

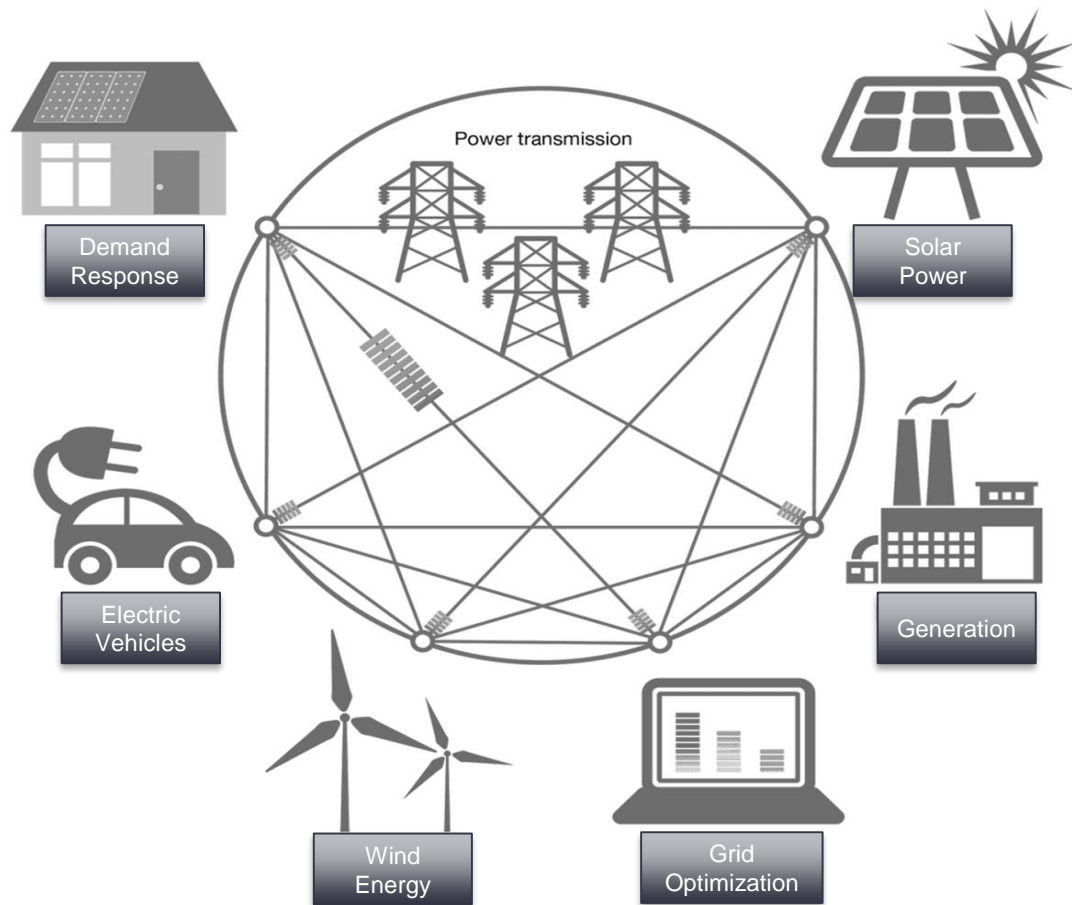


# Energy Efficiency is a Distributed Energy Resource

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Open Energy Efficiency  
May 2017

# Energy Efficiency Has to Fit Into Distributed Energy Resource Markets



What's the  
Weights and  
Measures for  
Energy  
Efficiency?



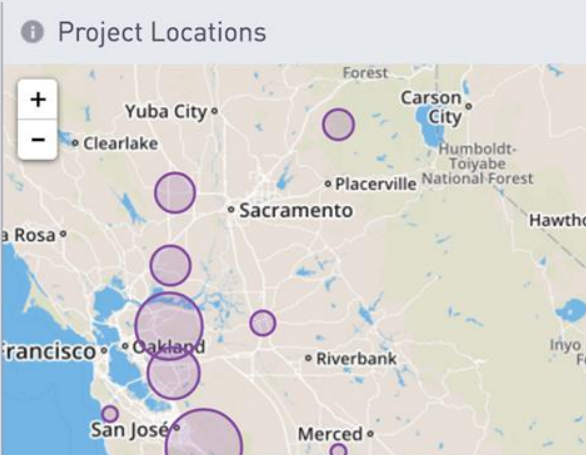
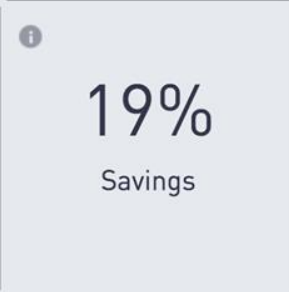
# CalTRACK Open Dashboard



FILTERS: > 10000 kWh HVAC system improvement roof insulation improvement

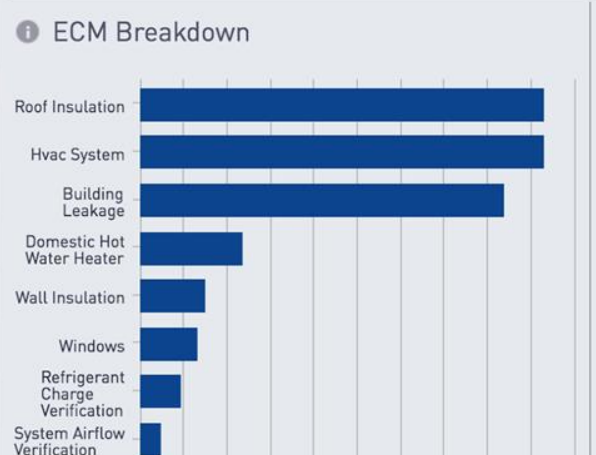
● Editable by everyone | Go Full Screen | Tags | More | ★ | ⓘ

