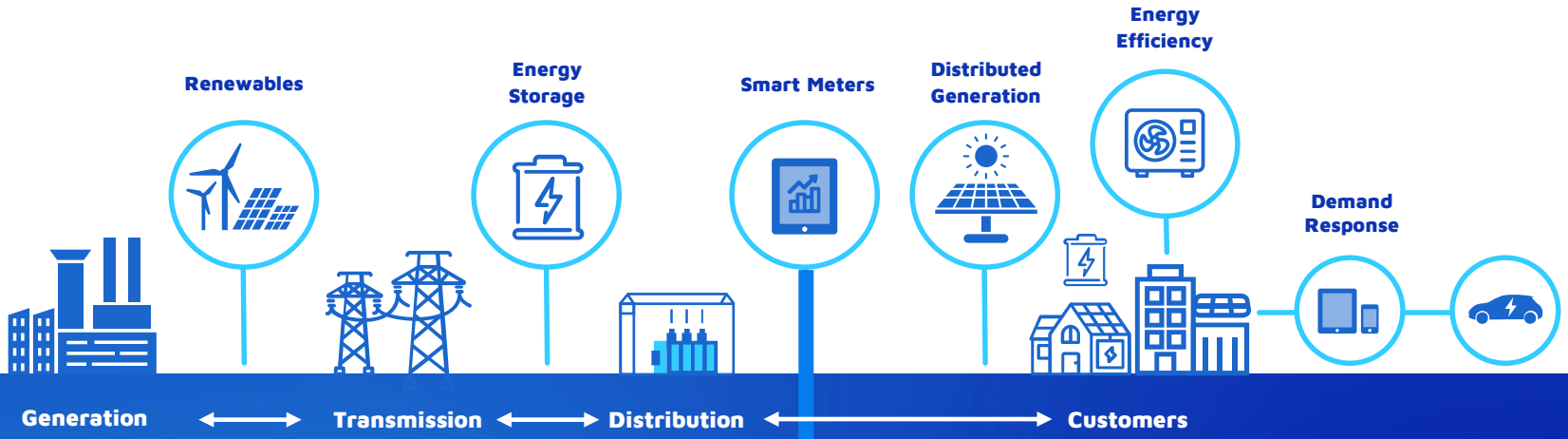

RECURVE

The Grid is a Balance of Supply and Demand

Supply ≡ Demand

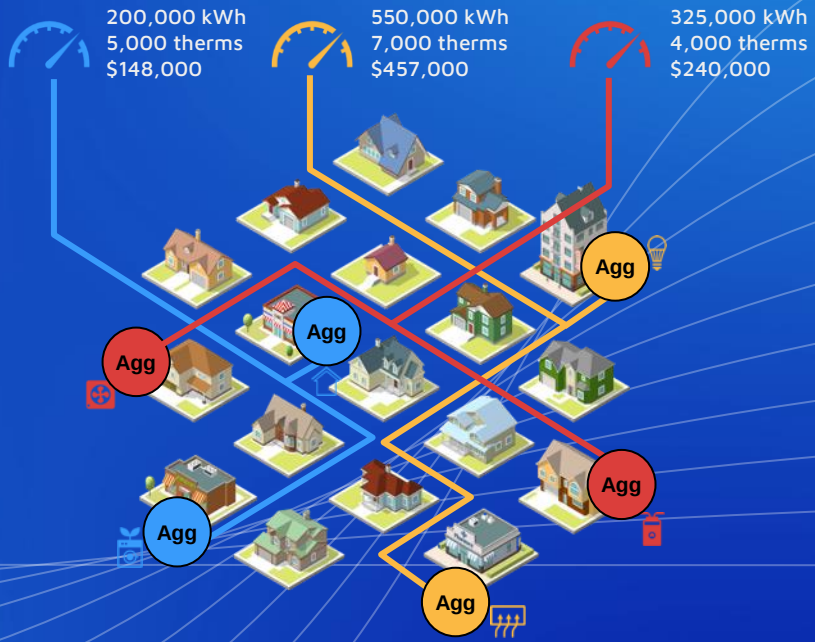


Supply: Energy Resources

Demand: Load Modifying Resources

Recurve Solutions

Demand Flexibility Analytics Platform

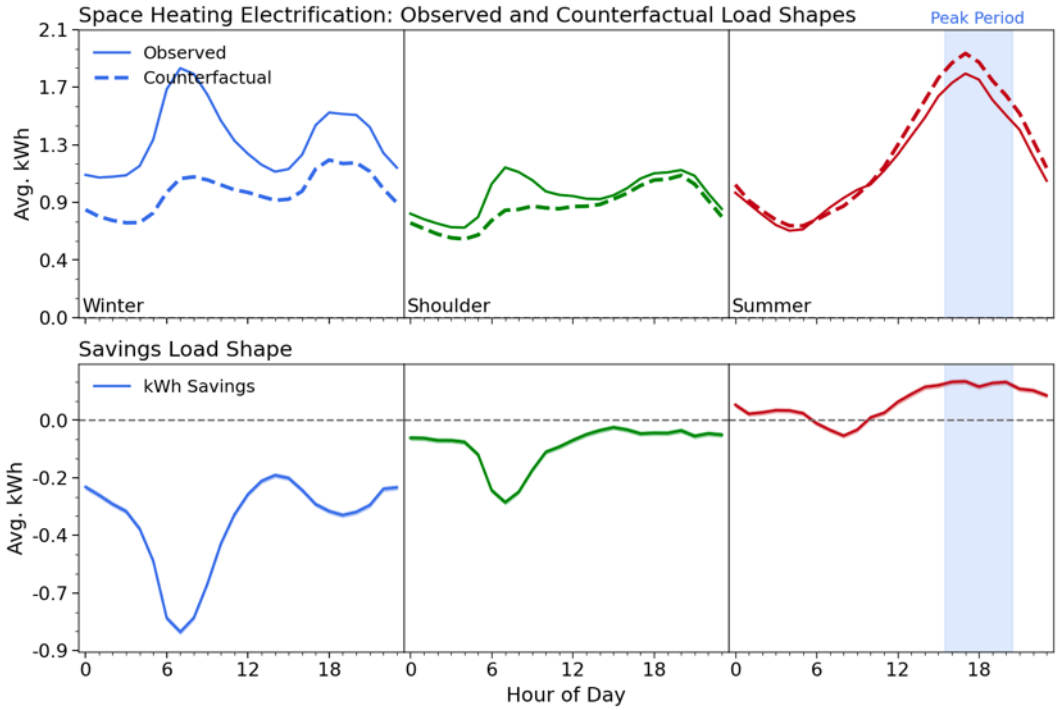


Demand Flexibility Settlement Platform

Equitable Heat Pump Electrification Analytics

Electrification Analytics: Overview & Rationale

- Equitable **decarbonization** is a high priority in Illiniois
- Electric and gas utility can **leverage combined analytics** to target and optimize program deployment
- Early experiences and impacts will **drive future adoption** and staged roll out of the program
