



California Public
Utilities Commission

Demand Flexibility Management White Paper & Rulemaking

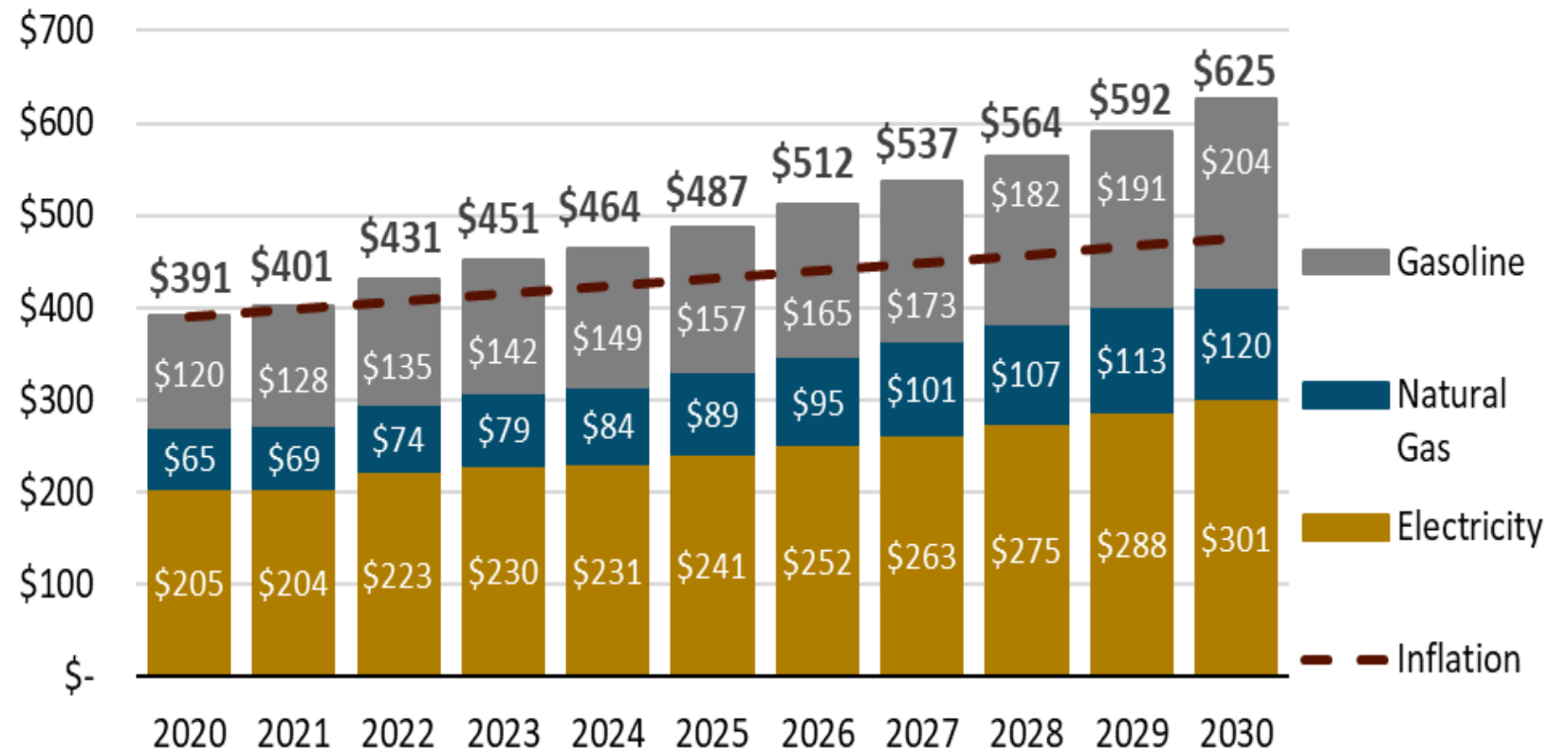
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Household Energy Costs Are Projected to Increasingly Exceed Inflation Over the Next Decade

- An accelerating trend for all three major IOUs.
- **Main drivers:**
 - kWh sales decline, behind-the-meter resources; load departure.
 - Rate sensitivity to large capital investments due to smaller customer base and lower economies of scale.
- Increased electrification and decreasing natural gas and gasoline will stabilize this trend.

