SCE Dynamic Rate Pilot

October 26, 2022

ET Summit Fall 2022

Emerging Markets and Technology Program

SCE Engineering Services, CP&S

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Pilot Overview

Purpose/Desired Outcome

- Demonstrate the CPUC's vision of dynamic flexible and locational rates to enable DER integration and to receive feedback on how it aligns with SCE's strategy and vision.
- The Pilot is an important examination of how Utilities can cost-effectively develop real time locational day ahead pricing in accordance with recent CPUC regulatory mandates and engage customer assets for local grid reliability.
- The Pilot provides an opportunity to develop innovative rate designs that would support infrastructure changes would be needed for future implementation.

Current Situation/ Key Insights

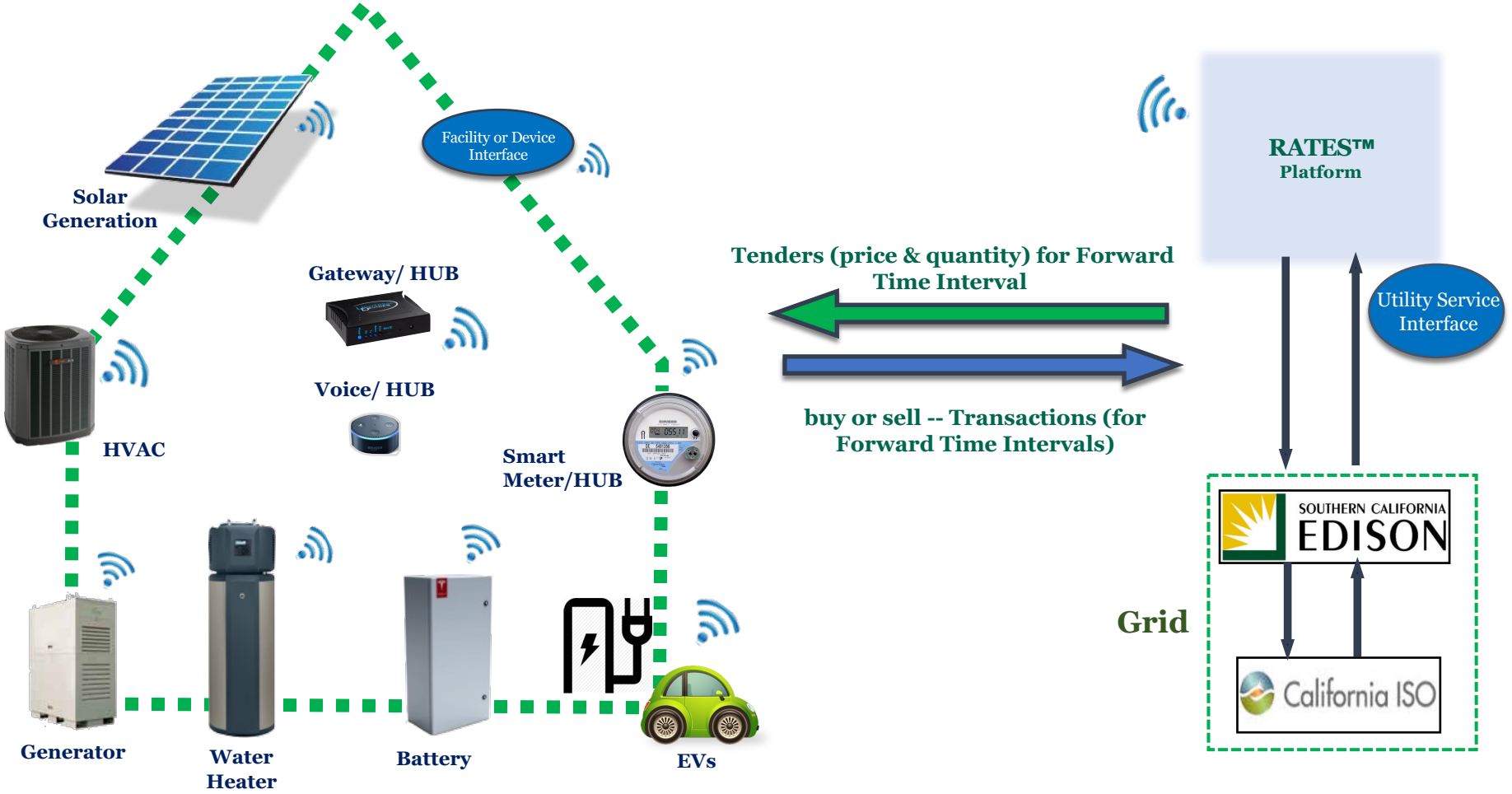
- The CPUC initiated the Demand Flexibility OIR in which Track Two will develop working groups for the CalFUSE concept in 2024.
- The Pilot is examining innovative forms of customer enabling technologies associated with DERs and how dynamic pricing developed at the local grid level can help assist SCE with enhanced reliability and customer benefits
- Major customer groups and expert technical advisors interviewed expressed high positive interest

Background

- The Pilot is examining the mechanics of the CalFUSE transactive energy dynamic rate concept, which is founded on Track One of the CPUC's DER Action Plan 2.0.
- The CalFUSE concept vision is:
  - Mitigate reliability and grid integration challenges associated with high growth in renewables, end-use electrification, and behind-the-meter DER deployment by customers,
  - Minimize short- and long-term cost of service associated with the rapidly evolving electricity infrastructure, and
  - Fully leverage capabilities of customer DERs to address grid needs while providing fair compensation for grid services provided by the DERs.

