UCAN
UTILITY CONSUMERS' ACTION NETWORK
San Diego's Utility Watchdog

R. 21-06-017, Track 2: Future Grid Workshop #1

Operational Needs for California's High DER Future

February 8, 2024

Future Grid Operating Needs

"What are the operational needs necessary to efficiently operate a high DER grid, unlock economic opportunities for DERs to provide grid services, limit market power, reduce ratepayer costs, increase equity, support grid resiliency, and meet State policy objectives?"

- Objectives require displacing future utility T&D investments with 3rd party DERs, controls & services that maximize use of existing grid.
- Operating framework requires (1) market-enabling systems and (2) market reforms to enable LSE & DER aggregator service innovations.

Summary of Recommendations

1. Statewide platforms to enable functional operations
2. Market reforms to promote efficient operations

Summary of Recommendations

Statewide Platforms

- Data Hub: “API of APIs” ensures data access for all parties
- DER Register: database tracks location / capabilities of DER
- DER Market: facilitate trading & scheduling DERs, microgrid & CAISO coordination.

Market Reforms

- Shift to 5-/15- minute smart meter and CAISO load scheduling
- Implement LMS dynamic rates
- Expand DER submetering
- Allocate transmission costs to LSEs
- Enable Supplier Consolidated Billing
- Count Community-Scale DER as wholesale load reducers

Statewide Platforms

Essential facilities to ensure functional operations

Statewide Platform: Data Hub

- Utilities control systems essential for DER service-based innovation.
- Substantial cost, friction, and lack of interoperability associated w/ accessing multiple data types siloed within each utility:
  - Advanced Metering Infrastructure (AMI) Network
  - Meter Data Management System (MDMS)
  - Advanced Distribution Management System (ADMS)
  - Distributed Energy Resource Management System (DERMS)
  - Customer Information System (CIS) & billing
- Similar challenges re: accessing useful data from aggregators / DERs.
- **Market requires standardized and extensible approach to ensure efficient data access and interchange across entities (utilities, LSEs, DER providers).**

