The Equitable Approach to a 100% Clean Energy Future

presented to

Interstate Renewable Energy Council - CGE

by
Stephen MacDonald
Managing Director of Business Development

TEMIX
Transactive Energy Services

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To Achieve 100% Clean-Energy and Electrification Goals

The Challenges are well-known:

1. The generation of our Electrical Power System (EPS) is increasingly being supplied by intermittent sources causing balancing issues
2. Increased ownership of edge-connected generation and flexible load outside Utility control leading to compensation challenges using legacy retail *market design*

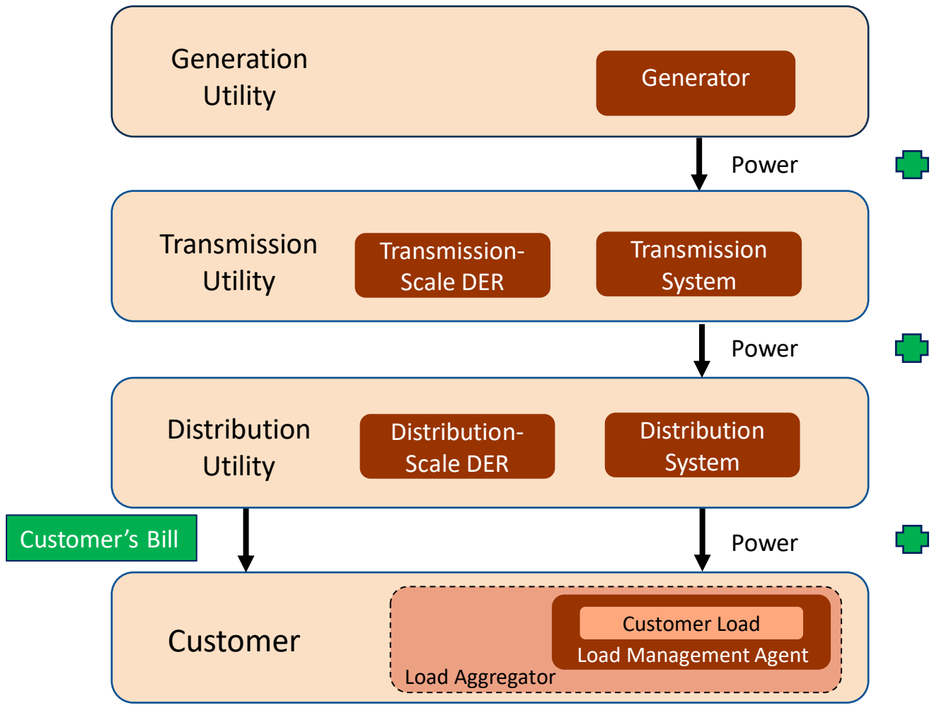
The solution is to:

1. Increase grid flexibility; so load follows generation
2. Deploy an *equitable* retail electricity market that properly incentivizes customers to adopt clean-tech and flexible electrified loads