- Ensure electrification **complement peak load** goals



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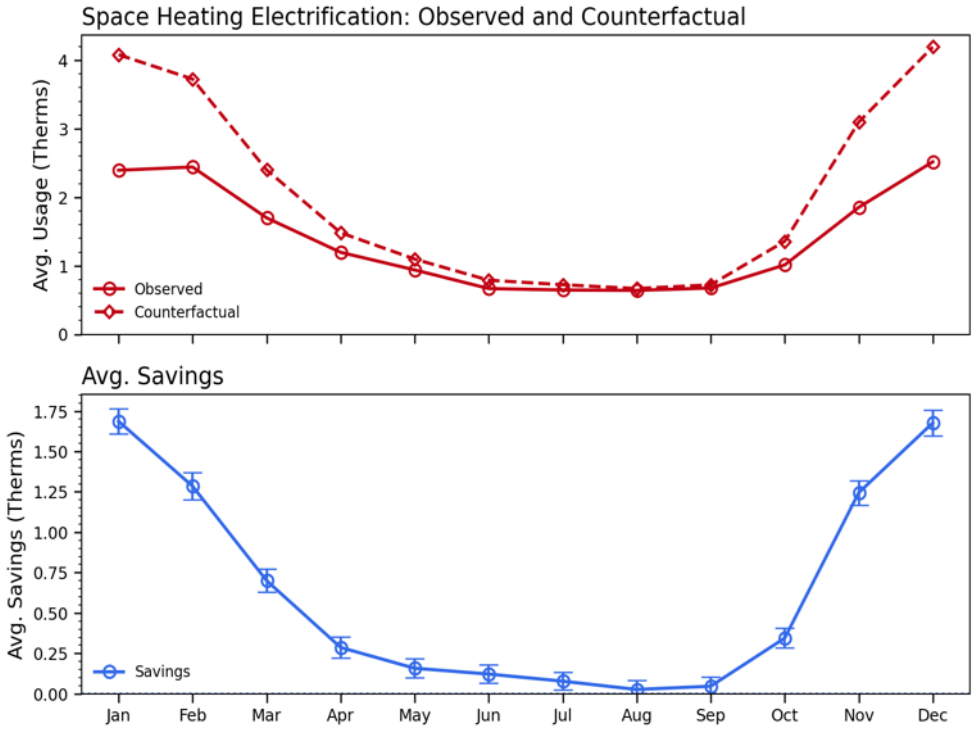


Resource Planner

Meter Level Analysis to Design, Forecast, and Target Electrification

- Weather-sensitive usage analysis to target impacts of electrification opportunities
- Optimize within demographic, geographic and other indicative parameters
- Identify highest value interventions for customers at a site level

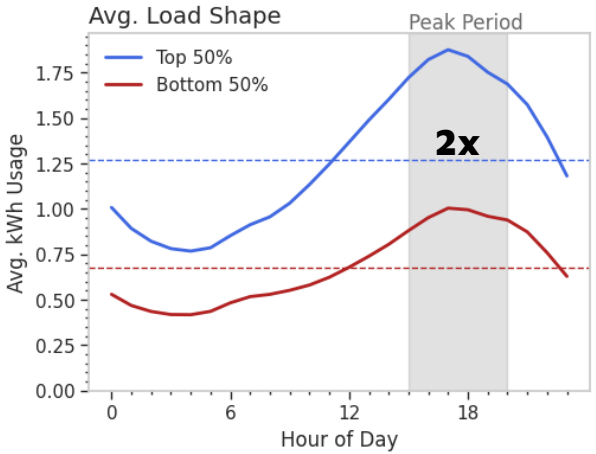
SCE: Customer Targeting

SOUTHERN CALIFORNIA EDISON®
Energy for What's Ahead℠

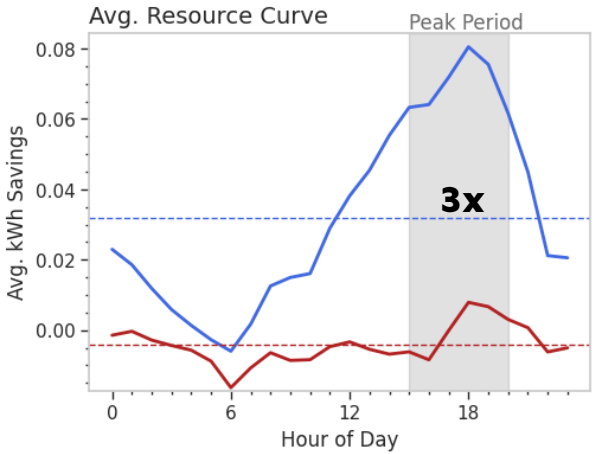
Problem: Finding peak savings potential

Solution: Target customers who will maximize peak period savings

Energy Savings



Grid Value (TSB)