NEW SQL CHART



Project Attributes

BLOCK ATTRIBUTES	RESULTS
Number of Buildings	465
Number of Contractors	50
Average Building Age	49 years
Average Square Footage	1945
Average Number of Measures	5
Number of projects with electric savings	465
Number of projects with gas savings	437



OPEN STANDARD

OPEN SOURCE

OPEN DATA



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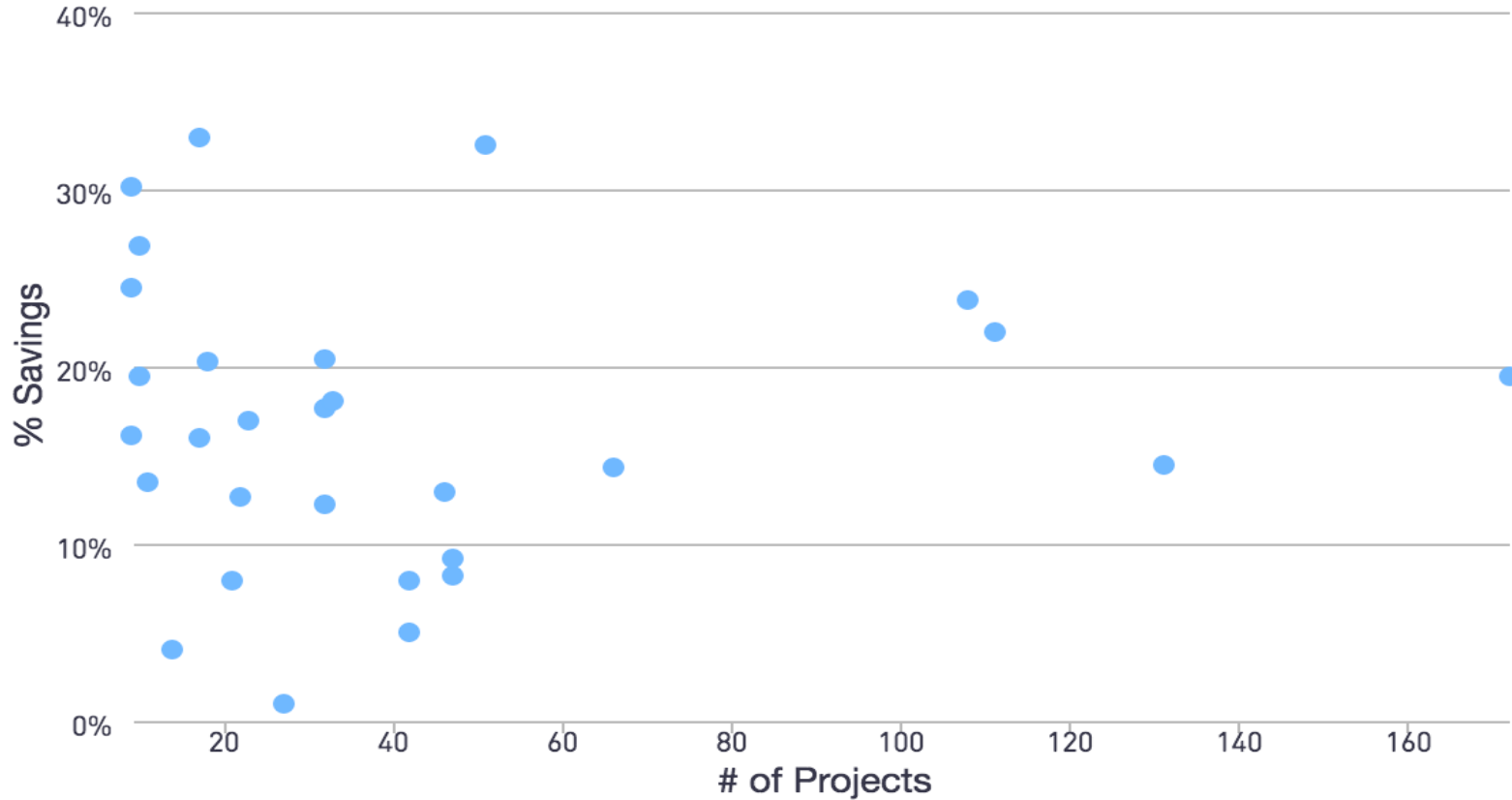
OPEN DATA