The SCE Dynamic Rate Pilot

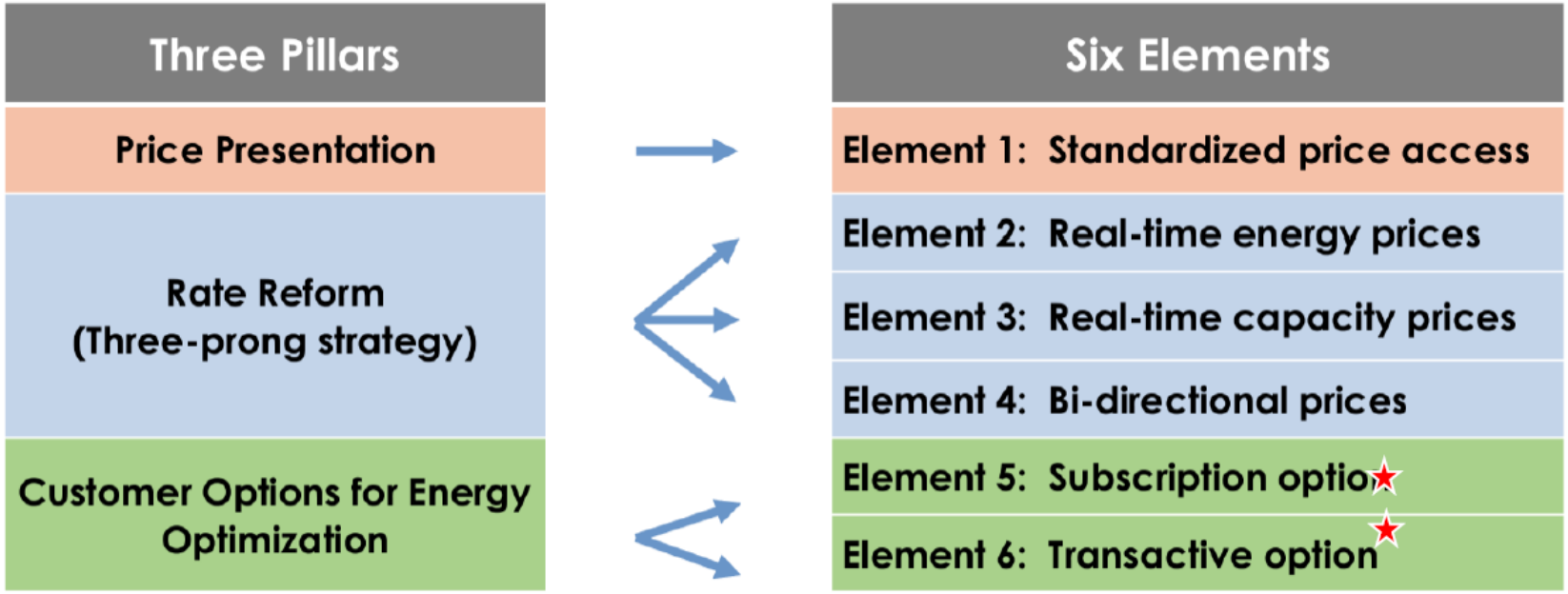
A new way to price electricity



DER ACTION PLAN 2.0
Scope and Structure

TRACK ONE	TRACK TWO	TRACK THREE	TRACK FOUR
Load Flexibility & Rates	**Grid Infrastructure**	**Market Integration**	**DER Customer Programs**
9 Vision Elements	4 Vision Elements	5 Vision Elements	6 Vision Elements
20 Action Elements	19 Action Elements	11 Action Elements	16 Action Elements
		1 Undefined Action Element	
			