Statewide Platform: Data Hub

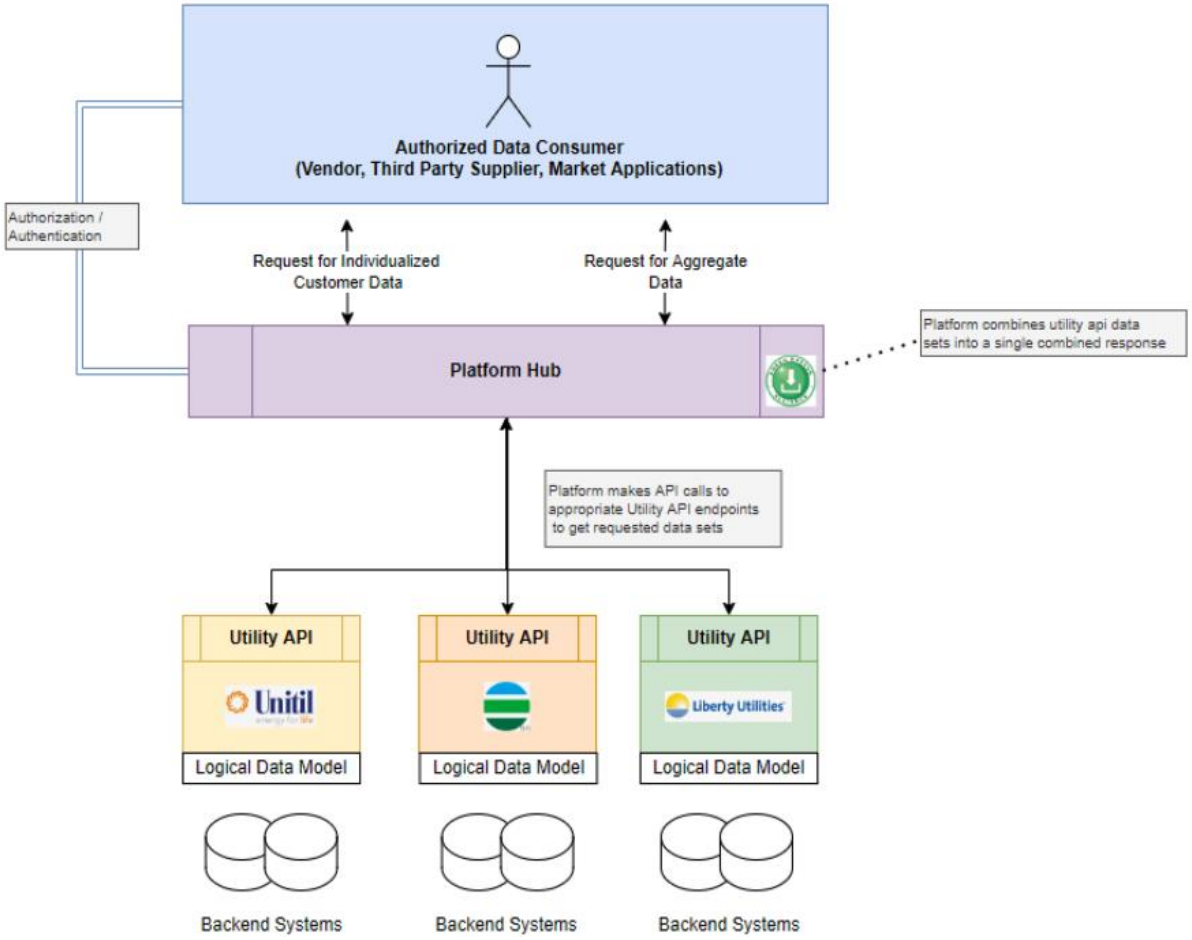
- Implements "API of APIs" across multiple utilities to standardize authorization, protocols, and data formats for 3rd party access.
- Data Hub structure:
  - Logical Data Model defines common model and format for required data
  - Individual utilities pull and normalize data from AMI network (headend), MDMS, ADMS, DERMS, and CIS systems upon request
  - Utility data flows through central web portal / standardized API to 3rd parties
  - LSEs / DER providers can provide data from DERs through Data Hub too
- Neutral third-party vendor runs central portal / API and manages 3rd party registrations and permissions.
- Updates overseen by representative council of industry stakeholders.