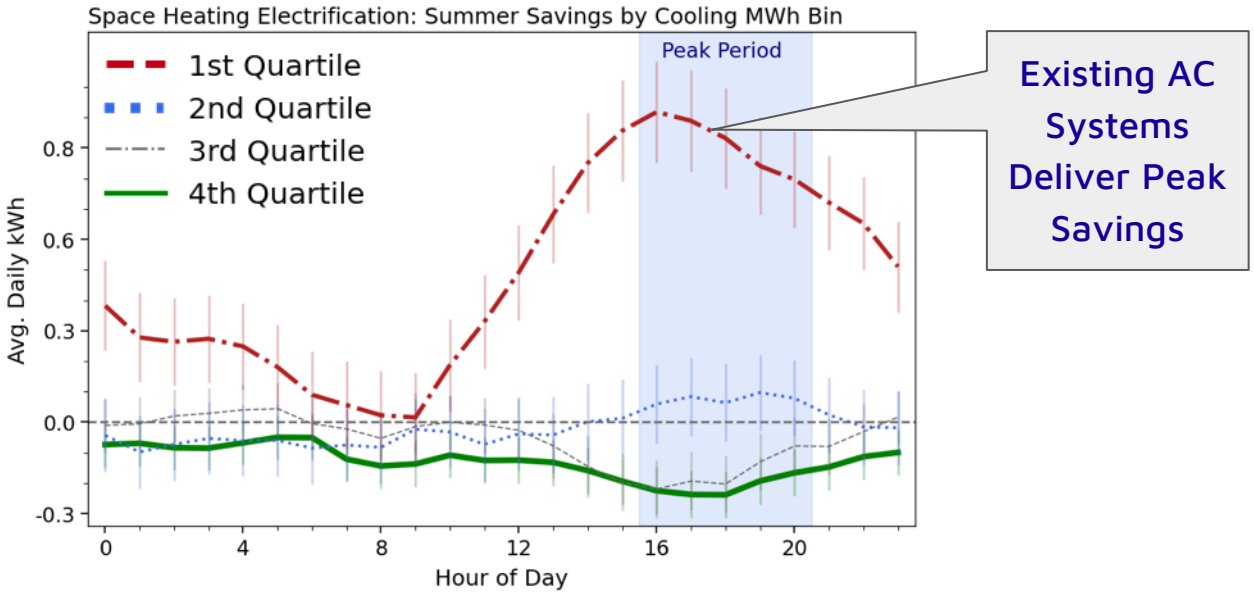


CLEAN CALIFORNIA TECH

Problem: Many California heat pump retrofit customers have increased energy demand after a heat pump installation

Solution: Find the 25% of customers with the highest AC usage, who deliver nearly all peak energy savings.

Targeting High AC Delivers Peak Savings



- 25% deliver nearly all peak savings
- Top ⅛ of customers deliver ⅔ of all summer peak savings

Top 25% Delivers 5x the Avg. Bill Savings

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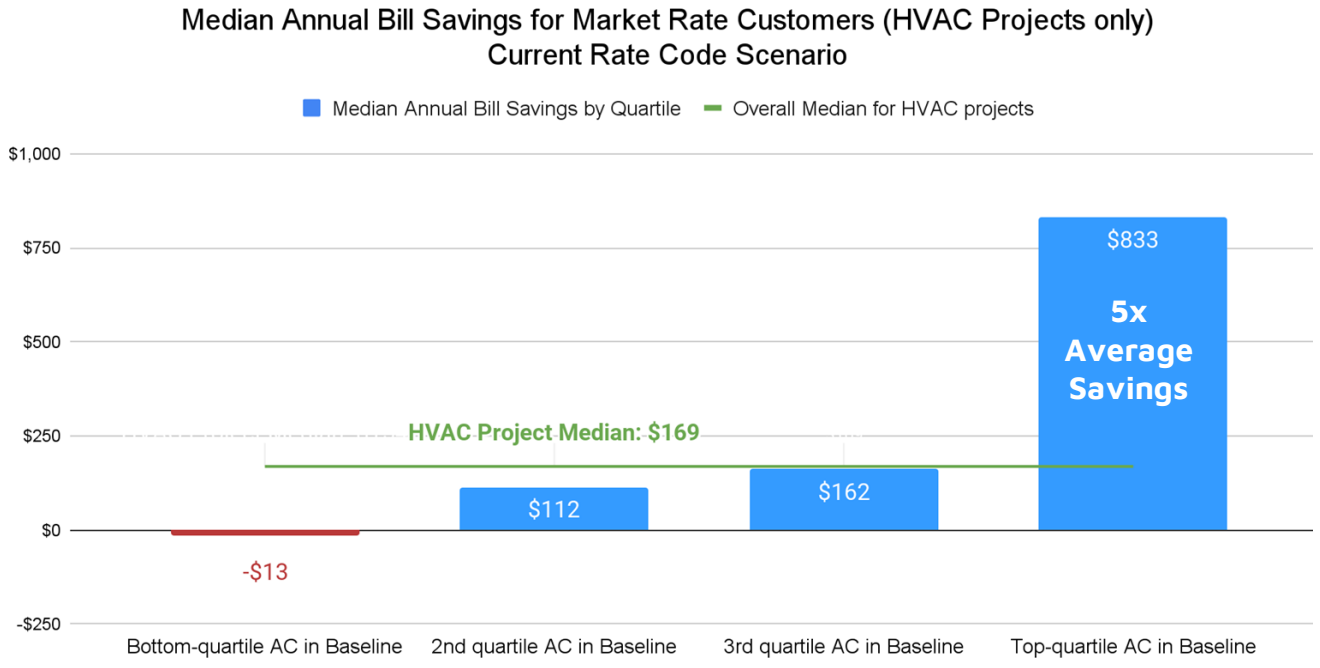