Track One – Deploying real-time/ transactive rates

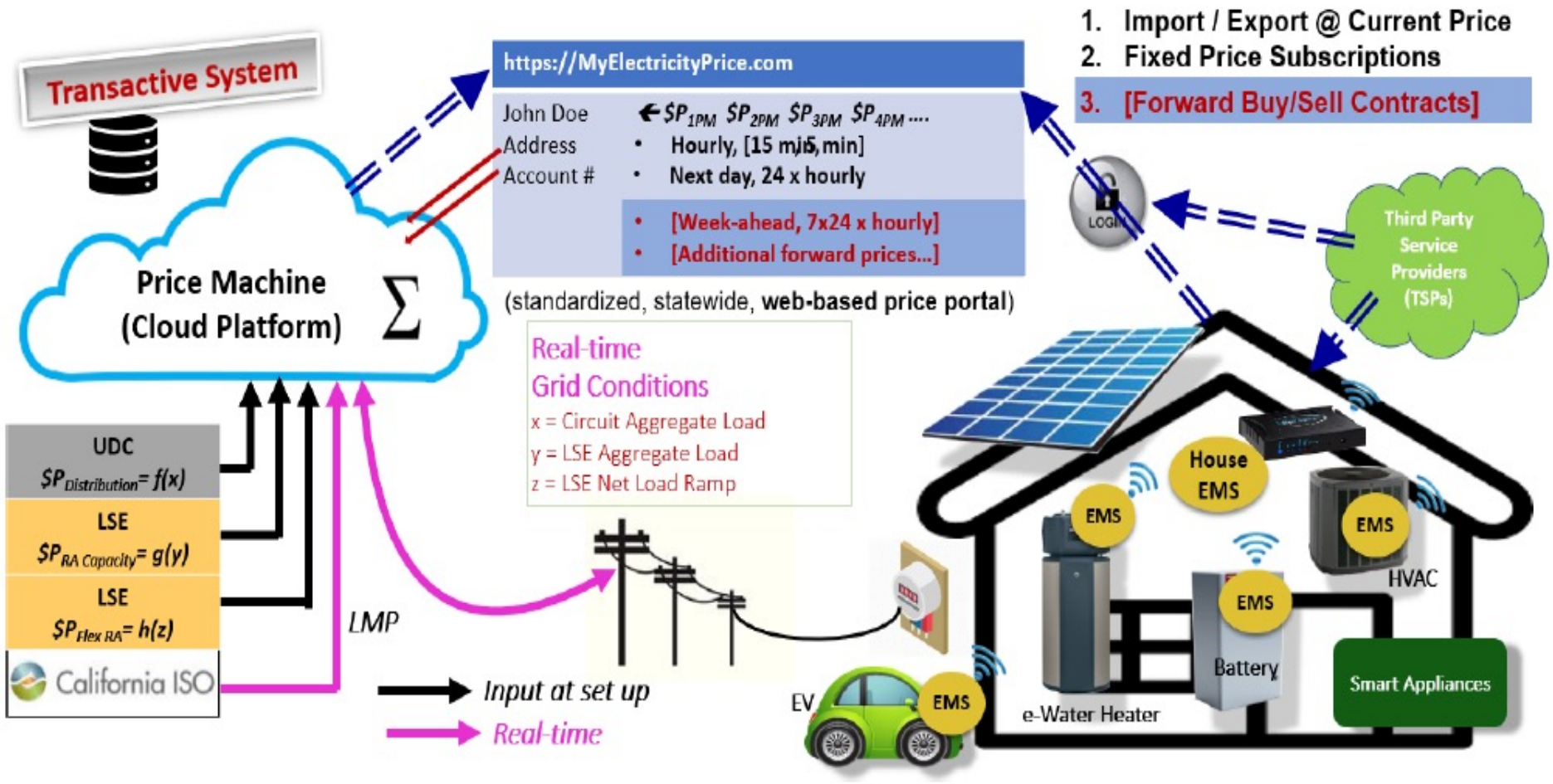


https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-costs/demand-response-dr/demand-response-workshops/advanced-der-and-demand-flexibility-management-workshop

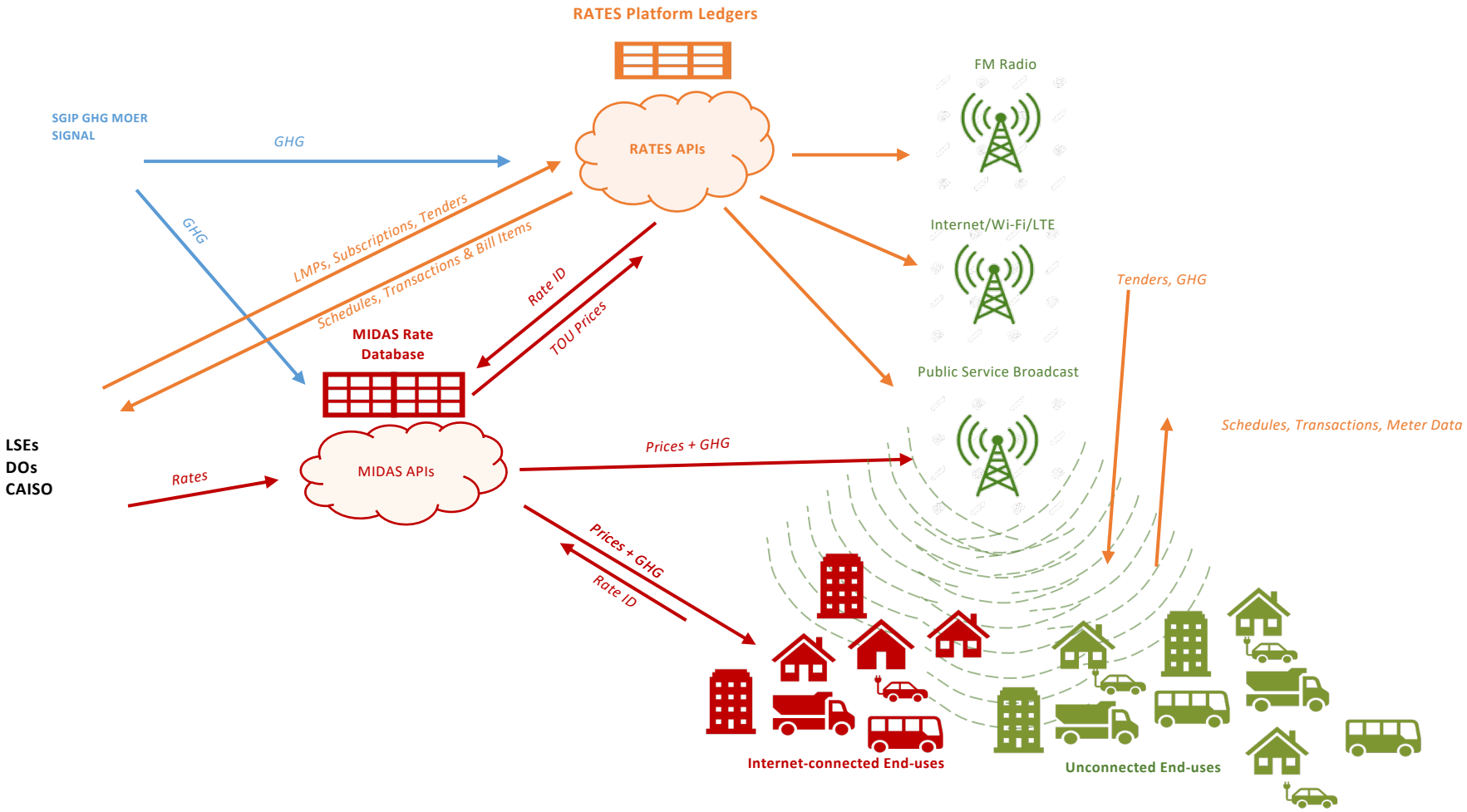
Demand Flexibility is a core policy initiative

