Flexibility as a Resource
Building Scalable DSM Programs Through Transparency and Analytics

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New Priorities:

- Decarbonization
- Affordability
- Demand
- Flexibility
A Grid with High Renewables and Little Demand Flexibility

March 23, 1:15 pm: Negative Pricing

April 15, 12:15 pm: Huge Variability

CA 2019: > 800 GWh Renewables Curtailment
One of These Things is Not Like the Other
No DSM Weights and Measures: What are the Consequences?

At a time of...

- 100% Carbon-Free Targets
- SB 350 Doubling Goals
- Climate Change = Existential Threat
- EE < 1% of US Energy Budget
- CA EE Goals and Budget Going Down
To Scale Demand Flexibility We Need Markets. Markets Need Standards.

Option 1: Bespoke, proprietary models
- Expensive
- No evidence of better results
- Based on evaluators’ judgment
- Unverifiable

Option 2: Open Source and Standardized
- Full transparency
- Concrete settlement mechanism
- Leverage community of experts
- Focus on program, not M&V
A New Deal: Meter-Based Pay for Performance (P4P)

Lower risk for Regulators, Utilities and Ratepayers;

Greater Reward for Quality Implementers

Transparency, Consistency

Alignment

Flexibility

Accountability

Who’s Making the Move?
PG&E, NYSERDA, CPUC, ICF, Franklin, Lime, Willdan, Marin Clean Energy, Bay Area Regional Energy Network, Build It Green, Home Energy Analytics...
Aggregation is Risk Management

- Like stock portfolio – Not every project a winner
- Aggregation = statistical power
- **Recommendation**: Aggregate projects to the extent possible
- **Recommendation**: Take more care with non-routine events for very small portfolios

Aggregate portfolio of projects in SMUD’s HPP Program: Annual MWh savings
P4P Incentive Design for Common Sense Innovation

• Pay more for savings where and when they are most valuable
• Encourage integrated approaches
• Balance risk among stakeholders
• Match risk with reward - verified metered savings worth more than predicted estimates
Aggregated Portfolio: Resource Curve
Aggregated Portfolio: Avoided Costs and GHG

- Program Average
  - .397 Tons
    - Project Annual GHG Savings From Electricity
  - .41 Tons/MWh
    - Avoided GHG per MWh Savings
- $146.97
  - Project Annual Electric Utility Avoided Costs
- $ .152/kWh
  - $ Avoided Cost per kWh Savings
Targeting: Summer Peak and Temp-to-Load

23% of Customers:
- 68% of program savings
- 2.5x program average
- 70% less negative savers
Targeting: Summer Peak and Temp -to- Load

23% of Customers:

- 2.7x GHG
- 3.0x Avoided Costs
Two Sides to the Coin: Low Usage and Temp-to-Load

22% of Customers:

- Virtually no savings
- Increased Peak Usage
Targeting - Why Does it Matter?

- 3 GWh Lifecycle savings
- 0.5% average household savings
- -$3 M Avoided Cost\(^1,2\)
- 742 Tons *increased* CO\(_2\) Emissions

60% of Projects (2,044)

- 342 Lifecycle GWh savings
- 12.2% average household savings
- $45 M Avoided Cost\(^1\)
- 116,200 Tons *avoided* CO\(_2\) Emissions

\(^1\)2025 CZ 4 avoided costs from the CPUC’s ACC, \(^2\)20 - year EUL assumed with 5% discount rate
\(^3\)Many of the poorly performing AHUP projects were in coastal regions where projects did have reasonable gas savings despite low electric savings
The Status Quo: Deemed Savings...

Regulators Need
- Transparency, Evaluability, **Results**

**Utilities Need**
- A **Dynamic**, Cost-Effective Resource

Implementers Need
- **Flexibility** and Accountability

Customers Need
- Individually-**Tailored** Solutions

Regulators Get
- Opaque, Inconsistent, **Reports**

Utilities Get
- A **Flat** Load Forecast Adjustment

Implementers Get
- Workpapers, **Limited** Measures

Customers Get
- The **Same** Thing as Their Neighbor

...A Dead End
Recipe for Shared Success with P4P

1. Transact in “standard kWh” with transparent, open-source M&V
2. Distribute performance risk appropriately among parties
3. Recruit high potential customers with customer targeting
4. Orient programs and incentives to real grid needs and pay more when/where savings are worth more
5. Balance risk among all stakeholders – don’t shift predominantly to customers
6. Manage performance with continual tracking of metered savings
References

1. CalTRACK: [www.caltrack.org](http://www.caltrack.org)

2. General Info/P4P [www.recurve.com](http://www.recurve.com) and [www.recurve.com/blog](http://www.recurve.com/blog)

3. Want to learn more about customer targeting?