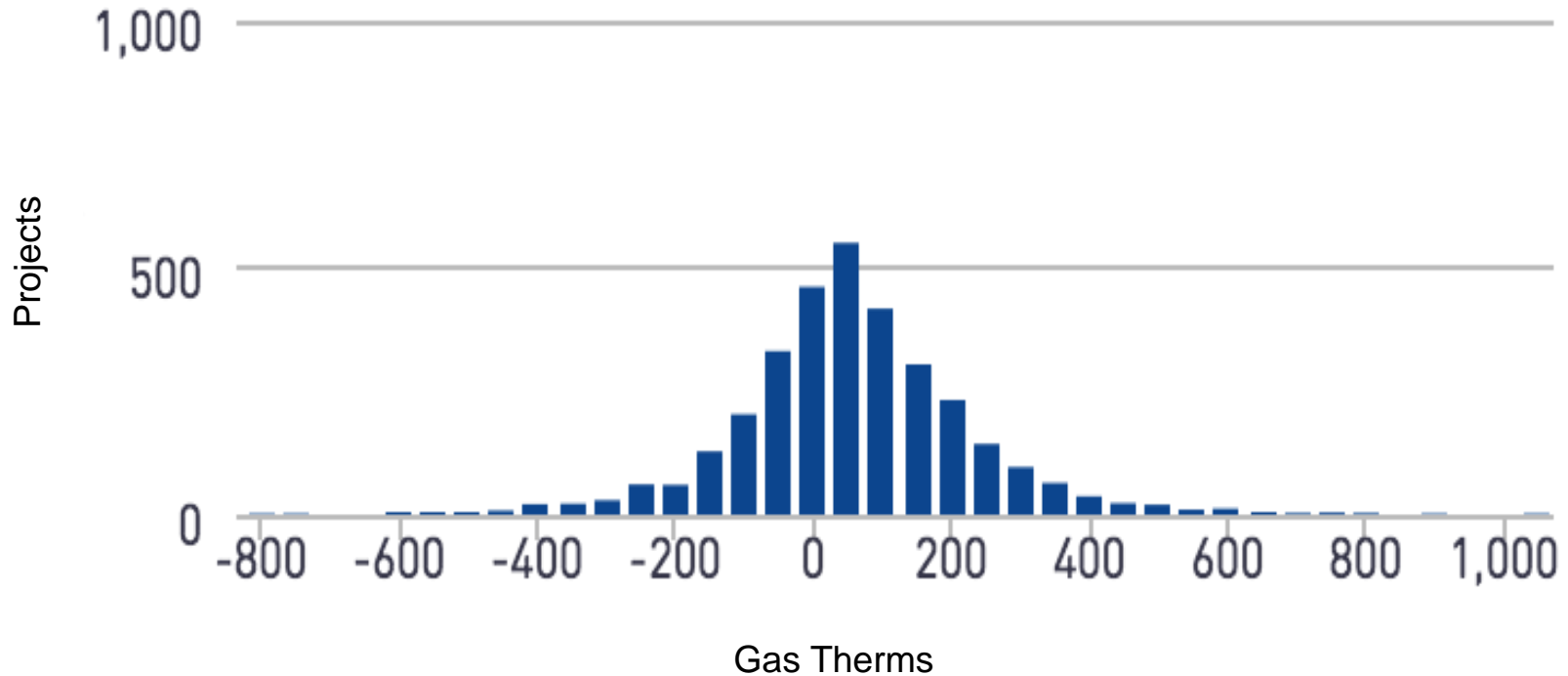
Share My Data



# How Do Contractors Perform?

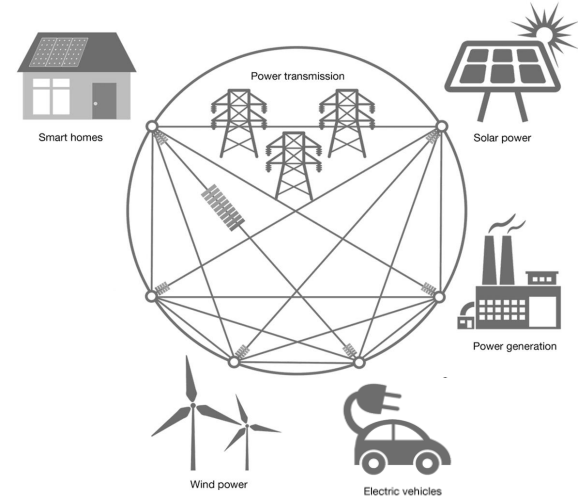
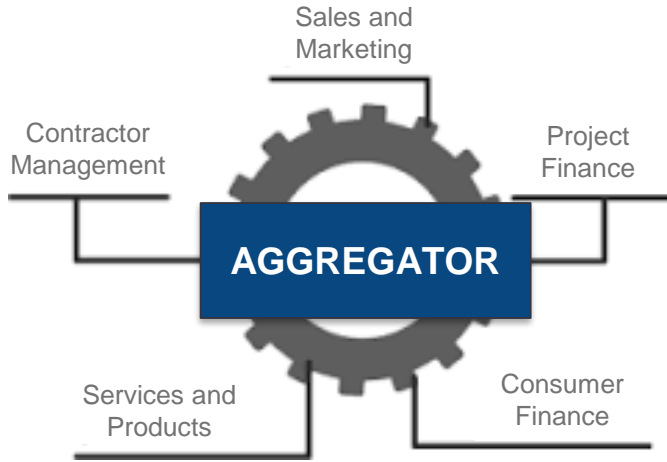