Comparing the *Market* Approaches

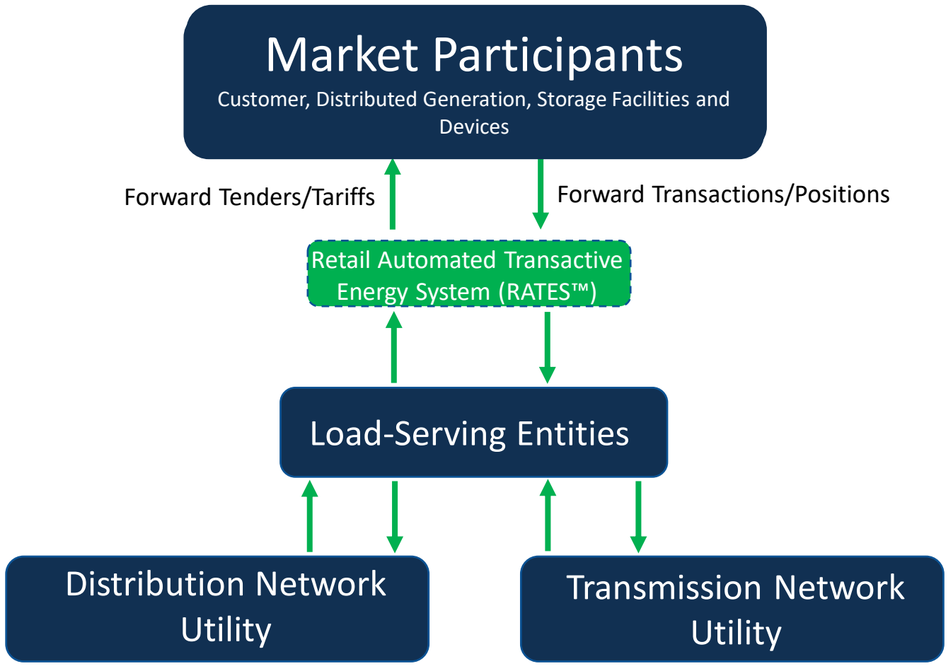
Regulated Monopoly Market

Based On: Cost of Service --- as its Recovery Methodology



Transactive Retail Design

Based On: Cost Causation of Service --- as its Recovery Methodology



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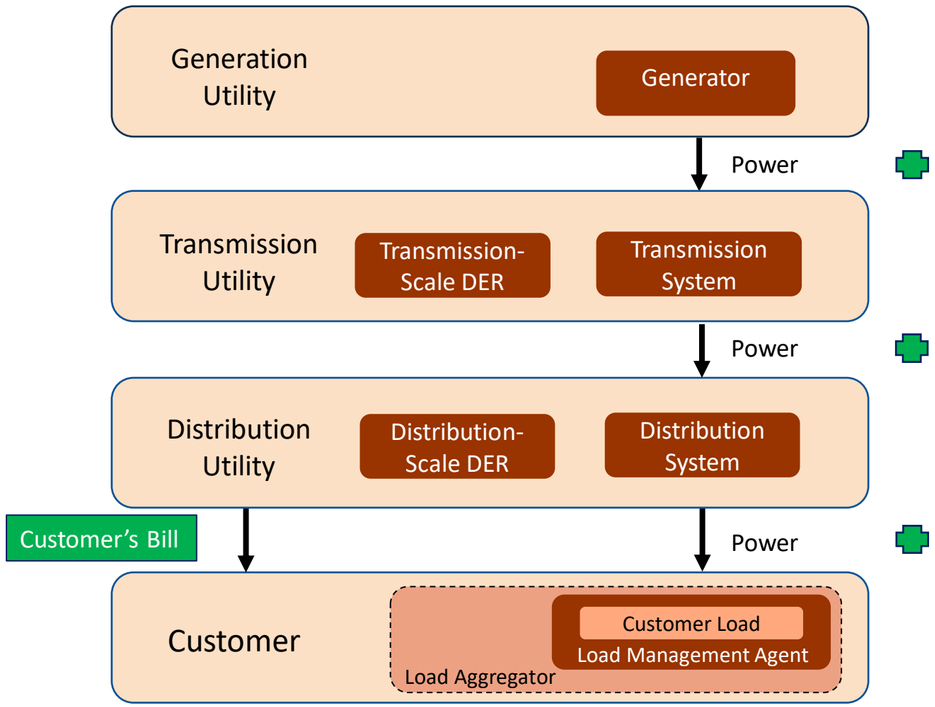