SDG&E – Household Energy Costs, 2020-2030



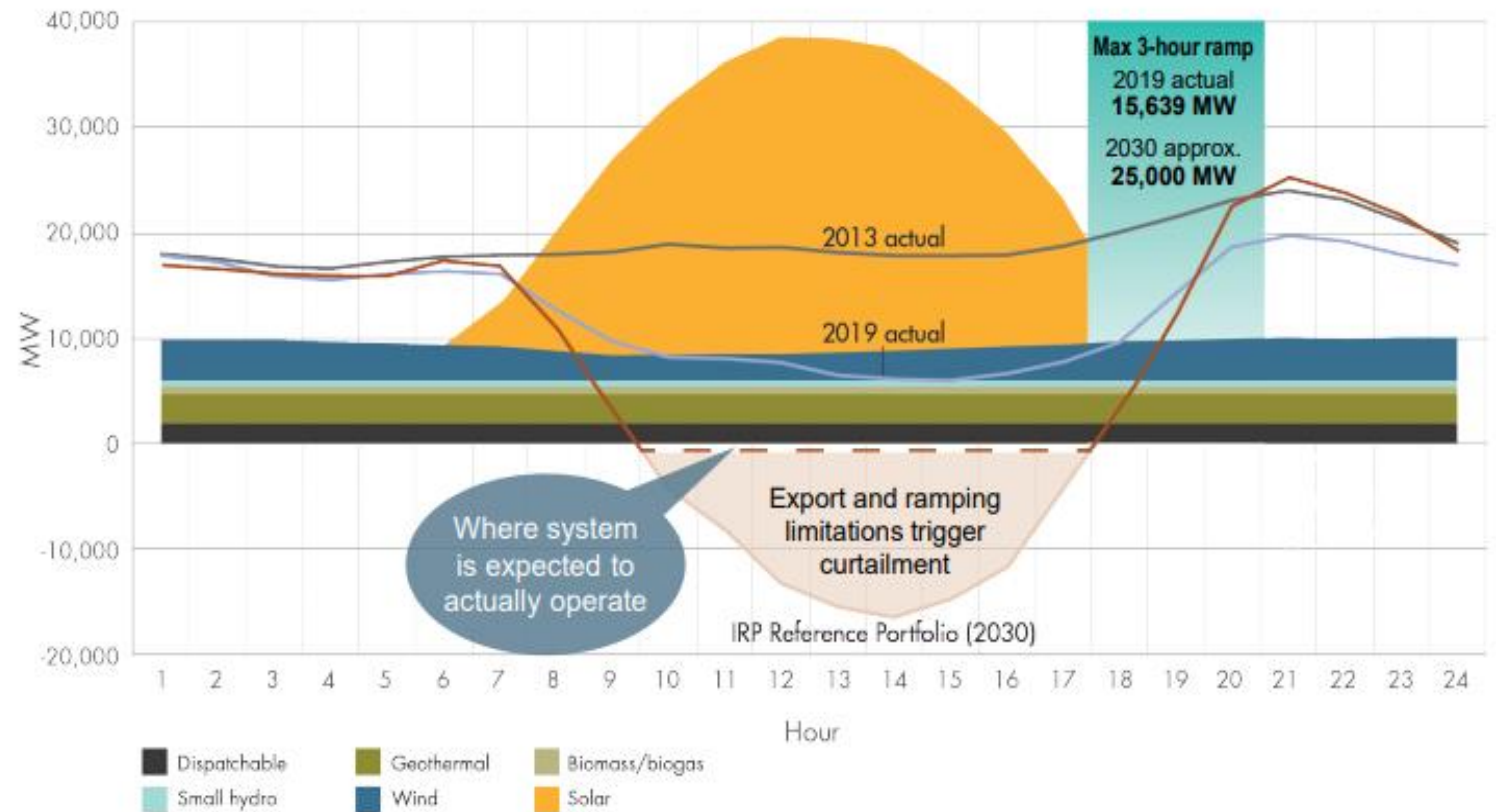
California's Electric Grid Challenges

System trends through 2030:

- 60% increase in evening ramp
- 15x increase in renewables curtailment

California is facing increasing reliability, stability and resource management challenges that must be addressed if electrification goals are to be achieved.

- Demand Response can be a cost-effective alternative
- But highly scalable, low-cost deployment strategies are needed



Objective: Integrated Demand Flexibility Management Framework

Objective: Launch a **statewide** rulemaking that leverages a consolidated menu of *opt-in and opt-out* advanced rates and DR strategies to effectuate *widespread load management*, improved grid utilization through a more *dynamic, transactive DER marketplace*.

1. Support rapid long term electrification.

- Leverage more effective DR and advanced retail rate design strategies.

2. Support and accelerate California's clean energy goals.

- Better address pressing grid issues associated with the growth of renewables, electrification, and DER adoption.

3. Promote fair and secure compensation for DERs.

- Encourage an increasingly transactive bidirectional (import/export) grid through a secure grid supported by greater automation.



Demand Flexibility Management White Paper & Staff Proposal

Problem Statement: Patchwork of Rates and Demand Response Programs Need Integration

Present

Basket of Rates

(cost recovery / allocation, equity)

Basket of Supply-Side Programs

(market integrated)

Distribution Level DR

- ➔ Complex, inefficient, expensive, confusing
- ➔ Difficult to scale, Limited adoption
- ➔ High cost of controls, automation

Future

Demand Side:

Unified Universal Dynamic Economic Signal

(UNIDE)

- ➔ Reduced complexity, single point focus
- ➔ Highly scalable, widespread adoption
- ➔ Reduced cost of controls, automation

Transition to the UNIDE Framework

1: Develop standardized, universal access to current electricity price

2: Introduce dynamic prices based on real-time, wholesale energy cost (*opt-in*)

3: Modify prices per real-time, localized grid conditions (*opt-in*)

4: Transition to bi-directional prices (buy & sell)