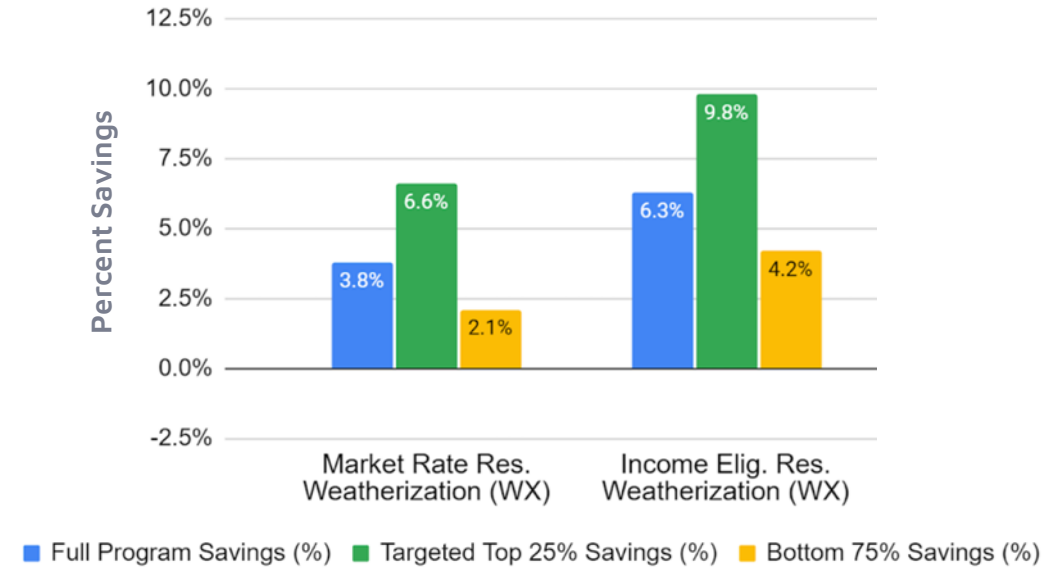
comed℠
AN EXELON COMPANY

Problem: Prove the effectiveness of usage-based targeting to optimize program performance.

Solution: Targeting drastically improves savings and grid impact.

Up to **3x** value from top **25%** of customers

Electricity Percent Savings Improvements with Targeting



Fleet Manager

Track & Monitor Electrification Impacts

- On going monitoring of impacts from electrification
- Standardized pre-post measurement for every project
- Site and portfolio-level granularity for program optimization
- Contractor management insights
- Revenue-grade transparency

Fleet Manager: Channel Manager

1. Real-Time Telemetry:

- Track the performance contractors, crews, and projects

3. Optimize Quality Assurance:

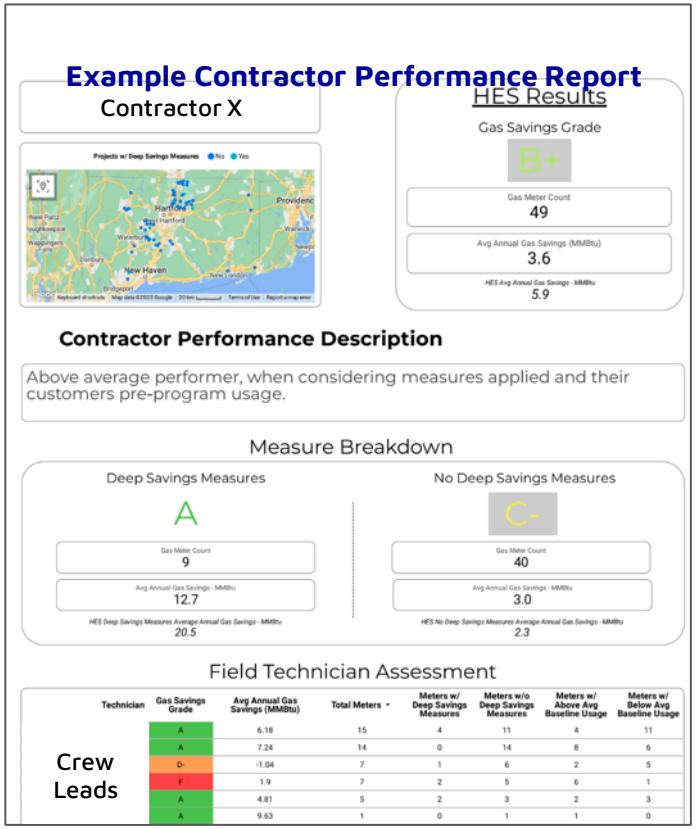
- Use performance metrics to focus QA where it counts

4. Benchmark Contractor Performance:

- Benchmark contractor performance against peers to provide support and extra training as needed