- ED's June 2022 Demand Flexibility Whitepaper lays out the framework for dynamic rates
  - TE/BE and BTM DERs present significant demand-side flexibility potential but current DR approach is complex and may not be positioned to address grid needs
  - Proposes the CalFUSE framework for common, accessible, dynamic, and economic retail electricity price signals
  - Three pillars of 1) Price Presentation, 2) Rate Reform, and 3) Customer Options for Energy Optimization
- OIR to Advance Demand Flexibility Through Electric Rates (Demand Flexibility OIR, R.22-07-005)
  - Seeks to modify electric rates to widely deploy dynamic price signals
  - Centered around CalFUSE framework, which is being tested in SCE's **Dynamic Rate Pilot**
  - Reviews demand charges for generation, distribution, and transmission capacity cost recovery
- Demand Flexibility OIR is a ratesetting proceeding that will establish rate design principles and then modify electric rate designs
- OIR is undertaking two major efforts:
  - Updating rate design elements including fixed charges (near term)
  - Broad deployment of dynamic price signals (long-term)

CalFuse transactive pricing concept



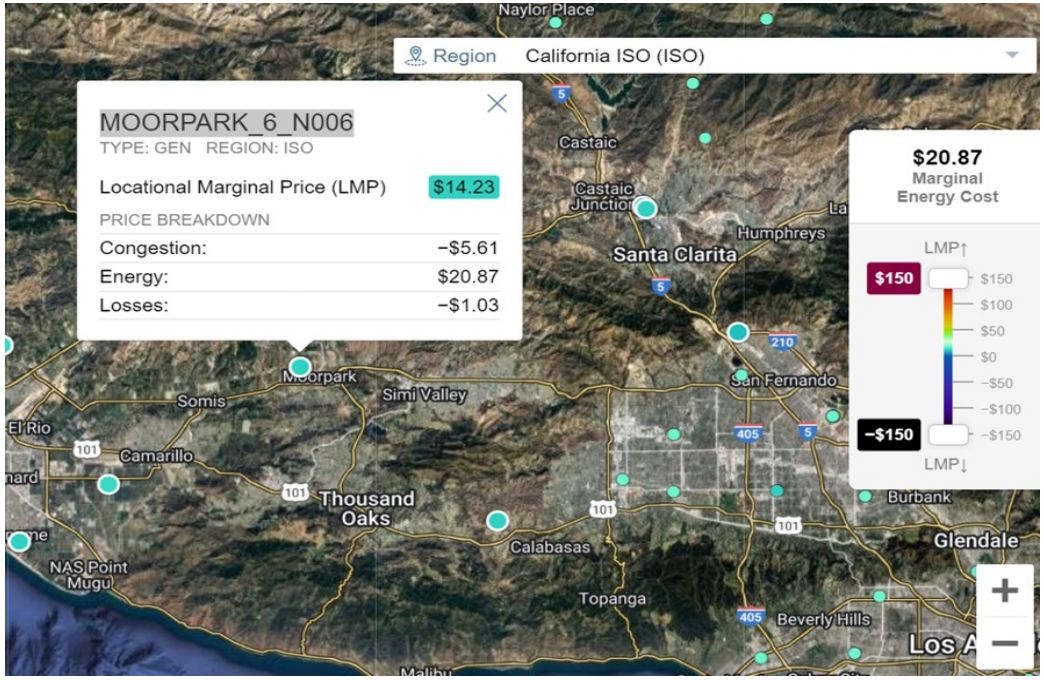
CEC MIDAS & RATES Integration



SCE's Dynamic Rate Pilot (at a glance)

- **Decision (D.)21-12-015** authorized SCE to conduct a **demonstration pilot** of the TeMix proposed "UNIDE Program" to "conduct comprehensive studies that fully assess the costs and benefits of real-time rates, including required infrastructure, manufacturer interest, and customer impacts."
- **TeMix** provides a cloud-based services platform that demonstrated a **transactive energy pilot** with 115 homes in SCE's territory in 2016 –2019 which was funded by a grant from the California Energy Commission's EPIC program. The pilot was called "RATES".
- **UNIDE** is a 6-step roadmap proposed by the Energy Division for a UNIfied, UNIversal, Dynamic Economic (UNIDE) signal that uses time and location-based dynamic rates to be offered as an opt-in basis across all customer classes by 2024.
- **SCE** is encouraged to enroll residential, commercial, and industrial customer with smart enabling price-responsive end-uses such as electric vehicle charging, behind-the-meter batteries, and controllable loads.
- The Pilot is being administered by SCE'S **Emerging Markets and Technology** program.