Example: New England Regional Data Hub

DOE GRIP Grant Proposal: Regional Joint Utility Energy Data Hub

Advancing Community DER Enablement and Customer Analytics in New England

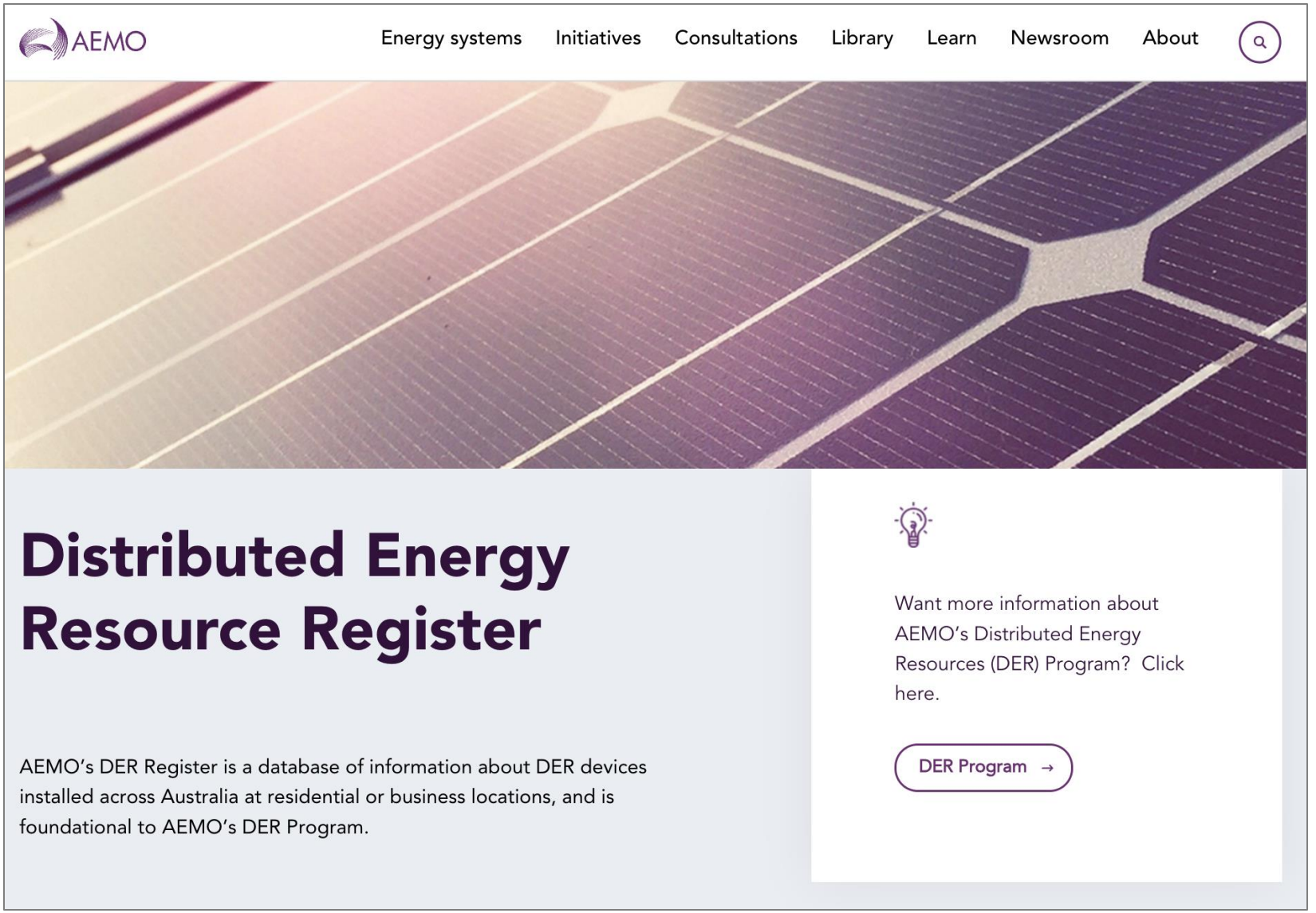
- MA, NH, CT utilities (VT, RI, ME interested too)
- Single API + format + 3rd party registration for sharing electricity & gas data across all utilities
- Starts w/ certified Green Button implementation
- Designed for extensibility: evolves to incorporate data from LSEs & DERs
- Changes overseen by Governance Council of 12 stakeholders (+expert consultant)



Statewide Platform: DER Register

- Comprehensive database of DER:
  - Retail BTM.
  - Distribution-interconnected.
  - Microgrids.
- Provides accurate and up-to-date information: grid location, type, gen/load/storage capacities, asset / inverter tech specs, operating & contractual parameters (firm & non-firm import/export limits, etc.)
- Enhances market transparency, operations, planning for CCAs, ESPs, DER aggregators, utilities, regulators, and consumers.

Example: AEMO's DER Register (Australia)



