The Equitable Approach to a 100% Clean Energy Future

presented to
Interstate Renewable Energy Council - CGE

by
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Managing Director of Business Development
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

- Generation Utility
- Transmission Utility
- Distribution Utility
- Customer

**Transactive Retail Design**

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

- Market Participants
  - Customer, Distributed Generation, Storage Facilities and Devices
- Load-Serving Entities
  - Distribution Network Utility
  - Transmission Network Utility

Diagram showing flow of power and customer interactions.
Comparing the *Market* Approaches

**Regulated Monopoly Market**

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

Diagram:
- Generation Utility
- Transmission Utility
- Distribution Utility
- Customer

Power flows from:
- Generation Utility to Generator
- Transmission Utility to Transmission System and Transmission-Scale DER
- Distribution Utility to Distribution System and Distribution-Scale DER
- Customer to Customer Load and Load Management Agent

Customer’s Bill

8/23/2020
Comparing the *Market* Approaches

**Transactive Retail Design**

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

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**Market Participants**
Customer, Distributed Generation, Storage Facilities and Devices

**Load-Serving Entities**

**Forward Tenders/Tariffs**
Retail Automated Transactive Energy System (RATES™)

**Forward Transactions/Positions**
Distribution Network Utility
Transmission Network Utility

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Current Retail Markets are Not Equitable

Example --

\textbf{E-TOU-C} customer enrolled in the \textbf{NEM} program

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Current Retail Markets are Not Equitable

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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.
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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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<th>True up Month</th>
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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

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The Equitable Approach -- RATES™ Demonstration

Grid

HVAC
Water Heater
Generator
Battery
Solar Generation

Any "Smart" Device
Facility or Device Interface
Gateway/ HUB
Smart Meter/HUB
Voice/ HUB

Tenders (price & quantity of energy) sent in Forward Time Intervals

Transactions/Operating Schedules = Positions

RATES™ Platform

Utility Service Interface

California ISO
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
**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?

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