SCE Dynamic Rate Pilot – real time pricing from the Grid



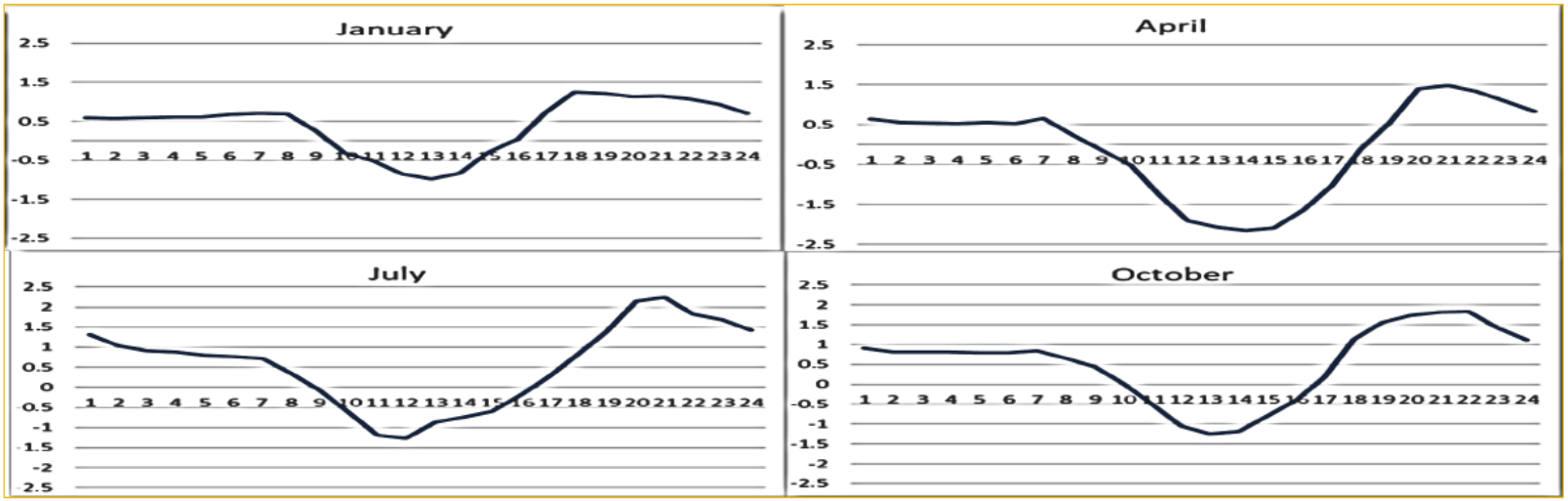
The Pilot has been ordered by the CPUC to inform the design of a **real time pricing rate** with the following pricing elements to be explored and determined through the pilot or subsequent application:

- Generation energy –Day-ahead CAISO energy prices as the RTP forecast
- Flex Capacity –Cost profile consistent with SCE's current approach
- Gen. Peak Capacity –Cost profile consistent with SCE's current approach
- Dist. Peak Capacity –Cost profile based on circuit constraint function or actual system constraints

Two-Part Subscription Transactive Tariff (STT)

Part 1. Subscription

Uses the individual Customer's historical hourly usage profiles and monthly bill @ OAT
(by definition, the subscription includes all costs for subscribed usage)

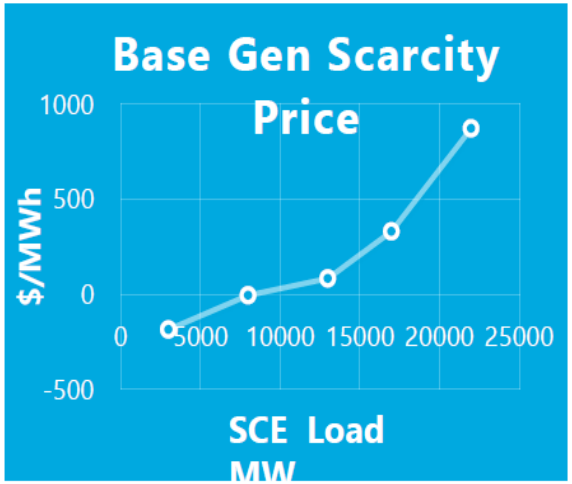


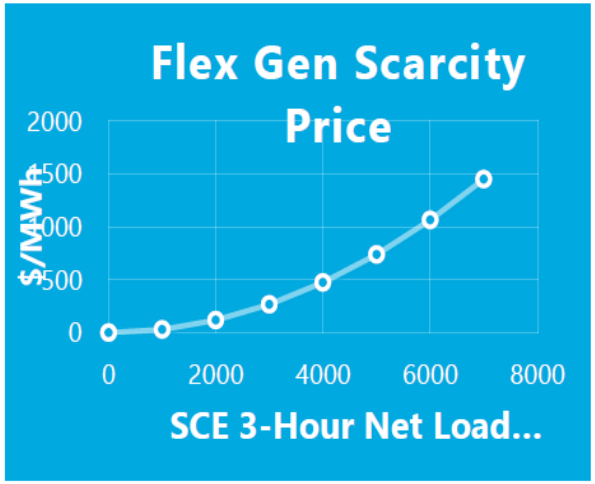
- Subscription provides bill and energy stability to customers and suppliers
- Allows full variability in transactive real-time tender prices
- Retains customer class, CARE, & NEM rate differentials in the OAT
- Allows similar transactive tender prices for all customers

