Bring Your Own Device
Opportunities with Dynamic Rates

Creating a Planet Run by the Sun

CA Public Utilities Commission | Oct 15, 2019

Audrey Lee, Ph.D.
Vice President, Energy Services
NEM 2.0: Customer experience with time of use rates

Don’t change your habits to avoid evening price spikes.

Typical electricity use with solar
This is not your usage.

Typical electricity use with solar
This is not your usage.
Bring Your Own Device (BYOD) Programs

Utility + Competitive Partnership

- Utility identifies need, predicts peak/sends signal or sets discharge profile, does settlement.
- Competitive companies finance, manage, and assume all risk.
- Participating customer receives backup power and energy savings at lower cost, minimal complexity.
- ALL ratepayers receive savings without ratebase risk.
- VT, NH, MA, RI, NY; west coast
Massachusetts National Grid BYOD Program

**BYO Thermostat**
- Simple
- ~1 kW/home
- 20 events/yr
- Customer fatigue
- $20 upfront, $25/yr

**BYO Device**
- Flexible
- ~2.5-4.5 kW/home
- Daily events
- Recharge constraints

**2018 BYOD**
- Pay for performance
- $70/kW-year
- Summer only
- 2-5 pm
- Exports not counted

**2019 BYOD**
- Exports valued
- 2-7pm
- 3 hour/event
- Summer (June-Sept):
  - $225/kW-yr
  - ≤ 60 events
- Winter (Dec-Mar):
  - $50/kW-yr
  - ≤ 5 events

https://www.nationalgridus.com/MA-Home/Connected-Solutions/BatteryProgram
1. Distribution Load Shift (DLS) Product
   - ≈ Pay for Load Shape (P4LS)
   - + Distribution Services
2. Market Integrated Distribution Service (MINTDS) Product
   - ≈ Load Shift Resource 2.0 (LSR 2.0)
   - + Distribution Services
   - Utility as Distribution System Operator
   - Utility-offered tariff via aggregators

Distribution Load Shape (DLS) Product: Illustration

Utility meter reading or net load at residential customer site, hourly intervals

System power flow

Battery state of charge
Distribution Load Shape (DLS) Product

Approach Benefits

- Easy to program/schedule DER and account for within interconnection and planning processes.
- DSO/CCA coordinated response to align with excess energy and peaking capacity needs for the benefit of all regional customers.
- Optional rider tariff stackable with NEM and receives capacity payment for beneficial permanent load shape.
- Hosting capacity expansion/deferral benefits if coordinated holistically within interconnection processes.
- Available to retrofit existing (if needed) and future DER customers with capabilities to provide coordinated capacity services.

Note: single schedule shown for simplicity, but other schedules possible.
Market Integrated Distribution Service (MINTDS) Product: Illustration

During negative price signal: Battery charges from rooftop solar eliminating exports and resulting in positive demand from the grid.

During positive price signal: Battery discharges at high power resulting in net export to grid.
Market Integrated Distribution Service (MINTDS) Product

Approach Benefits

- **Real time dispatchable** load shift product.
- DSO/CCA dispatches resources to align with excess energy and peaking capacity needs for the *benefit of all regional customers*.
- Unlike CAISO’s PDR, customer resources are able to self-consume during peaking period with alternative baseline allowing for DER Capacity export.
- Optional rider tariff stackable with NEM and receives performance based capacity payments.
- **Hosting capacity** expansion/deferral benefits if coordinated holistically within interconnection processes.
- Available to retrofit existing and future DER customers with capabilities to provide coordinated capacity services.
Harness customer investments & Advance system planning
To plan for the future and lower costs for all

- Utility and CCA **Bring Your Own Device** (BYOD)/rider tariff programs are designed for customers to respond to dispatch signals for coordinated aggregated response.
- Consider the impact/inequity of exposing customers to local/regional high pricing.
- Don’t simply hope customers respond to high prices.
- Resources participating in BYOD programs are better suited for **coordinated real-time dispatching** than individual customers responding to real-time rates.
- BYOD programs encourage **technology adoption**.
- **Protect customers** unable to adopt new technology and exposed to real-time pricing.
- Don’t forget about **distribution hosting capacity** coordination benefits as one of four Multiple Use Applications stacked within these BYOD programs.