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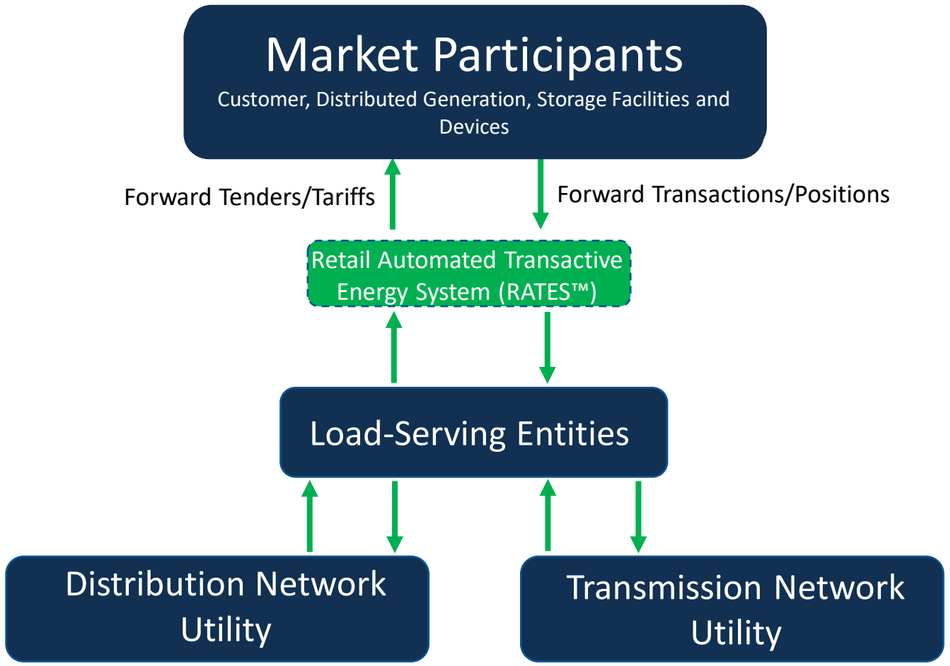

Current Retail Markets are Not Equitable

Example --

E-TOU-C customer enrolled in the NEM program

- The NEM program is simply an ‘adder’ to an otherwise applicable tariff (OAT) and tracks a facility’s annual ‘net energy.’

What is net energy?

PG&E's Net Energy Metering (NEM) program helps you reduce your monthly electric bill with the energy generated by your own private rooftop solar energy system. A special net meter measures the difference between the amount of electricity your system generates throughout the month and the amount of electricity PG&E supplies. We calculate your bill using this difference, called net energy.

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Understand your energy statements

The following list includes key terms that may appear on your statement.

1. BASELINE ALLOWANCE
2. BASELINE CREDIT
3. BASELINE TERRITORY
4. BUNDLED SERVICE CUSTOMER
5. CA CLIMATE CREDIT
6. COMPETITION TRANSITION CHARGE (CTC)
7. CONNECTED LOAD CHARGE
8. CONSERVATION INCENTIVE ADJUSTMENT
9. CUSTOMER CHARGE
10. DEMAND CHARGE
11. DISTRIBUTION CHARGE
12. DWR POWER CHARGE
13. ENERGY COMMISSION TAX
14. ENERGY COST RECOVERY AMOUNT (ECRA)
15. FRANCHISE FEE
16. GAS CORE PROCUREMENT COST
17. GENERATION CHARGES
18. HEAT SOURCE
19. HIGH USAGE SURCHARGE
20. METER CHARGE
21. METER CONSTANT
22. MULTIPLIER
23. NUCLEAR DECOMMISSIONING
24. POWER CHARGE INDIFFERENCE ADJUSTMENT (PCIA)
25. PUBLIC PURPOSE PROGRAMS
26. ROTATING OUTAGE BLOCK
27. SERIAL
28. SF PROP C TAX SURCHARGE
29. SOLAR CHOICE PROGRAM
30. TIME-OF-USE (TOU) ELECTRIC RATE PLAN
31. TRANSMISSION
32. UTILITY USERS TAX (UUT)
33. WILDFIRE FUND CHARGE
34. WILDFIRE HARDENING CHARGE