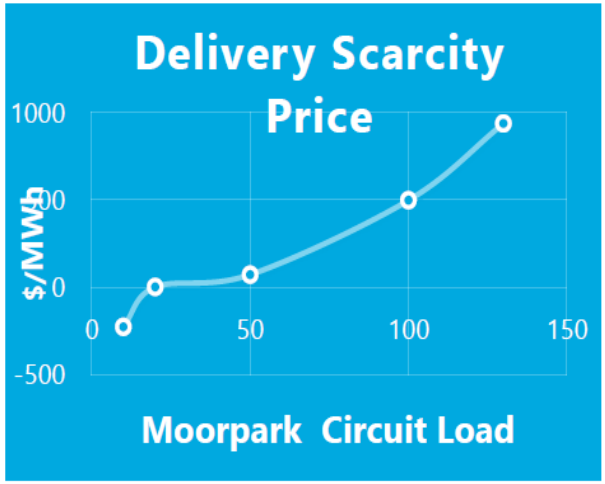
Two-part Subscription Transactive Tariff

Part 2. Transactive Scarcity Pricing

Wholesale Tender Price at Transmission/Distribution Interface = ISO LMP
LSE Tender Price at Transmission/Distribution Interface = (ISO LMP + Base Gen Scarcity Price + Flex Gen Scarcity Price)
DO Delivery Tender Price = Loss (Circuit Load) * ISO LMP + Delivery Scarcity Price
LSE Retail Delivered Tender Price = LSE Price + DO Delivery Price