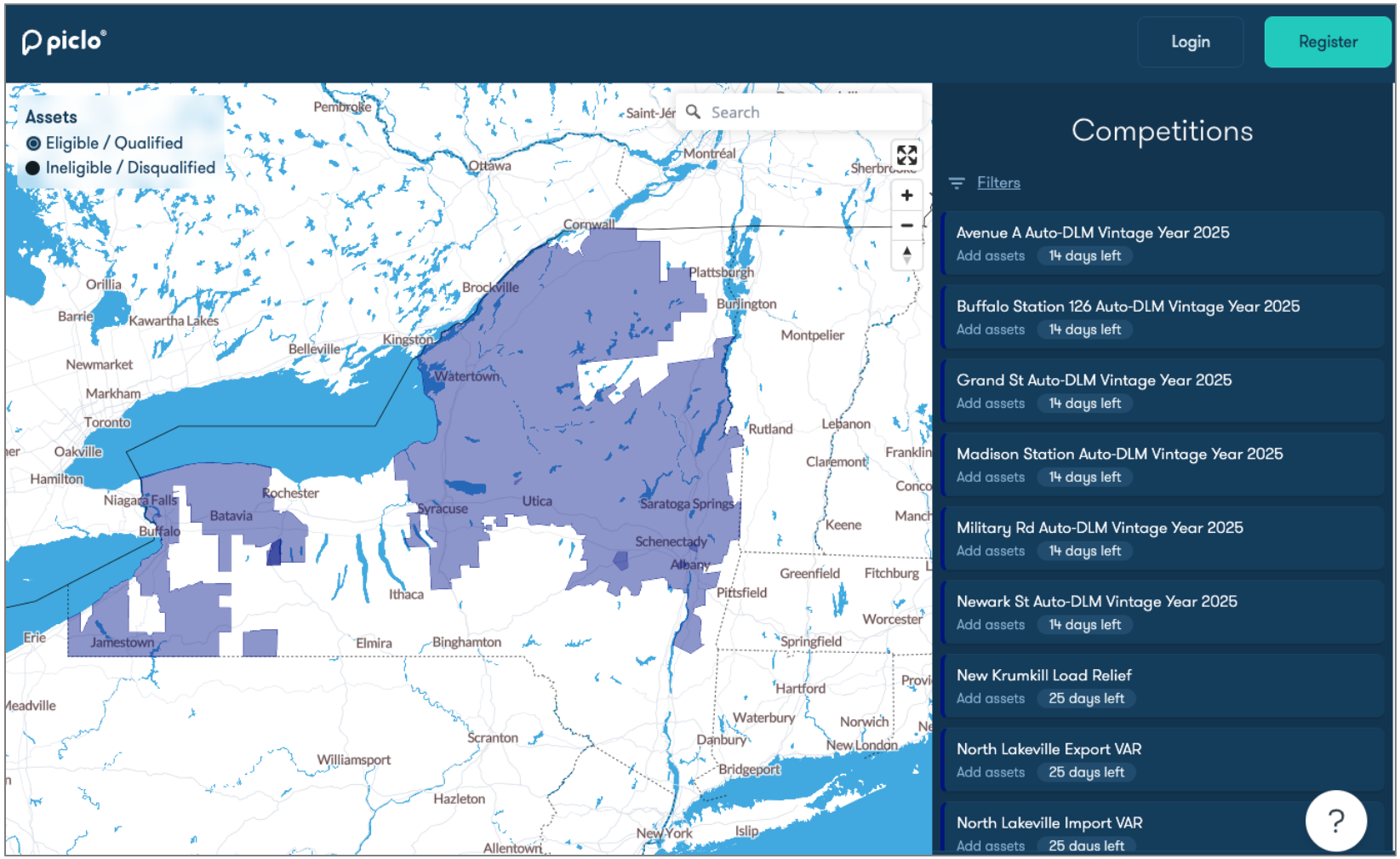
https://aemo.com.au/energy-systems/electricity/der-register

Statewide Platform: DER Market

- Statewide, distribution-level market platform.
- Facilitates scheduling and trading demand flex & DER services:
  - Integrates with DER Register to minimize transaction costs.
  - Utilities / LSEs advertise short <> long-term flex needs, initiate competitions, and accept / reject offers.
  - Operates in real-time or near-real-time.
  - Updates utilities / LSEs re: asset availability until time of dispatch.
- Standardizes contracts, market rules, asset monitoring, dispatch, settlement / invoicing, and compliance monitoring.
- Evolves to coordinate DER / demand flex with CAISO markets at T-D interfaces → islanding of microgrids and regional zones.

Example: Piclo Flex Platform (National Grid, NY)