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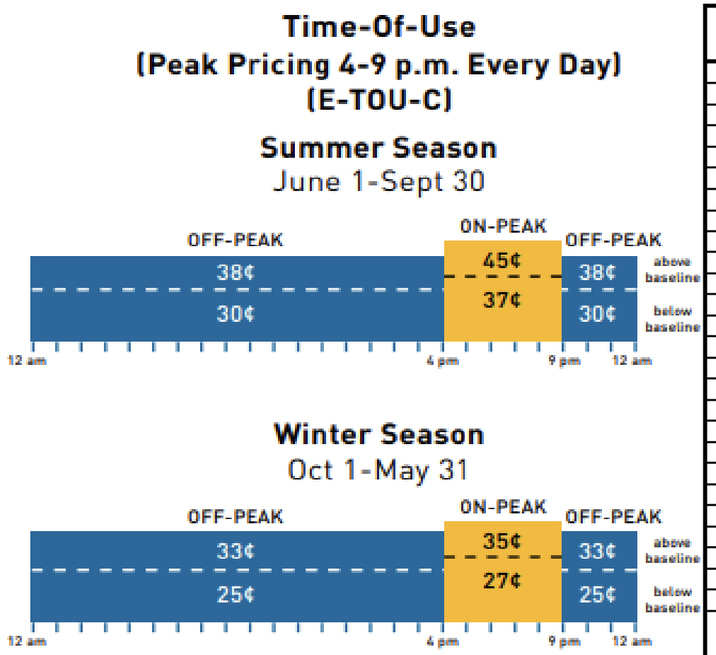
- NEM uses a ‘fair market value’ wholesale price to compensate for an annual net surplus which significantly differs from the OAT rate. Creating an inequitable incentive for customers.



Net Surplus Compensation Rates for Energy

True-up Month	NSC Rate* ($/kWh)
Jan. 2020	0.02935
Feb.2020	0.02890
Mar. 2020	0.02589
Apr. 2020	0.02495
May 2020	0.02528
June 2020	0.02534
July 2020	0.02548
Aug. 2020	0.02538
Sep. 2020	0.02541
Oct. 2020	0.02576
Nov. 2020	0.02628
Dec. 2020	0.02639
Jan. 2021	0.02600
Feb. 2021	0.02586
Mar. 2021	0.02179
Apr. 2021	0.02723
May 2021	0.02763
June 2021	0.02907
July 2021	0.03068
Aug. 2021	0.03321
Sep. 2021	0.03573
Oct. 2021	0.03748
Nov. 2021	0.03954
Dec. 2021	0.04130
Feb. 2022	0.04501

** Per D.11-06-016, the electricity portion of the NSC rate is the simple rolling average of PG&E's default load aggregation point price from 7 a.m. to 5 p.m., corresponding to the customer's 12-month true-up period.*

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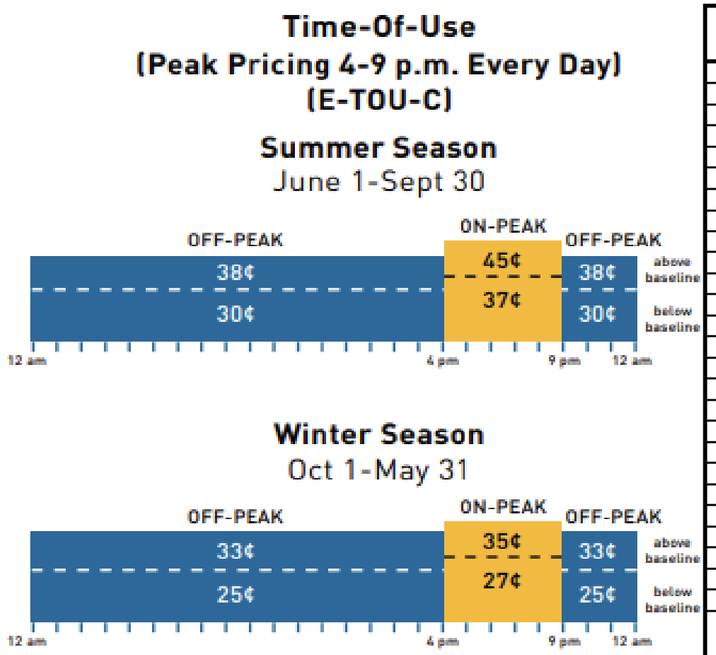
- The NEM program does not support all clean-tech,, nor does NEM allow participants to get compensated for all intervals throughout the year; most use an annual ‘true-up’ process to calculate the yearly ‘net energy’ of a facility.