# Efficiency is Manageable as a Portfolio





# Align Incentives with Pay-for-Performance

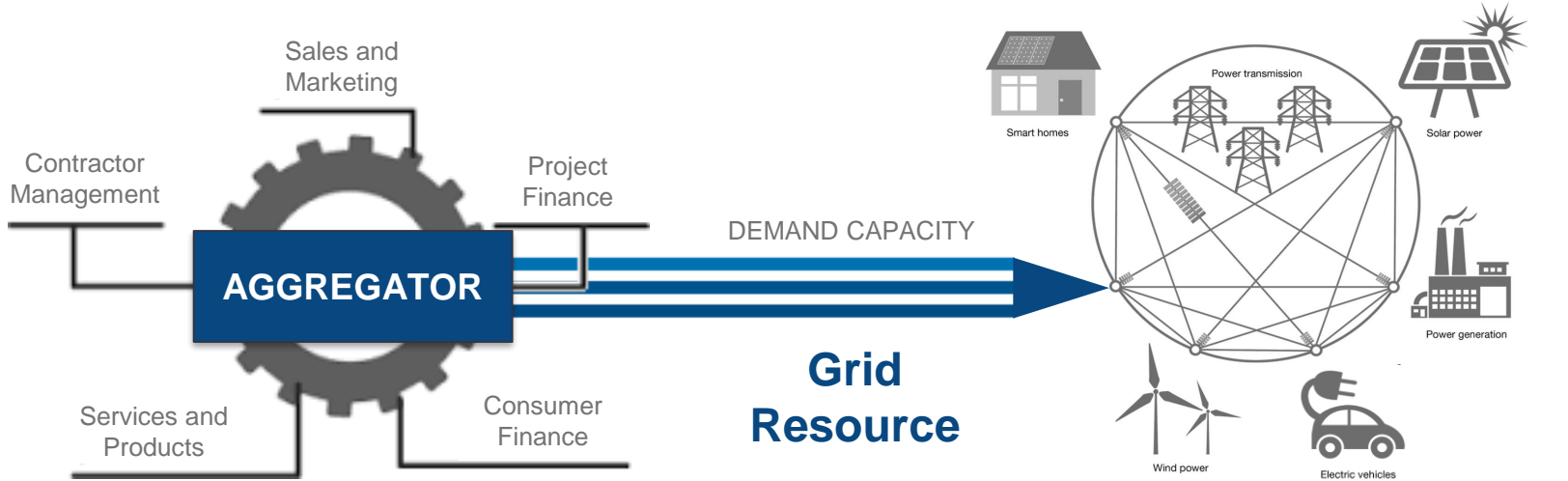


↓ **Business Models** ↑

**Savings Comfort Health**



# Align Incentives with Pay-for-Performance



↓ **Business Models** ↑

**Savings Comfort Health**



**Project Finance:** The long-term financing of projects based upon projected cash flows rather than the balance sheets of its sponsors.



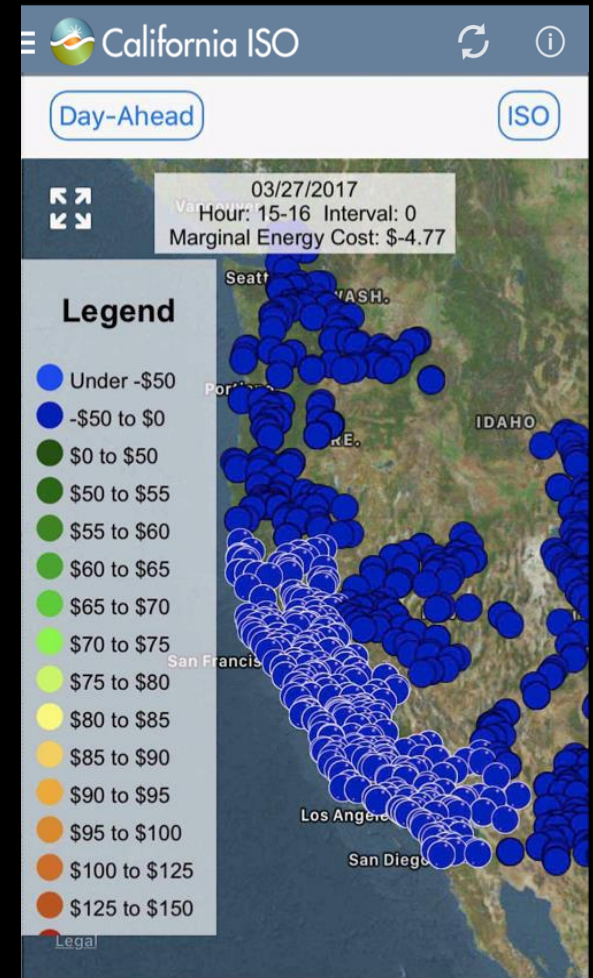
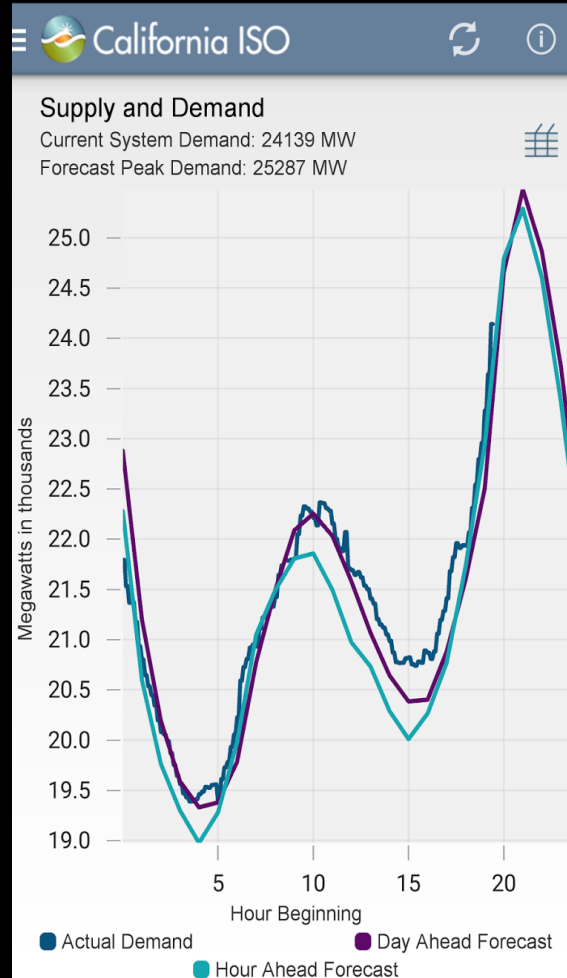