5. Performance-Based Lead Flow:

- Direct more leads toward top-performing contractors



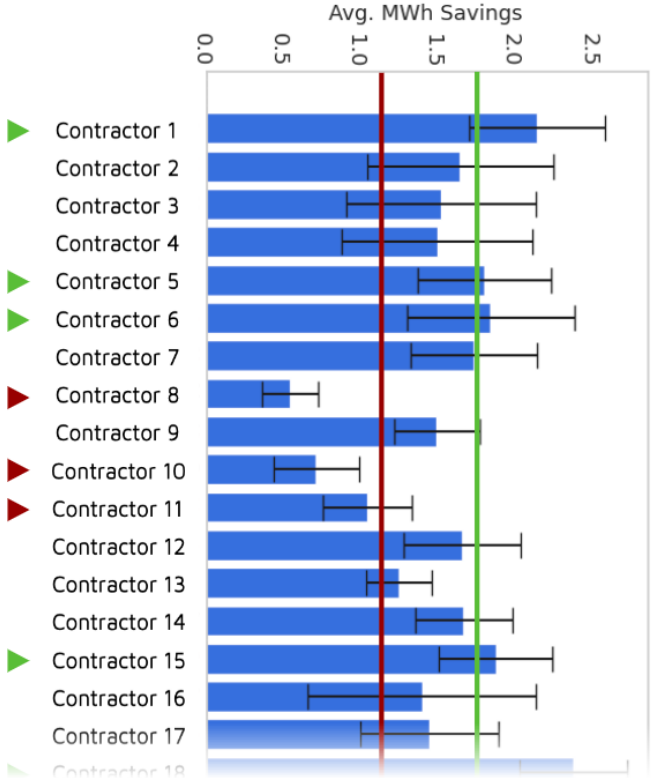
Data Driven Program Management

Problem: Contractor performance varies and QA is costly to the program and market.

Solution: By measuring performance APS can focus QA where it counts and promote high performing contractors.

Contractor Scorecard

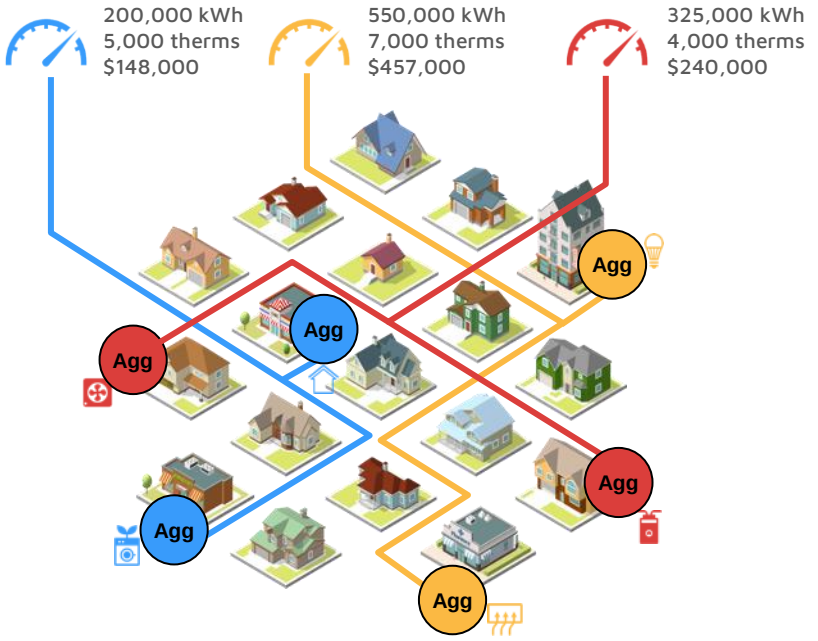
- Reduce QA costs by focusing on contractors and projects that are outliers
- Focus training where it can help the most
- Conduct O&M where it counts
- Send leads to high performers



Performance-Based Demand Flexibility Platform

Overview & Rationale

- Illinois **efficiency and peak load** goals can be synergized
- A **performance-based market** could drive incremental impacts
- A pilot could **demonstrate combined effects** of DERs and include embedded M&V
- **IRA-HOMEs** could leverage the pilot to support deployment