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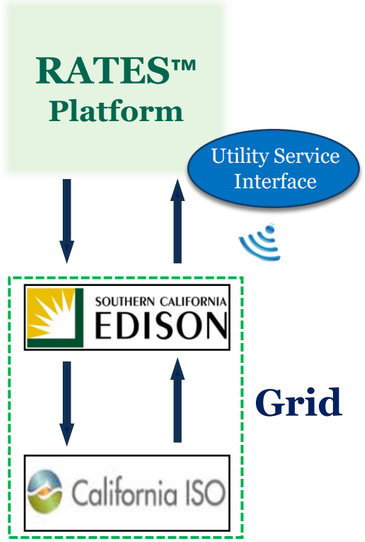
The Equitable Approach -- RATES™ Demonstration

Sponsored by the California Energy Commission (CEC), *from `16-`19*, involved 115 Facilities in SCE's Service Territory

https://ww2.energy.ca.gov/2020publications/CEC-500-2020-038/CEC-500-2020-038.pdf



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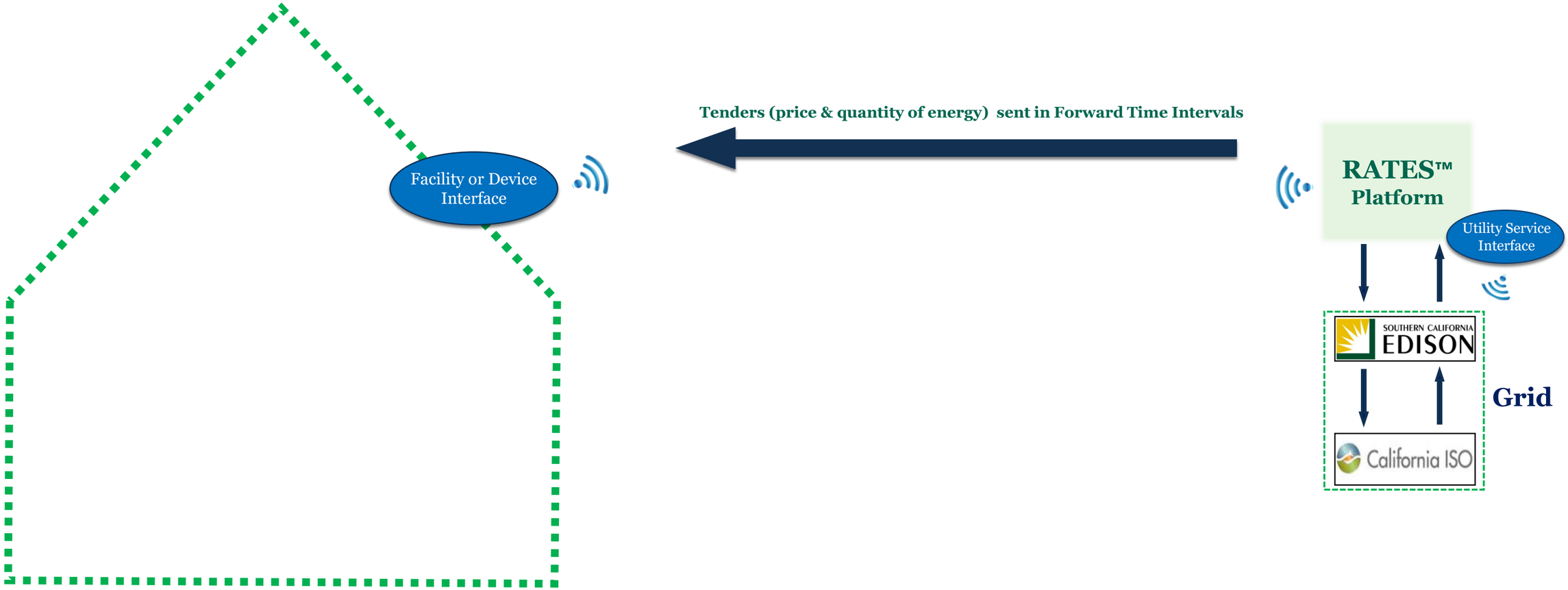