# Diablo Canyon Nuclear Power Plant Closure

Procurement of  
2,000 gWh of EE  
by 2025

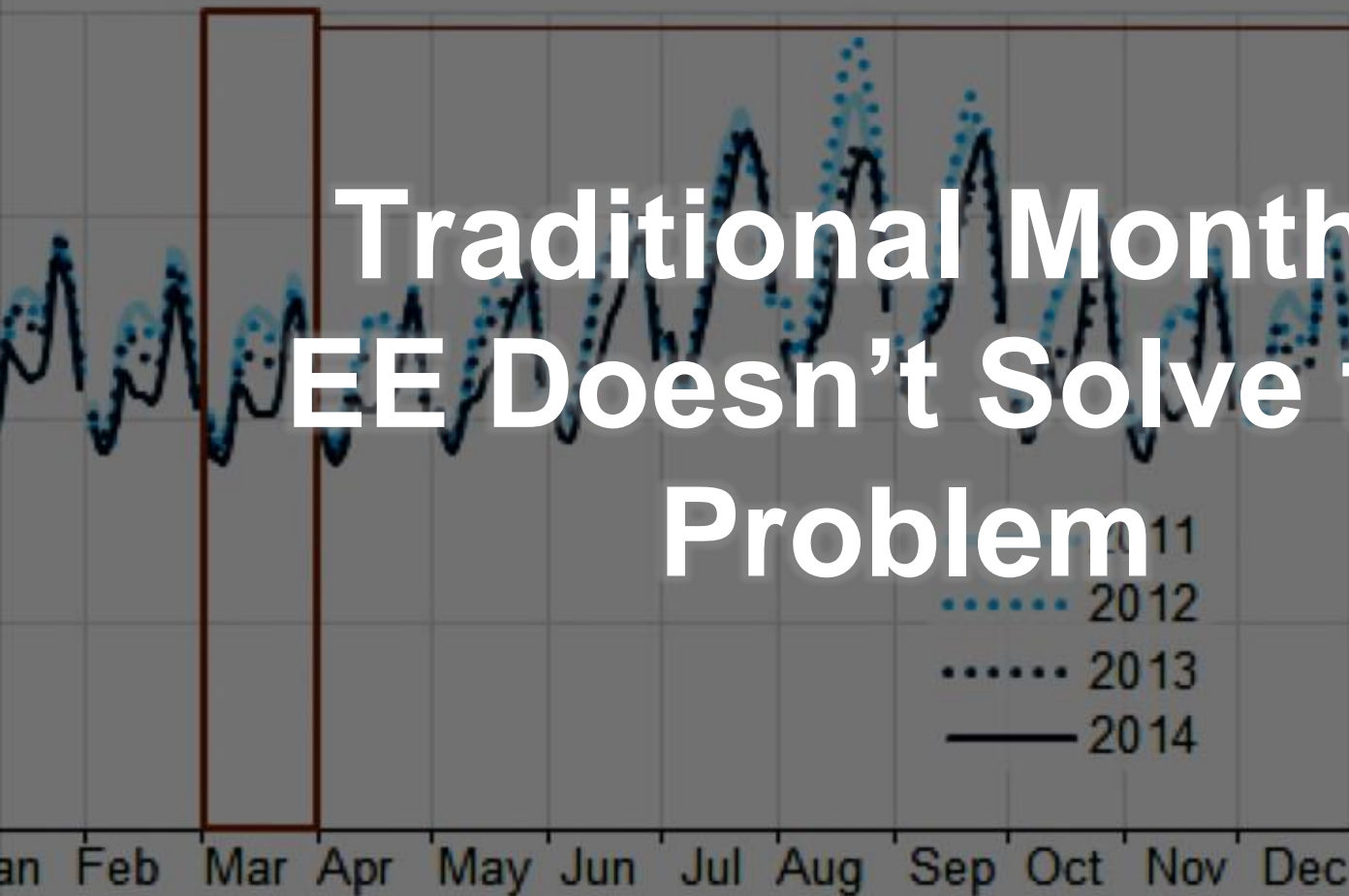


# Lots of Renewables, But Nobody's Buying