Demand Flexibility Settlement Platform

Virtual Power Plants Align Demand and Supply

EV Load Shift

Behavior & Control

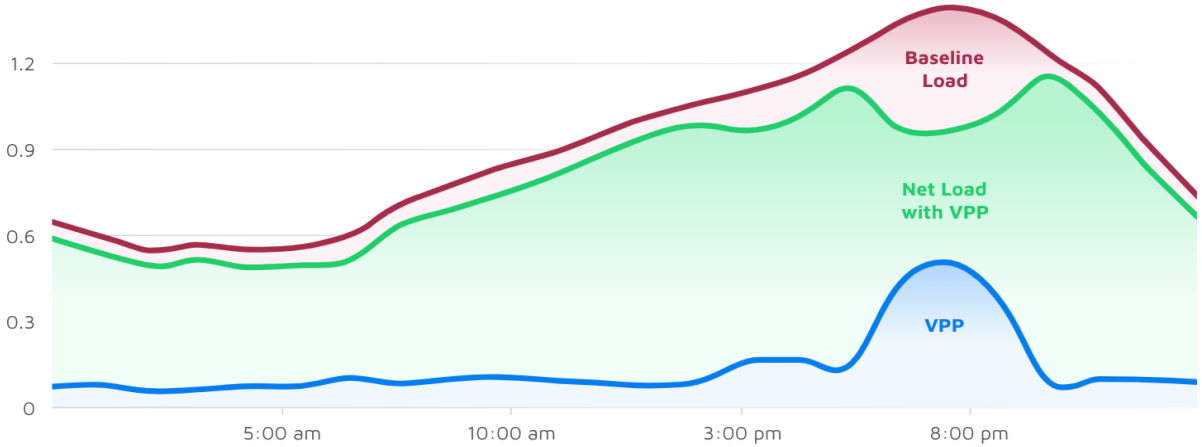
Shell Upgrades

HVAC & Electrification

Energy Storage

All DERs behind-the-meter shift or shape demand

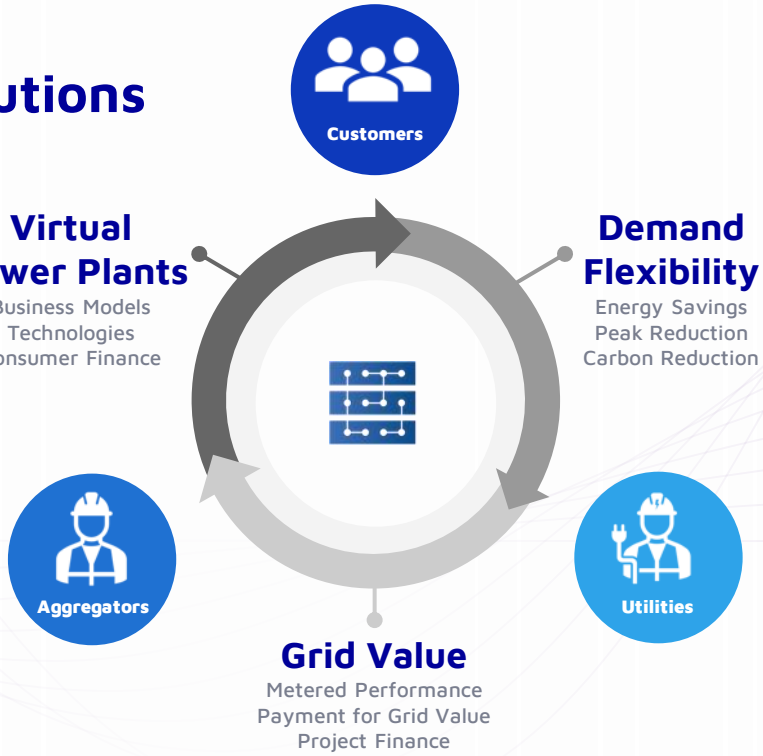
- **Long-term EE** is Long-Term Capacity
- **Dispatchable DR** is Peak Energy Resource



Settlement and FLEXmarket

Settlement Platform for technology-agnostic solutions

- Applies to all DERs, DERMs, and VPPs
- Third party settlement
- Low transaction cost
- Market engagement
- Cost-effective by design



Planning
Forecast DERs for every meter on the grid

Aggregation
Eligibility, Value, QA, and Enrollment

Fleet Manager
Track and Manager Operating Assets

FLEX Ledger
Resource and Payment Management

Compliance
Regulator Reporting and Auditing

Align Incentives on Performance Value

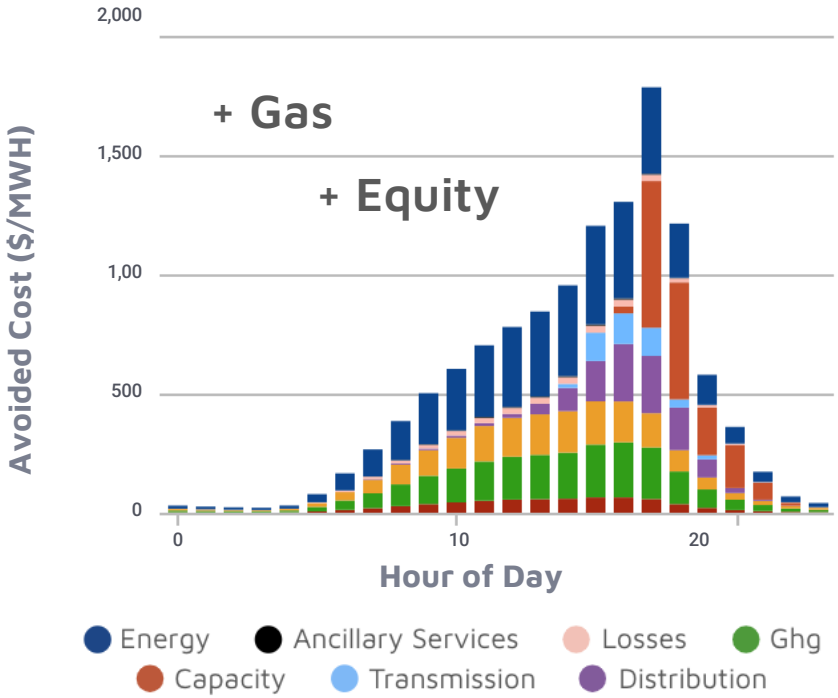
FLEXmarket Platform

Pay for delivered flexibility at the cost-effective based on Time and Locational price.

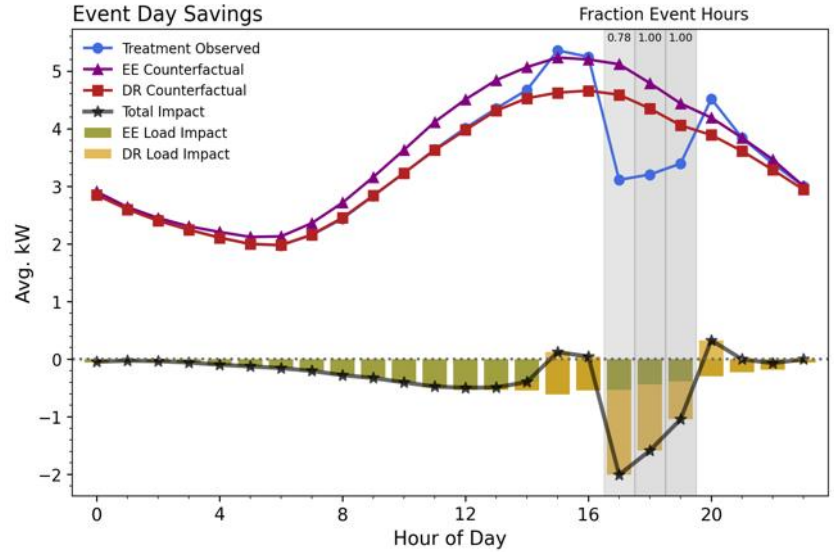
Complete VPP:

- Long-Term Energy Efficiency
- Event Demand Response

Hourly Electric Avoided Costs



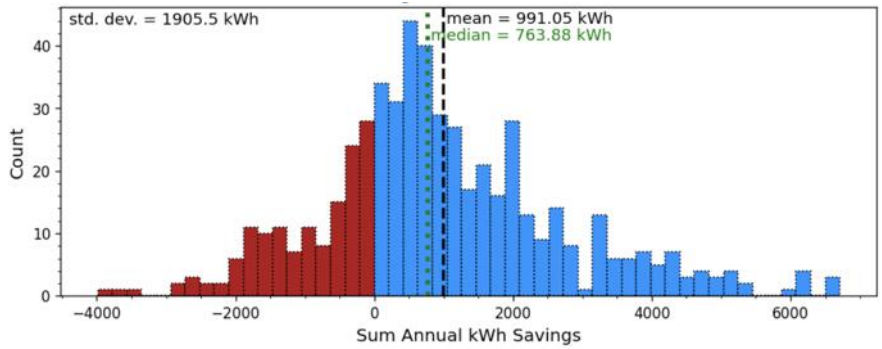
Measure Impacts with Open-Source Advanced M&V



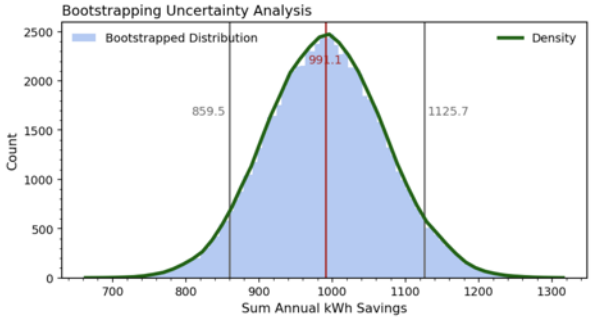
Energy Efficiency
365 Day Baseline

Demand Response
60 Day Event Baseline

Distribution of kWh Savings



Quantifiable Confidence



Predictable Results: There is 90% confidence that running this program ran again will result in Annual kWh savings between 860 and 1126 kWh.

FLEXmarket Model Reduces Friction

Utility / LSE

Program Administrator

Contract

Market Manager

Open-source advanced M&V Platform

LF ENERGY OPENEEMETER

Flexibility Purchase Agreements

Aggregators

Bay Right There! HEATING & AIR

CLEAResult

We change the way people use energy.

Sealed

BRIGHT POWER

BLOC POWER

GridPoint

BUDDERFLY

Install innovative projects to reduce energy use

Contract

Home and Building Owners

Receive comfortable homes buildings and lower utility bills

Sample Aggregator Journey

Onboard	Target	Enroll	Track
			
Sign Flexibility Purchase Agreement (FPA) Onboard into Platform	Effectively target and identify high-potential projects and estimate project value in the Recurve Platform	Acquire, enroll, and implement projects in the Recurve Platform	Track savings and receive payments using the Recurve Platform

Sample Customer Journey

Outreach	Solution Development	Contracting	Installation	Energy Savings
				
Aggregator connects with customer through service call or outreach.	Aggregator meets with customer and determines optimal measure set.	Aggregator and customer agree on the project and sign the contract.	Aggregator installs measures.	Customer saves on their bill and the overall community benefits.

Market Access

Problem: Summer reliability constraints led to a need for incremental load and system benefits.

Solution: By implementing an open-market solution aggregators quickly brought meaningful projects to help address the gap.

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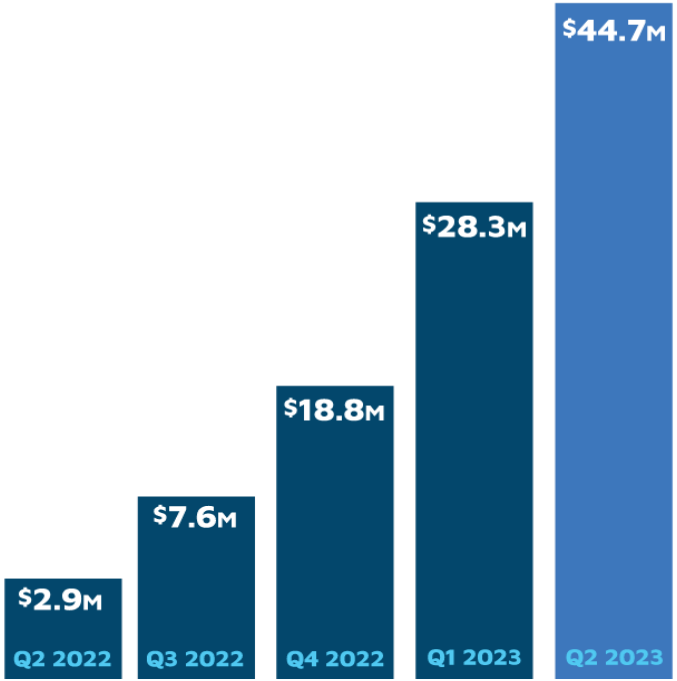
Performance-Driven Market

LIFETIME TOTAL SYSTEM BENEFIT

GAS AND ELECTRIC COMBINED TSB FORECAST VALUE



DEMAND FLEXMARKET

38%
INCREASE TO CALIFORNIA COMMERCIAL TSB

2X
TSB/MWh

$88 FLEXMARKET TSB/MWh SAVED

vs.

