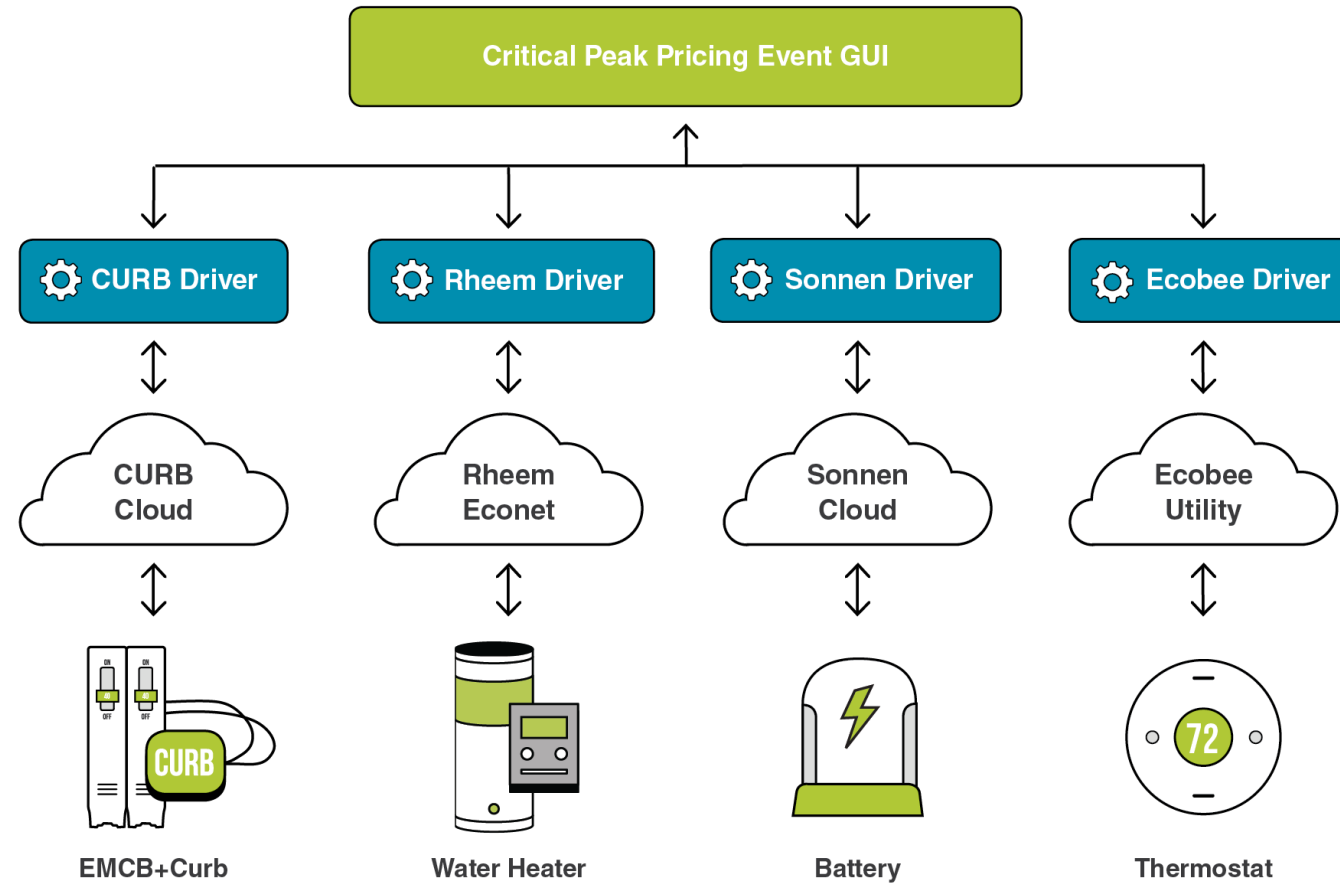
“Rules-based” where customer selects how devices are controlled when certain signals (DR, rate changes, etc.) are provided.

OpenDSRIP

Provides
Feedback
Loop on
Customer
Responsiveness
to Dynamic
Pricing



Communications and Controls Architecture





DSRIP
Key Findings

Successes

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

Challenges

- Control strategies for water heaters that successfully mitigate needle peaks and unexpected heat-ups.
- A layered control strategy that maintains customer's comfort/energy goals and overall grid benefits.
- An understanding of customer's tolerance for automated controls on customer-sited end-devices.



Task at Hand

While the overall DSRIP platform architecture demonstrates orchestration, control and feedback, the next piece is gaining a better understanding of how customers will respond to this control and related pricing structures.

Leverage Points

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



DSRIP

Suggested Next Steps

1

Test Control Strategies

to mitigate water heater needle peaks and expand battery function to both “Consumption” and “Production”.

2

Low-priced and Full Price Signals

to establish a Time-of-Use rate signal and test the full response of the system to real price signals.

3

Add Behavior Factor

through deployment and testing in the field, leveraging other EPRI-lead EPIC projects.



Discussion



Thank you for coming

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