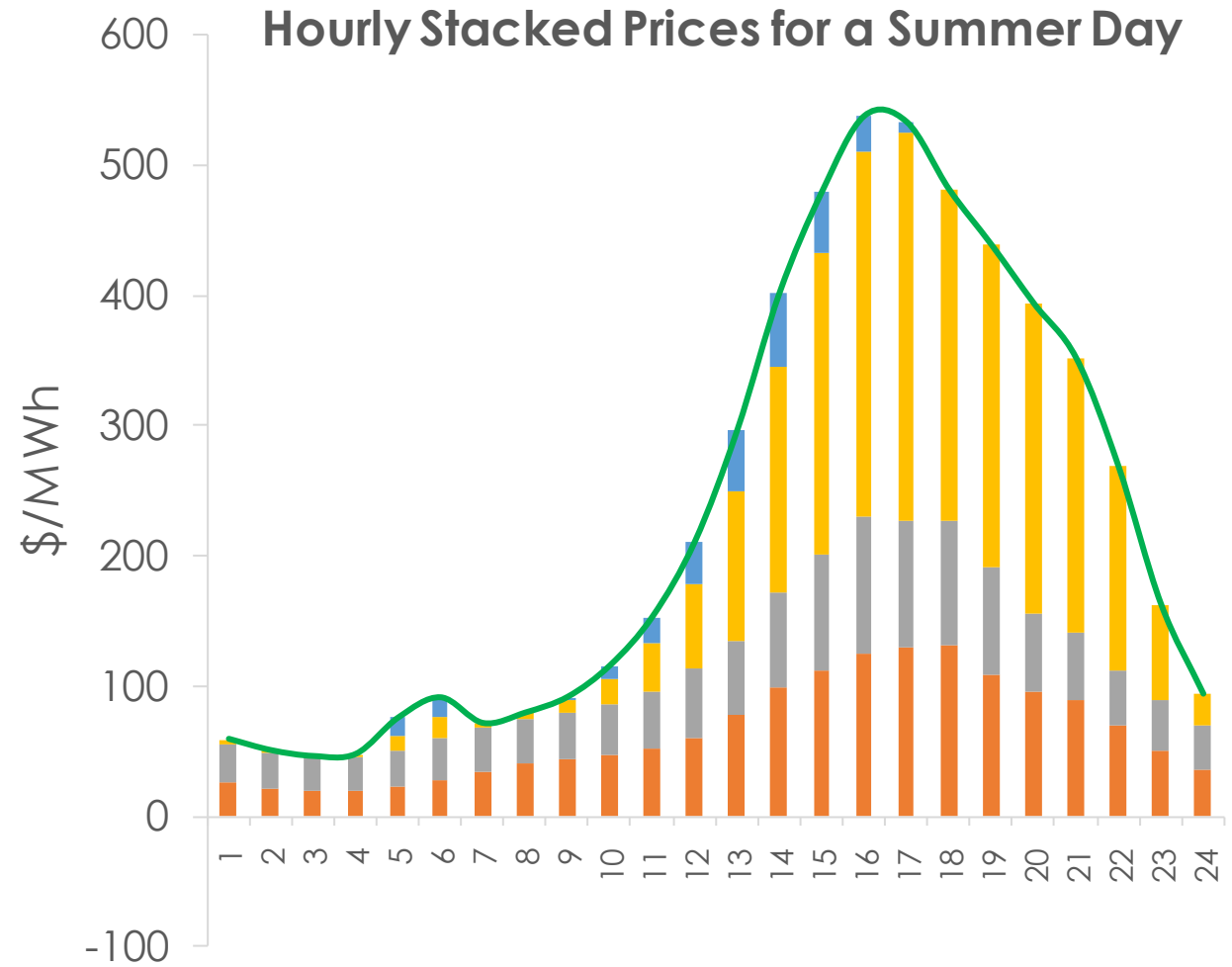
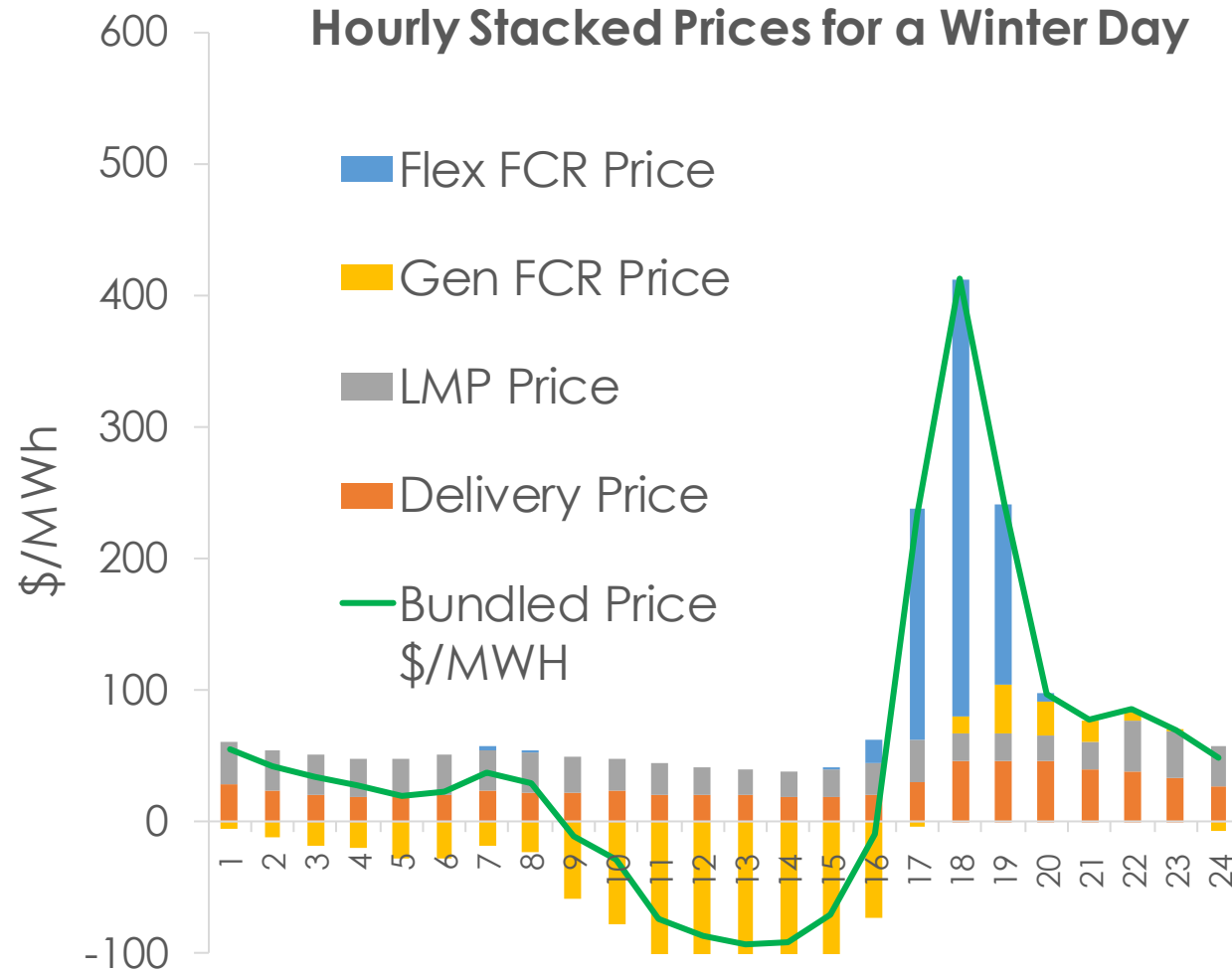
5: Offer subscription option (average load shape & energy quantity)