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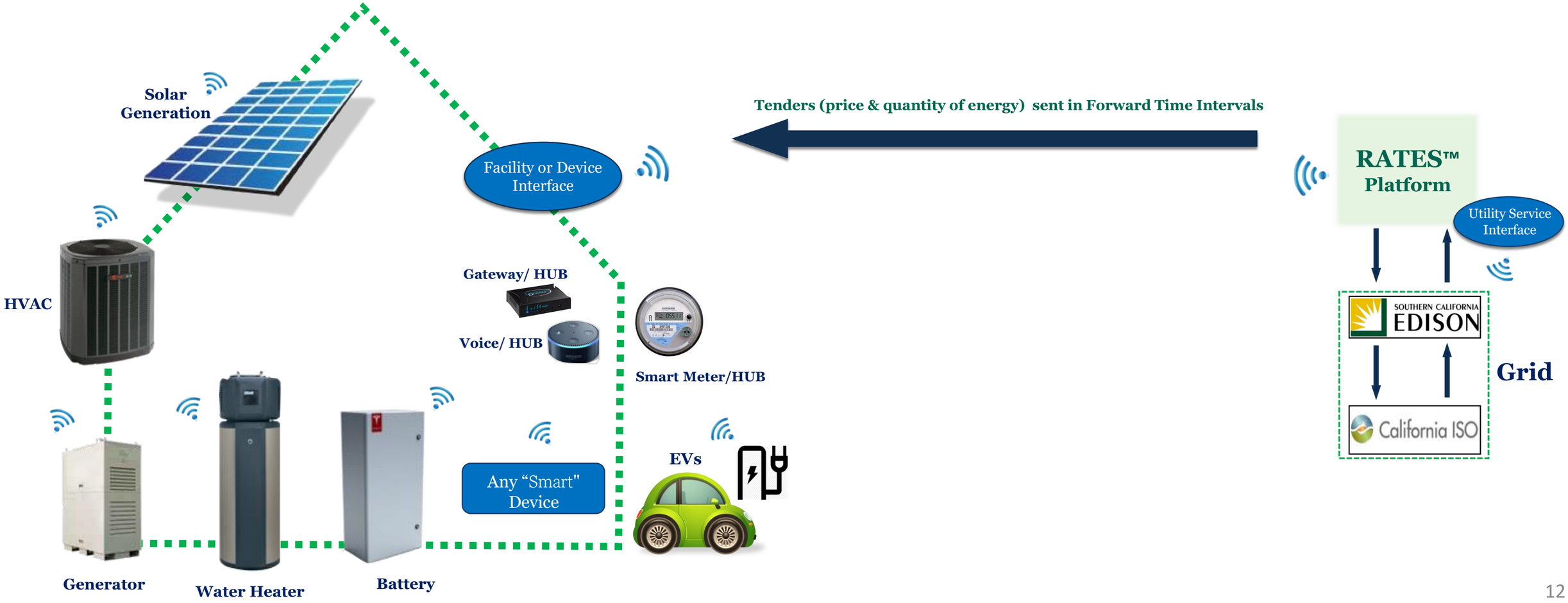