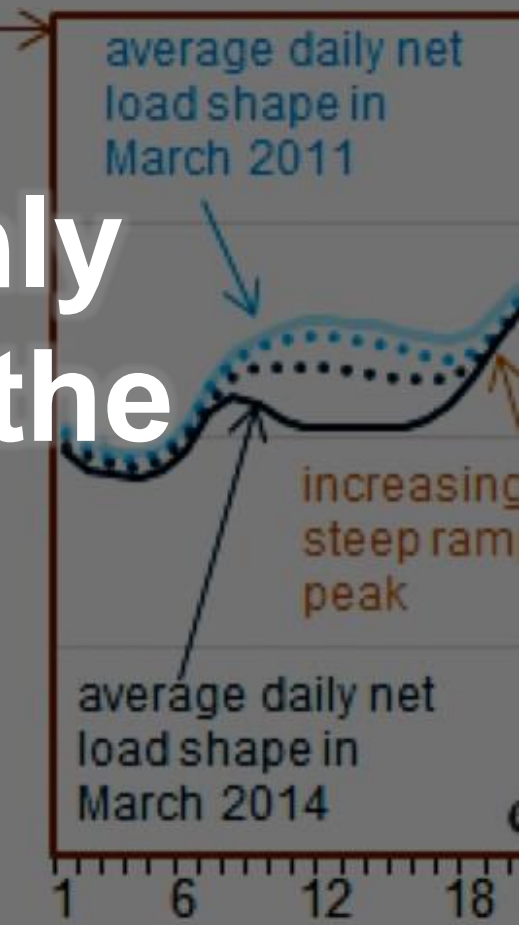


average daily net load by month (2011-14)

atts



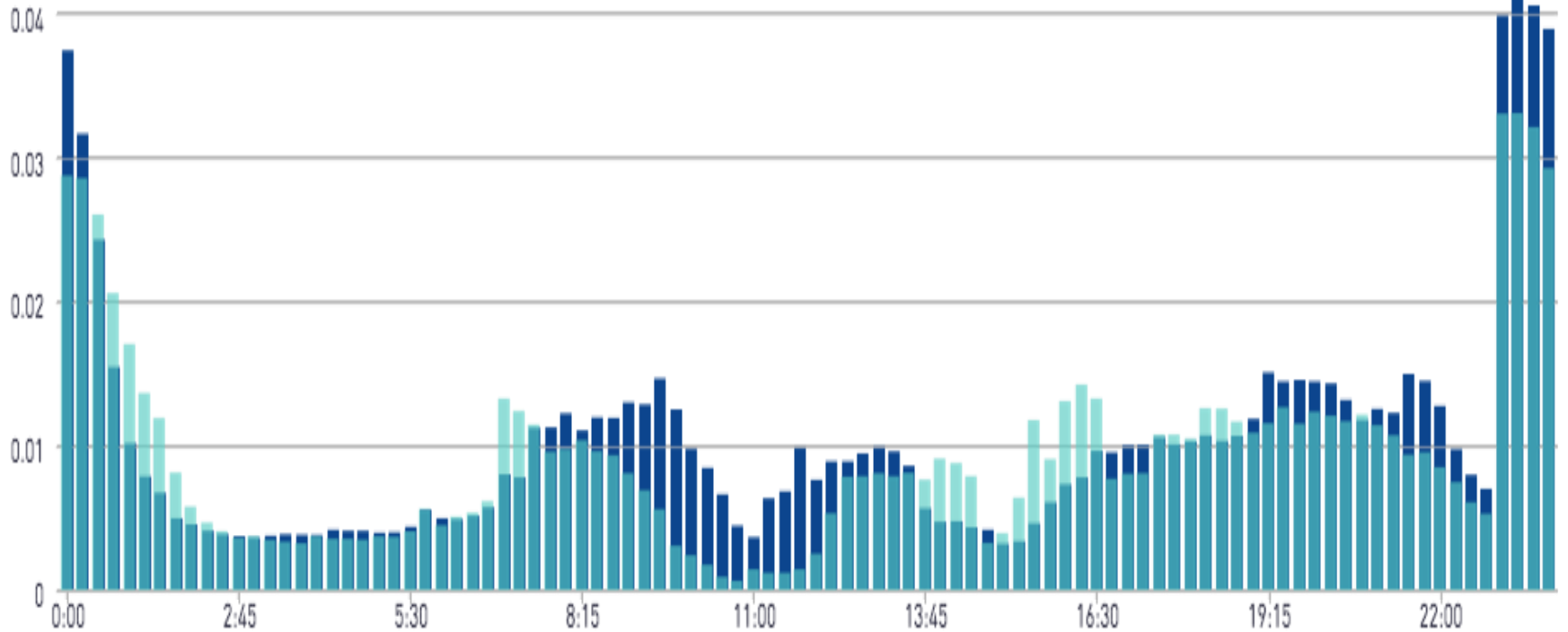
CAISO average daily load (March)