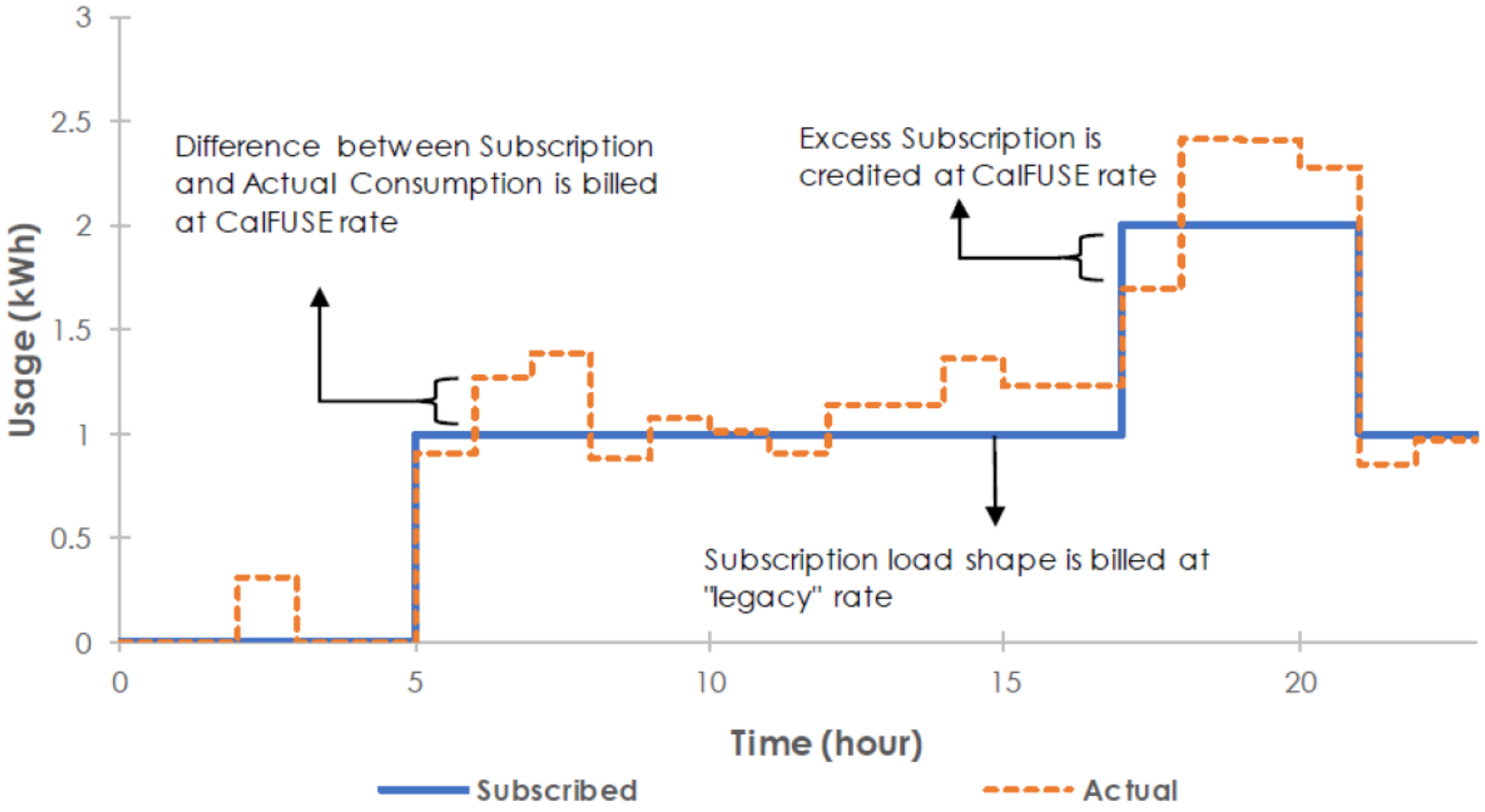




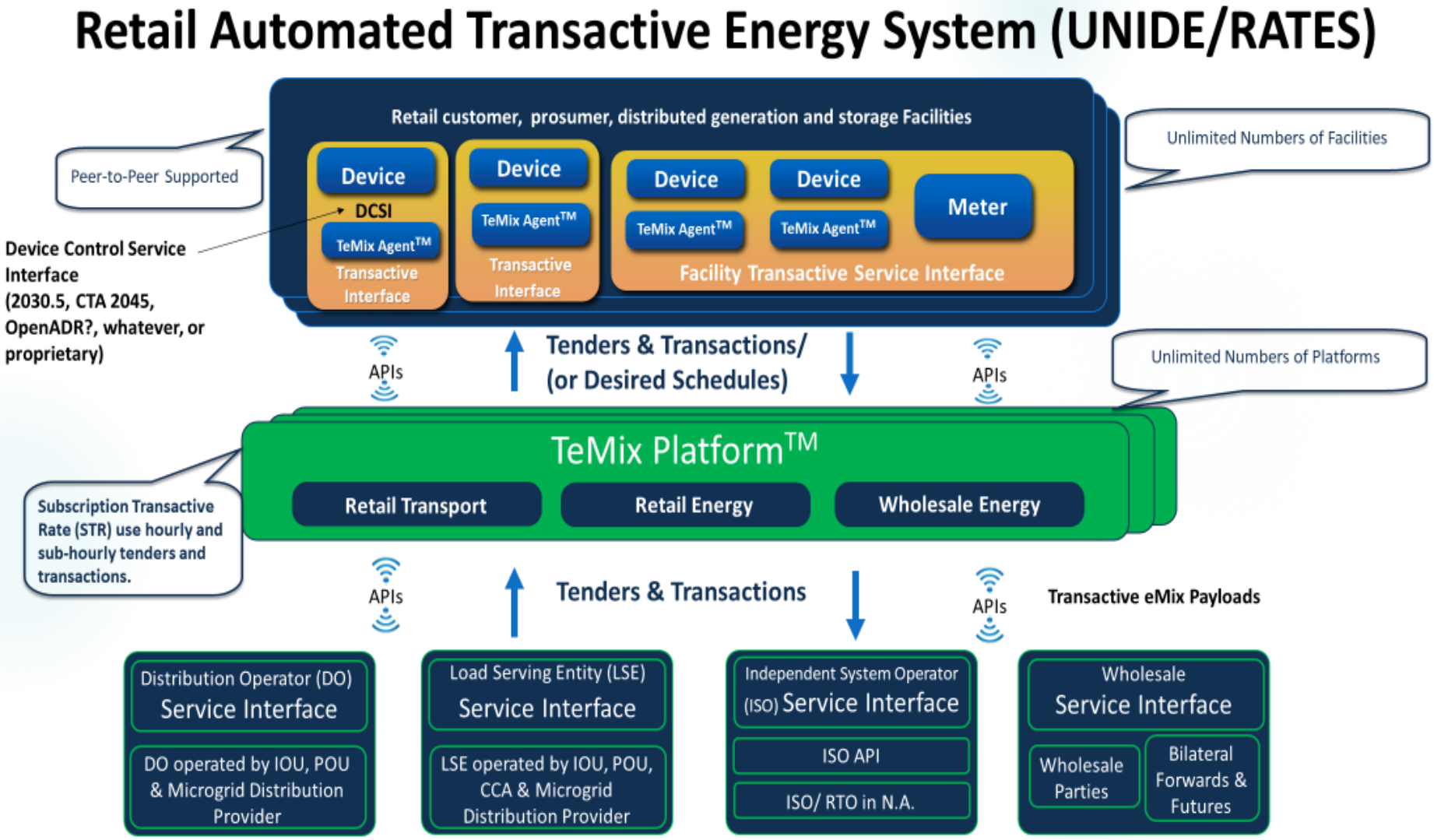


(curves calibrated to fully recover Fixed and Variable allowable costs)

Subscription forward contract hedges transactive tenders

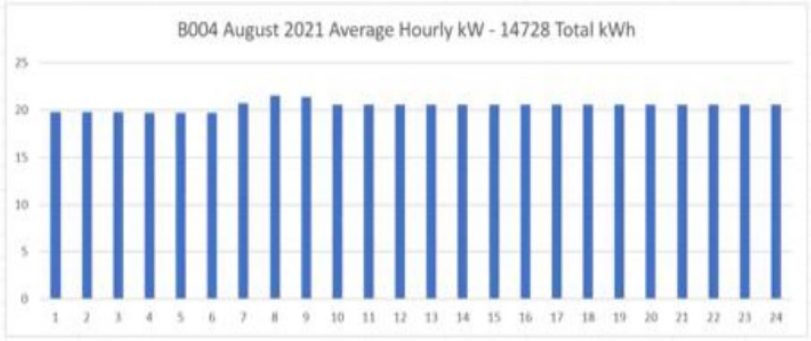


TeMix UNIDE proposal in the Reliability OIR



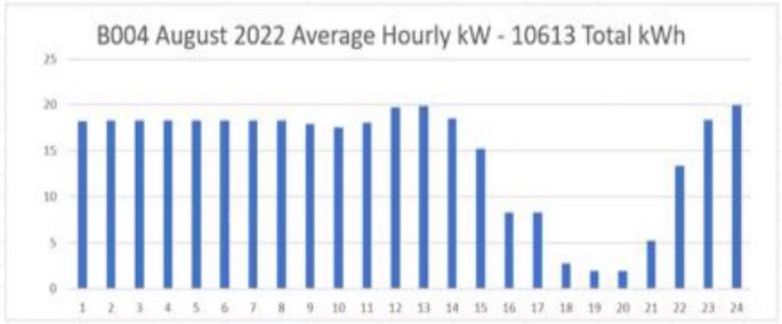
VCE- TeMIX – Polaris shadow bill incentive example