$40 CA COMMERCIAL EE TSB/MWh SAVED

102%
PERFORMANCE/ REALIZATION RATE

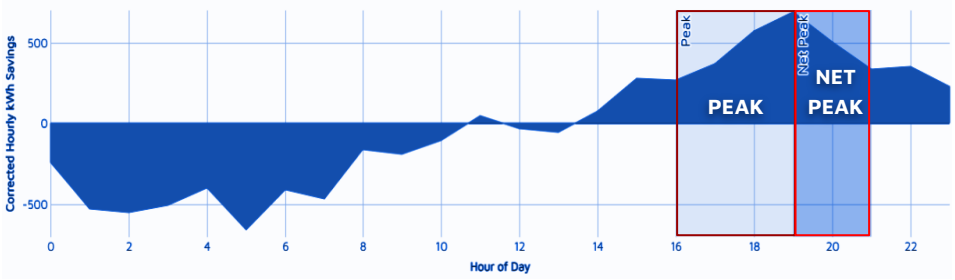
MCE | My community. My choice.

Problem: Market exposure and reliability issues during summer peak periods

Solution: Deploy a complete FLEXmarket paying for long-term and peak savings

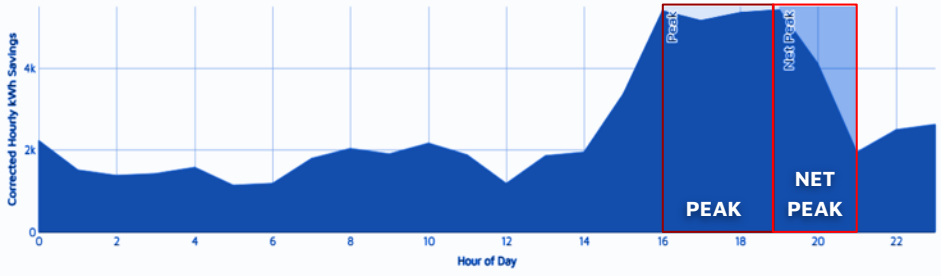
EV Charge management load shifts out of the evening peak

EV Load Shift



Smart Tstats reduce across all hours but increases during peak

Behavior & Control



IRA HOMES: Measured Performance

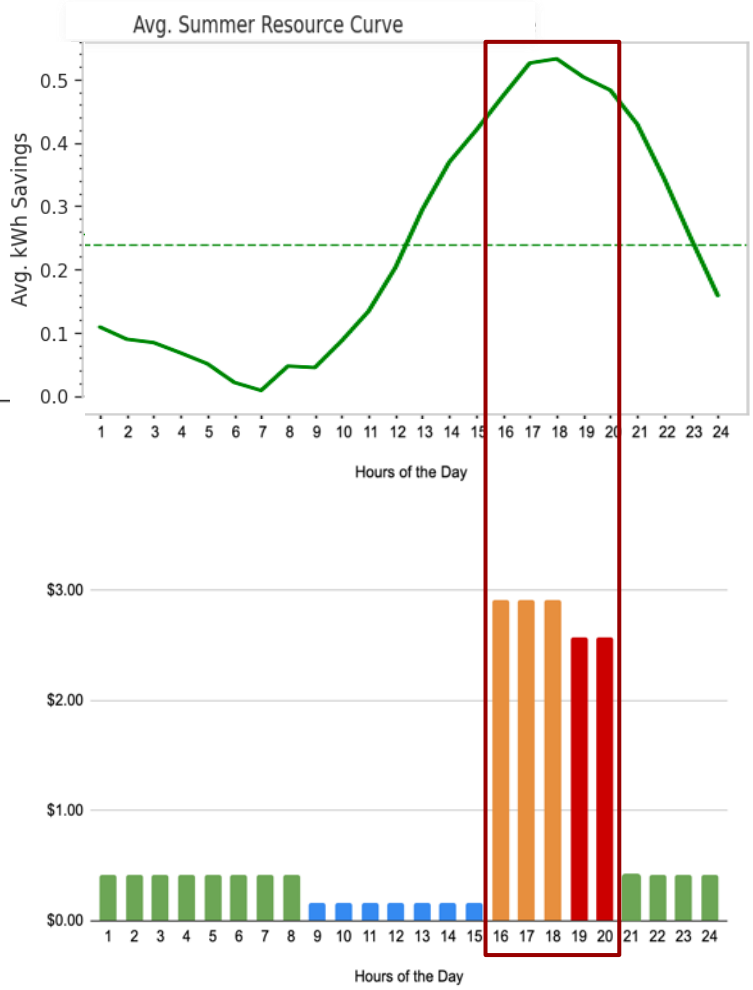
Problem: Fixed incentives for home performance programs can mis-align motivations.

Solution: Leverage the measured path to align incentives, mobilize the market to capture customer and grid value

Weight hourly savings incentives to grid value and time of use:

Monthly Payable Value	Market	LMI
Monthly kWh Rate	$0.51	$1.01
Monthly Therms Rate	$14.86	$29.73

Hourly Payable	Market	LMI
Gross Peak	$2.91	$5.81
Net Peak	$2.57	$5.15
Midday	$0.16	$0.32
Off Peak	$0.42	$0.84



RECURVE

SHAPE THE FUTURE OF ENERGY

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