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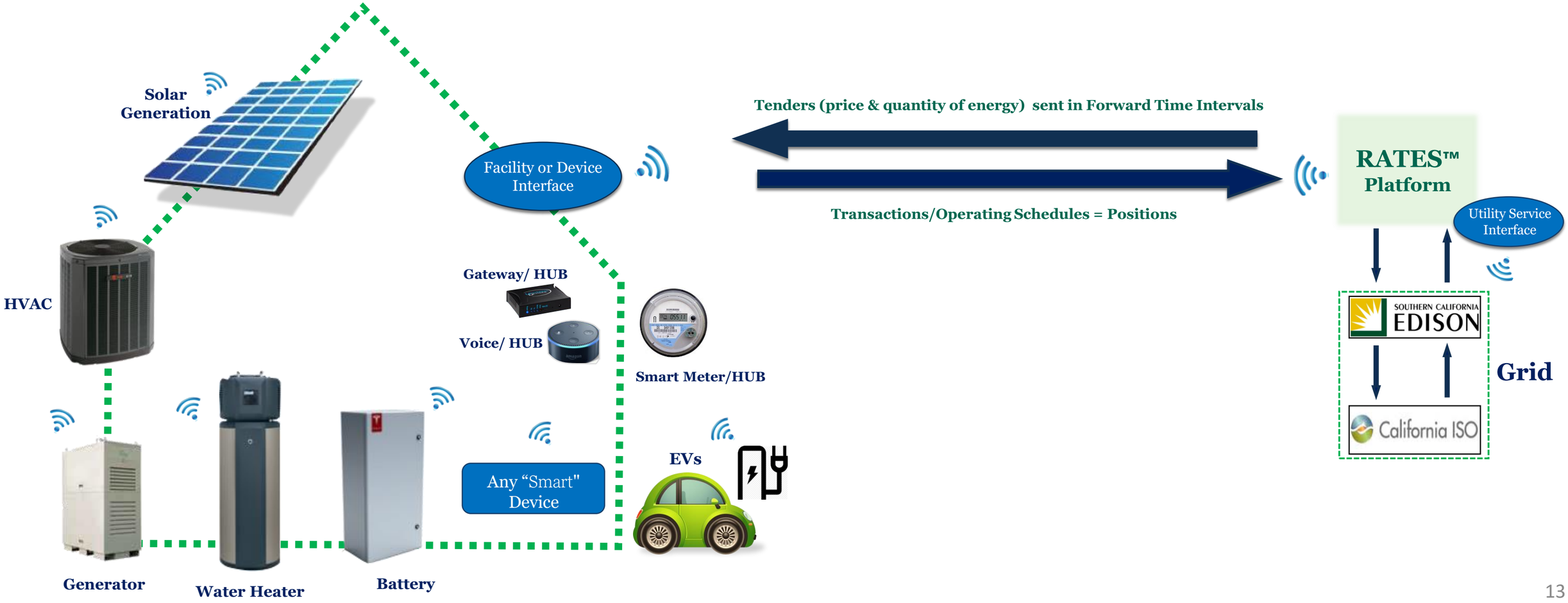


Example: TeMix Agent Scheduling Behind-the-Meter (BTM) Storage

Battery Specifications:

9.8 kWh Storage Capacity

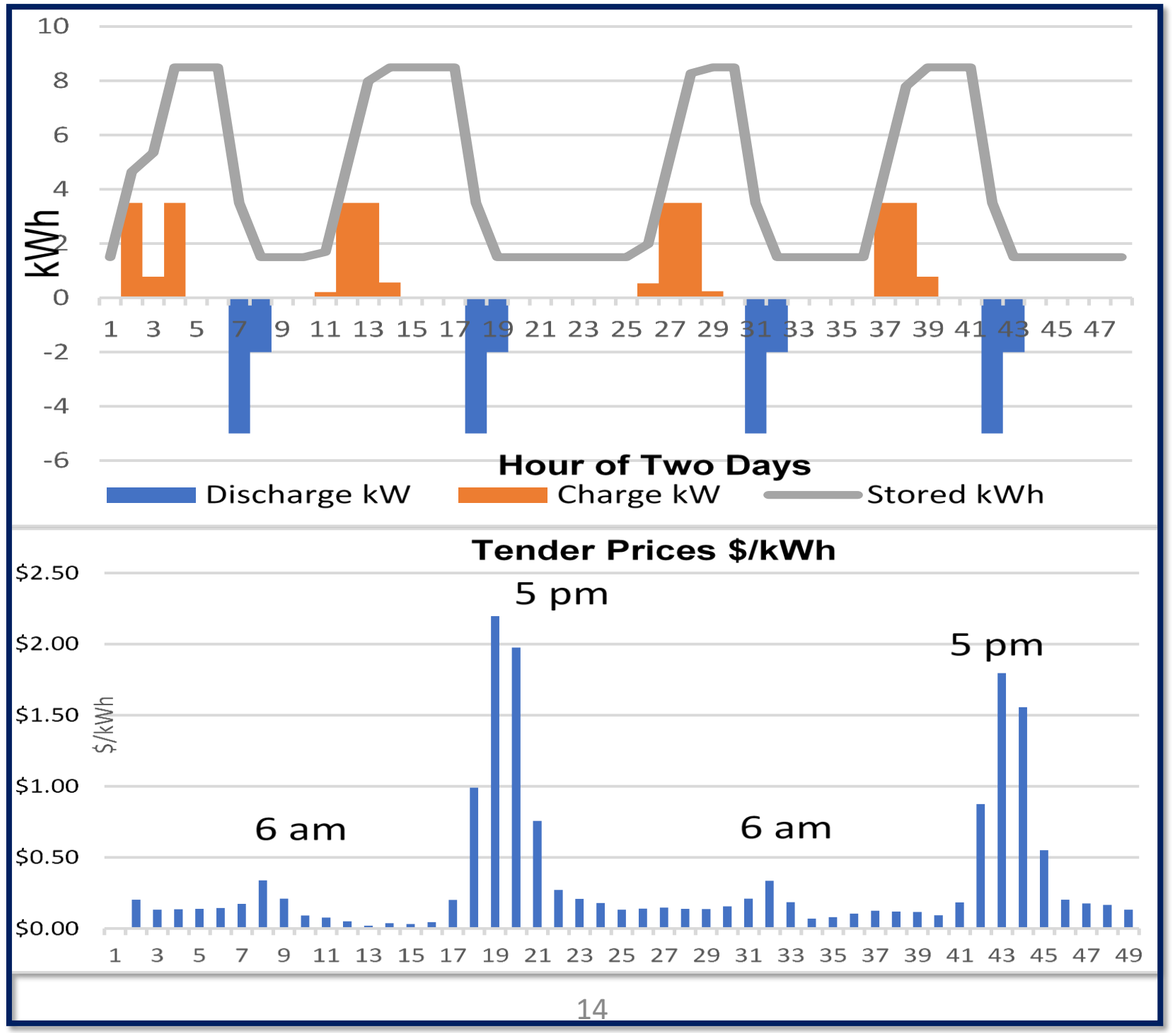
8.5 kWh Maximum Storage
1.5 kWh Minimum Storage

5 kW Maximum Discharge Rate
3.5 kW Maximum Charge Rate

90% Round Trip Efficiency

Operating Results:
14 kWh / Daily Discharge
15.56 kWh / Daily Charge

$17.00 First Day Net Revenues
$13.50 Second Day Net Revenues



TEMIX Transactive Energy Services

BENEFITS OF RATES™

1. Involves all Customer-types while retaining the low-income discounts in the subscription
2. The Subscription Transactive Tariff (STT) fully recovers all allowable Utilities costs; while *stabilizes* Retail Customer's energy costs
3. Increases flexible load and intermittent generation adoption
4. The RATES™ supports:
    i. a phased roll-out approach by circuit or by device-type
    ii. easy transition from Flat tariffs --> TOU --> STT
5. Lowers grid investment and operational costs, for all stakeholders, while increases grid efficiency and has *no scaling* issues
6. Fully incentivizes participants to procure and operate flexible devices to maximize their benefit while reducing the cost of the overall grid

--Thank you for the attention--

Happy to Answer Any Questions?

Name: Stephen MacDonald

Title: Managing Director of Business Development

Contact: Stephen.MacDonald@temix.com 360.773.2781