6: Introduce transactive features (ability to lock in price in advance)

Unified Universal Dynamic Economic Signal (**UNIDE**)

Critical Case Study: Edison/TEMix "RATES" Pilot

Composite Hourly Prices based on Hourly Capacity Utilization & CAISO LMP



Vision: Statewide Portal Feeds Real Time Energy and Scarcity Capacity Prices to Devices



...leading to a reduction in peak loads, energy prices, and required infrastructure...



PEAK LOADS



Lower peak load means less infrastructure cost..

...and customers buy more electricity when it is cheaper

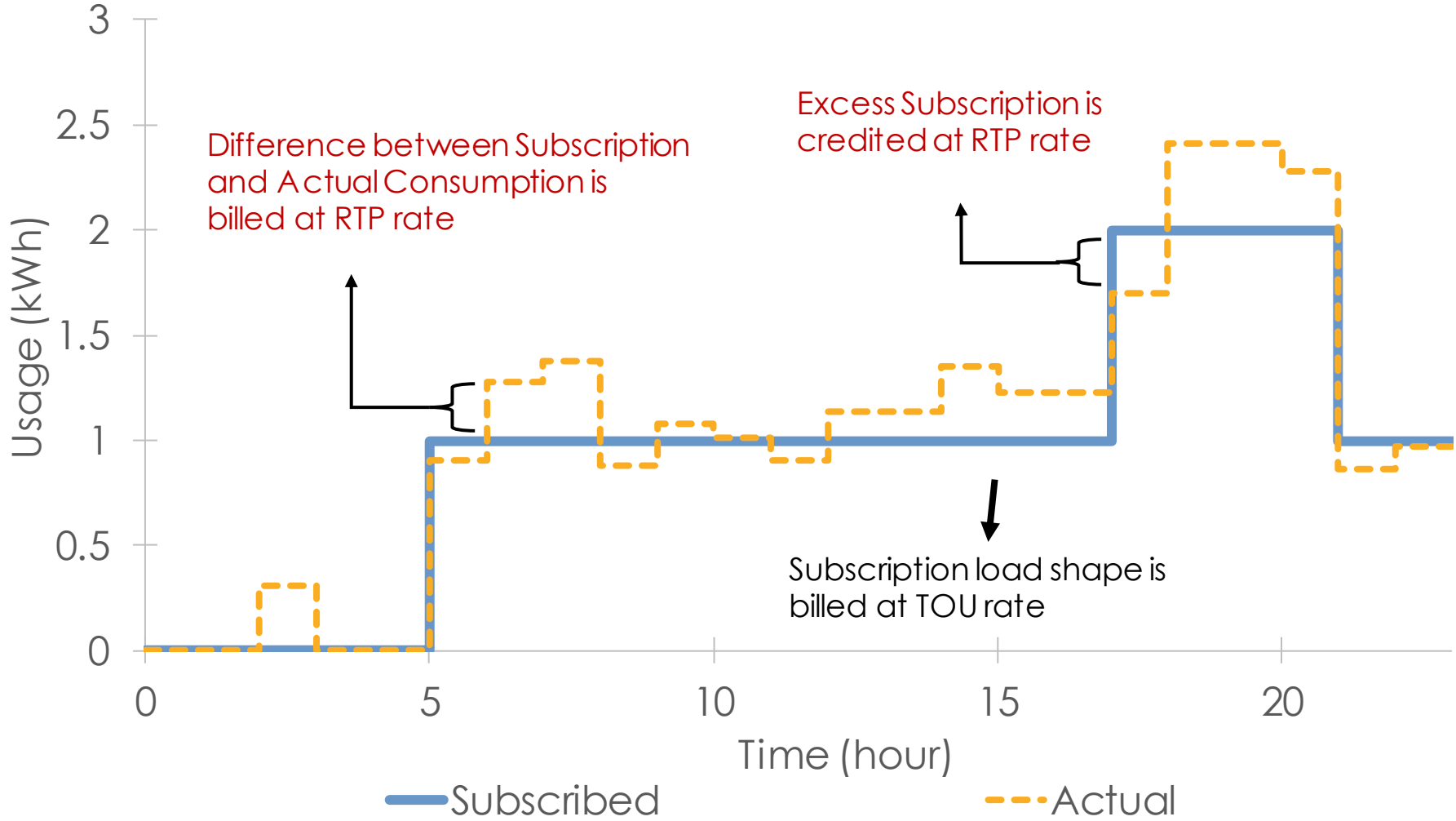


Wholesale Electricity Cost



Subscriptions: Load Shape & Energy Quantity at Fixed Monthly Price

Stabilizing Element for Both Consumers and Utilities



Other Customer Protections Contemplated for UNIDE Framework

- **Income Graduated Fixed Charge**

- Multi-tiered (3 layers) income strata to alleviate rate pressures on low-income customers.
- Partially financed / offset vis a vis California climate credit (cap and trade) revenues

- **Annual Updates to Marginal Generation and Distribution Capacity Costs**

- Annual true ups to reset marginal capacity cost assumptions and scaling factors resulting from peak reduction / system efficiency / load utilization improvements.
- Passthrough of incremental cost savings to customers

- **Marketing Education & Outreach Programs + Evaluation**

- Statewide and Utility-Specific focus group research, marketing milestones.
- Tracking surveys for customer acceptance and load shift.

Schematic Look at Fully Realized “End State” Transactive Energy Platform

