



CEC EPC Project 15-045

*Transactive Incentive Signals to
Manage Electricity Consumption
(TIME): A System for Transactive
Load Management*



Project Overview

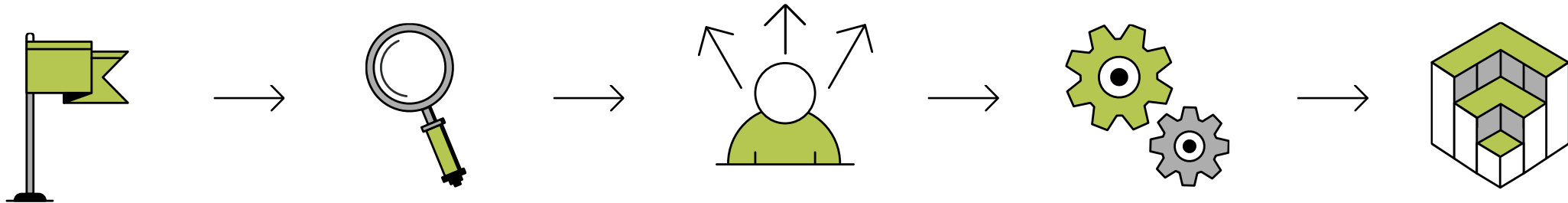


This research reviews California's pathways for a clean energy system with emphasis on the scope of the solicitation and TLM signals for electricity markets and demand response (DR) programs. The report focuses on the framework for the TLM system, and the TLM pricing and signal design structure to lead California toward the planned clean energy system. The research methodology includes:

1. Review of the existing California electricity market, regulatory structures, and electric grid
2. Review of the Group 1 and Group 2 project proposals that use the TLM signals
3. Literature review on existing supply-side and demand-side DR programs and advanced pilots that leverage DR as a grid resource

TIME Logic Model Framework

Updated: December 2018



PROJECT GOALS

Goals of this EPIC research and development project

KEY FINDINGS

Successes and challenges identifies through research and development.

OPPORTUNITIES TO EXPLORE

Activities or circumstances that could fill in the gaps and leverage points to enable forward movement.

EXPECTED OUTCOMES

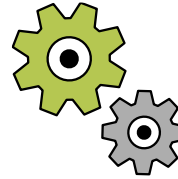
Most likely near term and longer term outcomes identified by the TA&D project team.

NEXT STEPS TO FOLLOW UP

Knowing what we know now, these are the suggested next steps.

RESEARCH QUESTION

How does a universal pricing signal facilitate DR to retail and/or wholesale markets – can a single incentive signal be used for both supply side and demand side?



SUCCESS TO DATE

1

A simulated TLM signal proved successful in determining pricing for retail and wholesale

2

The “Day Ahead” wholesale market pricing provide baseline

3

Pnode location marginal prices can be lowest desired spatial disaggregation for wholesale market demand prices

The background of the slide is a photograph of a modern, two-story house with large windows and a wooden fence in the foreground. A blue-bordered box in the upper left corner contains the text "Our Progress".

Our Progress

OPPORTUNITIES TO EXPLORE

- Mapping transactive signals to the behavior of the end-user
- Testing with actual signals

LEVERAGE POINTS

- Day-Ahead market is a binding market – rebates could be applied for under-using
- Real-time pricing could motivate people to engage in DR



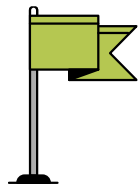
Our Challenges

CHALLENGES TO ADDRESS

- ISO is opposed to Transactive signals on the customer side
- Signals are not real – yet. Would need to test actual signals

ACTIVITIES FOR ADDRESSING THEM

- Operationalize and maintain the TIME systems and TLM signals
- Find a sponsor the next round of research and development



PROJECT GOAL

DEVELOP A SYSTEM TO CREATE AND COMMUNICATE TRANSACTIVE SIGNALS

How does a universal pricing signal facilitate demand response to retail and/or wholesale markets – can a single incentive signal be used for both?



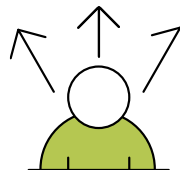
KEY FINDINGS

SUCCESS

- A simulated price-based signal developed successfully to manage customer loads.
- Delivery of hourly price signals to customers using standard OpenADR protocol.

CHALLENGES

- Limitations on methods for estimating real time pricing. Data sources are often lacking,
- Data is in a variety of places and not all are accessible.



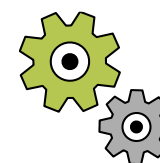
OPPORTUNITIES

MISSING PIECES

- Mapping transactive signals to the behavior of the end-user.
- Evaluation of existing retail and wholesale pricing models.
- Testing with actual signals

LEVERAGE POINTS

- Day-Ahead market is a binding market – rebates could be applied for under-consumption
- Real-time pricing could also motivate customers



EXPECTED OUTCOMES

NEAR-TERM OUTCOMES

- Electric grid operators, service providers, regulators, and technology innovators can use these interim research findings to identify value in their regions

LONGER-TERM OUTCOMES

- New practices for widespread adoption of economics-driven transactive technologies are developed
- New systems are developed for an integrated, electric “grid of the future.”



NEXT STEPS

NEXT STEPS

1. Operationalize and maintain the TIME systems and TLM signals
2. Enhance the retail price signals to better reflect local grid conditions

ACTIVITY/ OWNER

1. EPRI
2. Utility TBD





Thank you for coming

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