AGA2 Ag<35 kW High Use



Aug 2021 kWh	14728.46 at 10613		
Aug 2021 Shadow Bill (with 2022 Tenders)	$1,160.05	$ 835.91	$ 0.08
Aug 2021 OAT Bill	$3,341.77	$2,408.00	$ 0.23

AGA2 Ag<35 kW High Use and AgFIT/CalFUSE



Aug 2022 kWh	10613	
Aug 2022 Shadow Bill	$1,343.55	$ 0.13
Aug 2022 OAT Bill	$2,700.32	$ 0.25
Aug 2022 Incentive	$1,356.77	
Shadow Bill Delta	$ (507.64)	
Total Benefit	$ 849.13	

For this pump, for the Billing month for August the top graphs show a reduction in total load for the month and a shift from high price evening hours.

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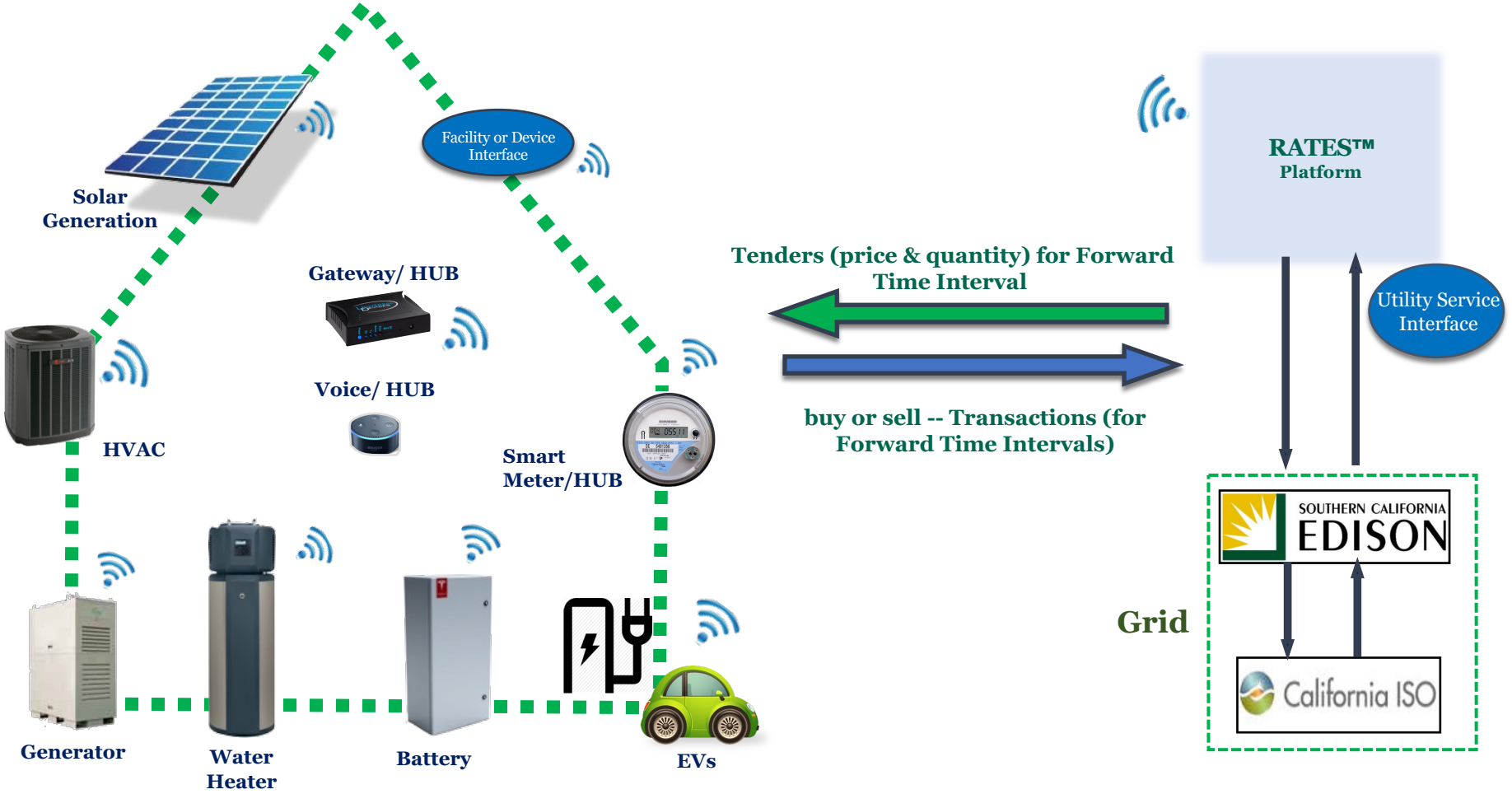

Thank You

DRET | DEMAND RESPONSE EMERGING TECHNOLOGIES

https://www.dret-ca.com/dynamic-rate-pilot/