**Traditional Monthly EE Doesn't Solve the Problem**

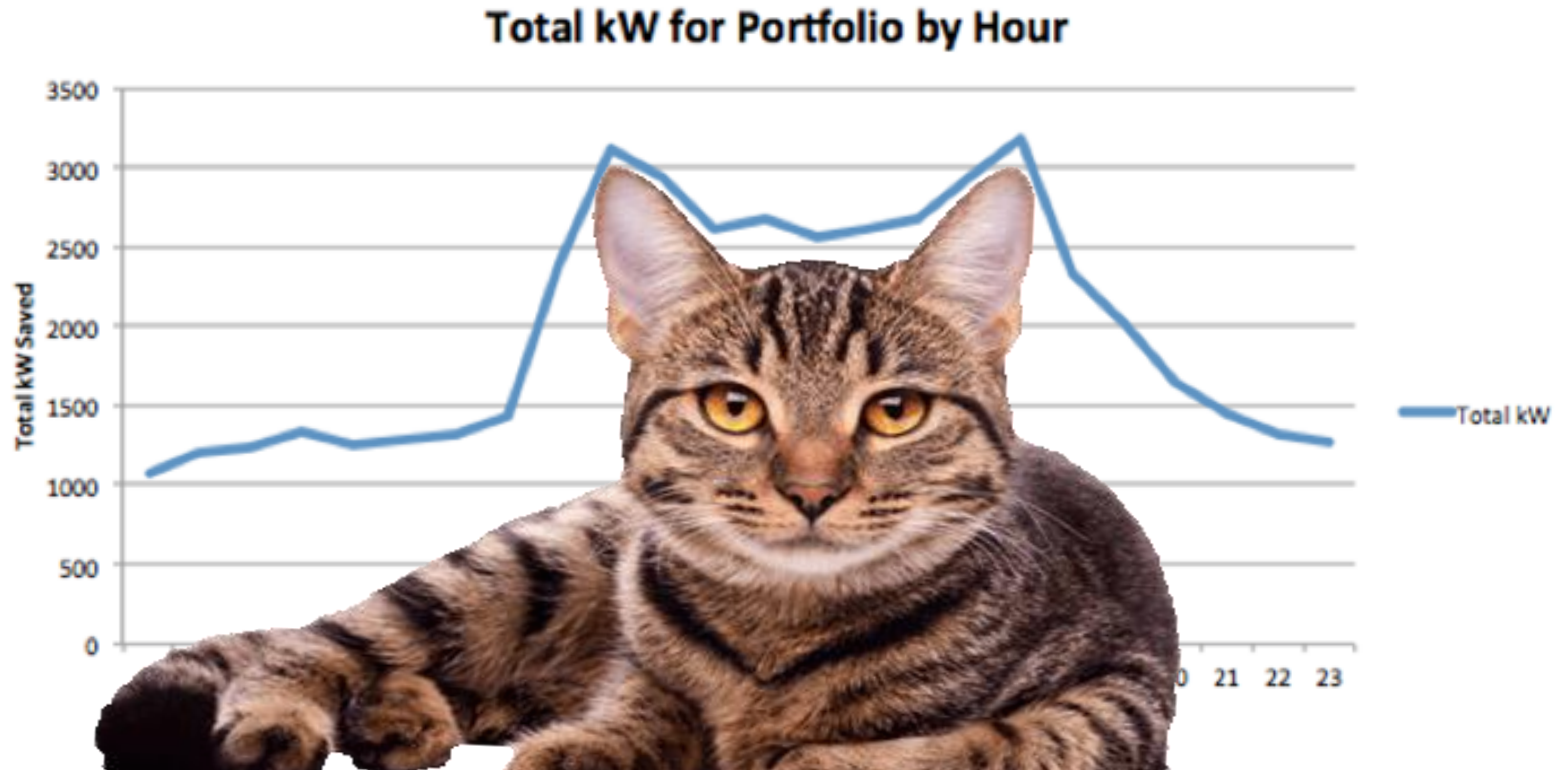
# ≡ RESOURCE CURVE

## Time Based Savings



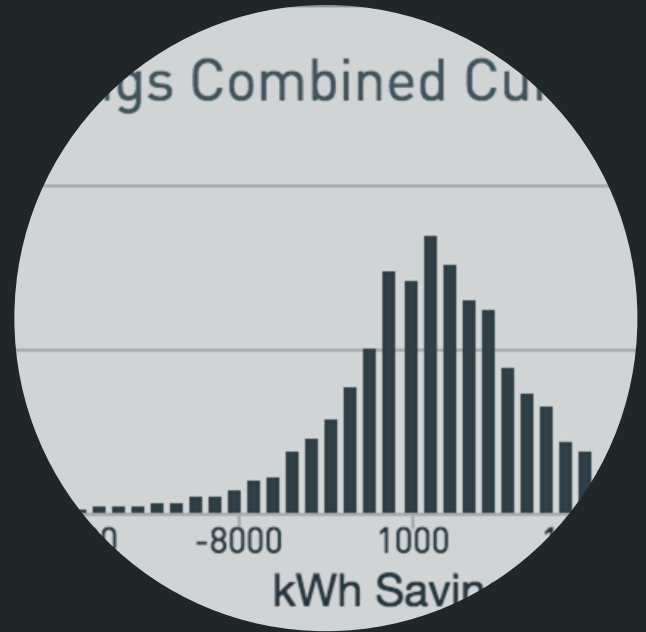
# ≡ RESOURCE CURVE

## Portfolio Level Grid Impacts





# Procurement of Demand Capacity



How  
Might  
One of  
These  
Procurements  
Work?

