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<th><strong>Docket Number:</strong></th>
<th>17-IEPR-12</th>
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<td><strong>Project Title:</strong></td>
<td>Distributed Energy Resources</td>
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<tr>
<td><strong>Document Title:</strong></td>
<td>Presentation - Retail Automated Transactive Systems (Rates)</td>
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<tr>
<td><strong>Description:</strong></td>
<td>8.8.17: Presentation by Michel Kohanim of Universal Devices</td>
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<td><strong>Filer:</strong></td>
<td>Raquel Kravitz</td>
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<td><strong>Organization:</strong></td>
<td>California Energy Commission</td>
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<td>Commission Staff</td>
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RETAIL AUTOMATED TRANSACTIVE ENERGY SYSTEM (RATES)

GFO 15-311 / Group 2

CEC IEPR Workshop
on
DR
August 8th, 2017

Michel Kohanim

http://rates.energy
https://www.universal-devices.com/rates
RATES – HIGH LEVEL INFO

✓ Behind-the-meter load management system
  – Maximize the potential of large # of small loads: Residential and SMB; up to 200
  – Use IoT/Smart Grid Technologies: Off-the-Shelf, Smart Meter, OpenADR
  – Minimize cost/complexity of customer participation: AI Assistants
  – Integrate renewable generation: CPUC rule 21

✓ Research Topics
  – Utilize Transactive Signal: what is it?
  – Improve grid reliability: reactive power
  – Identify tariffs that could produce higher value: what is value?

✓ Current Rates But we use our own tariff structure (RATES)

✓ Status
  – Recruiting, installing, and refining optimization (machine learning)
RATES TOPOLOGY

CAISO Portal
- LMPs
- Schedules
- Delivery
- ALSI for LSE

ADSI for DO
- Tenders
- Positions
- Transactions
- Delivery

TeMix Platform™
- Tenders, Positions, Transactions, Delivery

ISY Portal
- Interval Data
- Party Objective
- Return Optimized Facility Transactions and Device Schedules

VTN [EPRI]
- Customer Portal
- Amazon Echo
- Google Home
- Geo Fencing
- Climate Info

TeMix Agent™
- ISY Events published to the Portal
- Return: Device Schedules converted into ISY Programs

DER: EV
- PV
- Storage

Polyglot
- Sunspec
- CPUC 21/3

Universal Devices
- ISY994™

Z-Wave™, INSTEON™ or Other

Zigbee™ SEP
- Zigbee™ PRO

Internet

Smart Meter and/or EM3

Local Access Tablets/Computers/Touch Panels
- Occupancy Geo-Fenced
- Remote Access from anywhere

Sensors

HVAC

Lighting Pool Pumps
RATES – TYPES OF SUPPORTED DR

• Transactions at specific locations and time intervals
  – Energy related products such as Real and Reactive Power
  – Transport related products such as two-way energy transport

• Subscribe at specific costs and quantity for each interval
  – Easily automated using subscriptions, positions, and goals
  – Buy more at spot prices if necessary
  – Sell at spot prices if desired

• Voltage depends on Real & Reactive Energy/Power flows
  – Just like Real, Reactive is an Energy product that can be transacted using Transactive Energy
• Forward Transactions & Subscriptions with *Spot* Transactions
  – Optimize operations and stabilize revenues for DER
  – *Shape:* forward/spot transactions
  – *Shift:* lower price to increase load; higher price to decrease
  – *Shed:* the utility sends tenders to buy back what has already been purchased at a higher price. No baseline is necessary because Customer is selling back what was actually purchased
  – *Shimmy:* highly granular (as low as 4 seconds) tenders/transactions

• Solves
  – Baselines, M&V, and complex forecasting issues
  – Bill, revenue, and grid volatility issues
  – Recovery of both fixed and variable costs for all parties
BARRIERS

• Logistical
  – Recruiting volunteers!

• Technology
  – Each inverter, EV charger has its own set of APIs (using a bridge to simulate CPUC Rule 21)
  – Some volunteers didn’t have Smart Meters installed
  – Some volunteers do not want another system to override their existing pool pump system
Thank you!