Resource Procurement

Aggregators Bid  
Resource Curve

Reverse Auction

Savings Purchase  
Agreement (SPA)



# PG&E's Residential Pay-for- Performance Pilot

Develop models for taking Res EE to scale by enticing more private capital

Achieve Data Driven M&V by measuring "at the meter"\*

Pay for measured savings performance from retrofits and BROs

Develop a program that can successfully transition to grid-tied procurement



\* Weather-normalized

# Innovation Flexibility Competition

Unparalleled flexibility to pursue a range of improvements and activities over time to achieve residents' savings goals

## Retrofit

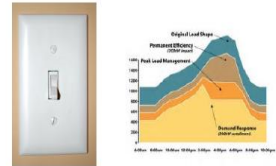
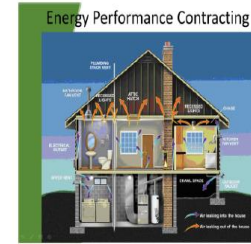
- Whole House
- HVAC
- Lighting
- Outdoor/Pool Deck

## Operational

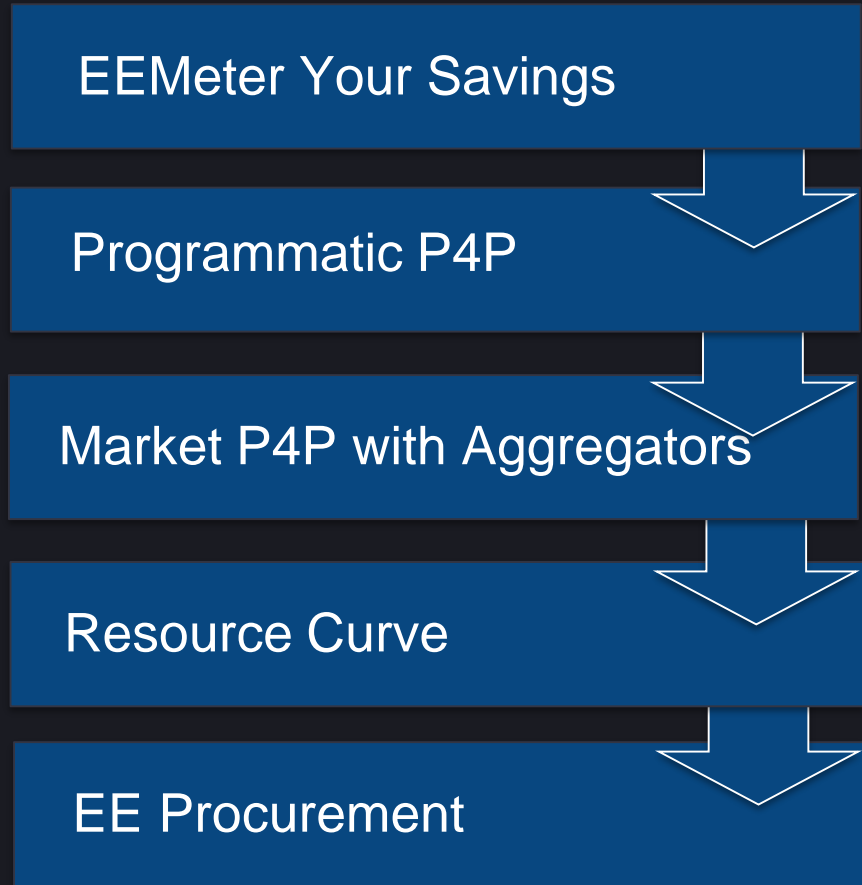
- Smart Thermostats
- Home Energy Management Systems
- Smart Appliances

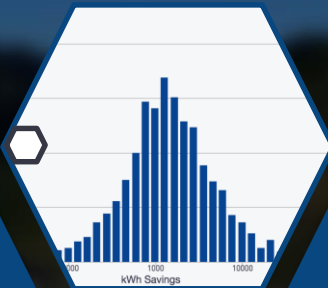
## Behavioral

- Homeowner Incentives
- Demand Response
- Other specially designed programs



# Roadmap To EE as a Distributed Energy Resource





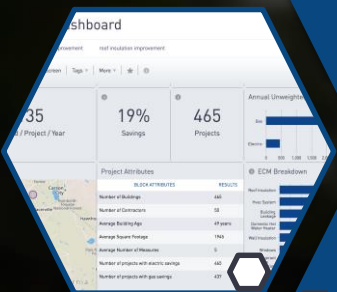
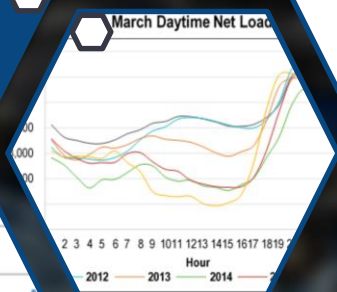
Procurement

Pay for Performance

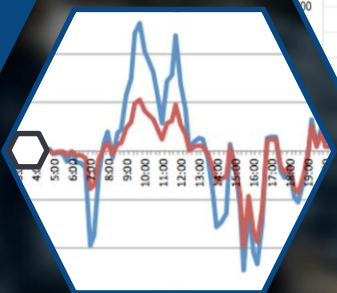
Demand Capacity



Resource Curve



EEMeter



**Matt Golden, CEO**  
[mattgolden@openee.io](mailto:mattgolden@openee.io)