- Piclo Flex — 60k flex assets / 19GW in EU — just launched in NY:



https://usa.picloflex.com/dashboard

Market Reforms

Actions to promote efficient operations

Shift to 5-minute Supply / Demand Balancing

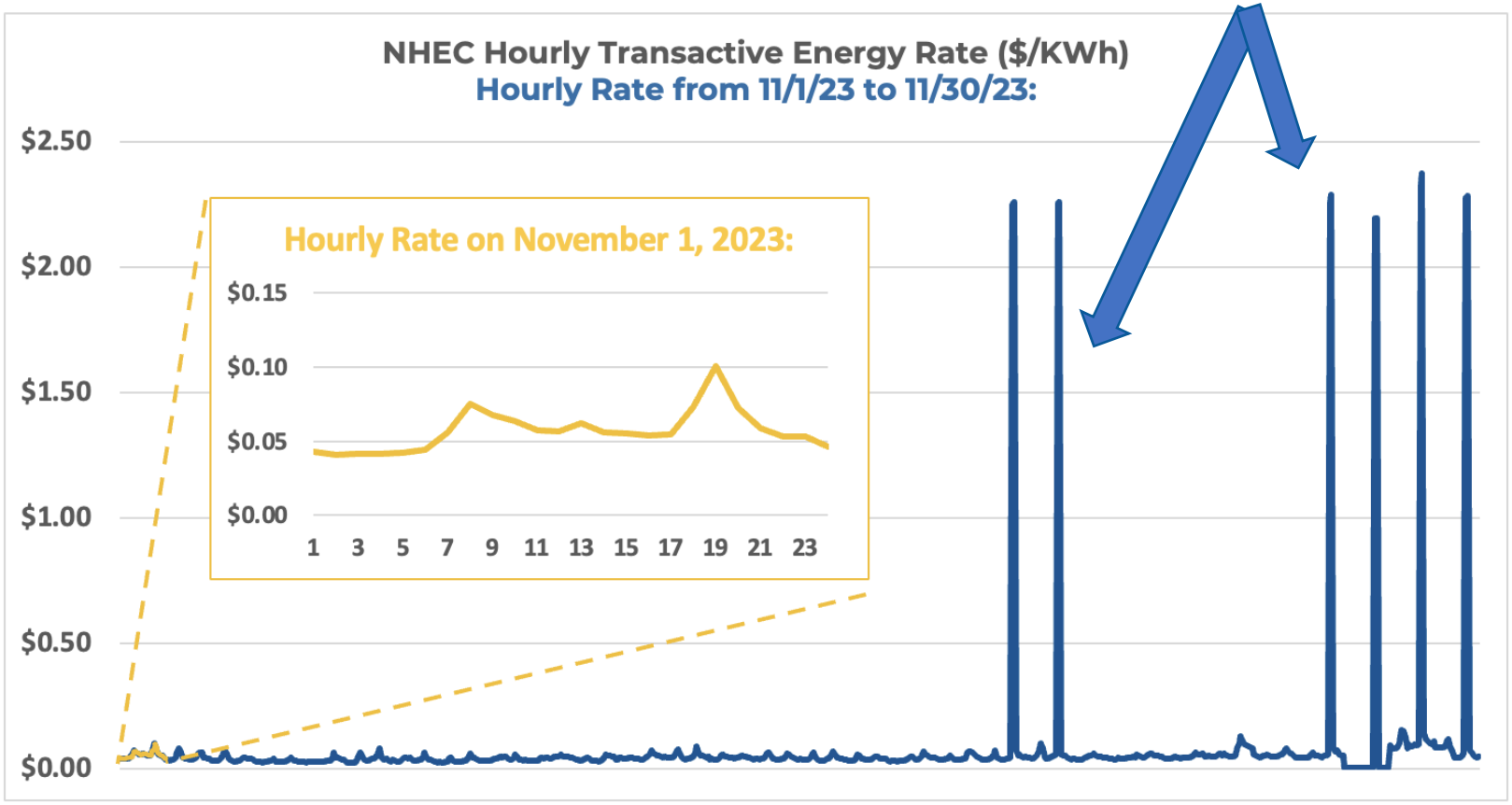
- Retail meter data and wholesale load scheduling should align with generation real-time markets (5- and 15-minute dispatch intervals).
- Utility AMI Networks should:
  - Shift to 15-minute interval collection for mass market customers
  - Allow LSEs to collect more granular interval data collection for subsets of customers (e.g., 5-minute interval usage for DER & demand flex customers)
  - Provide updated smart meter data to LSEs every morning in advance of CAISO's day-ahead demand bid submission deadline.
- CAISO load scheduling & settlements should align by shifting to 5- and 15-minute intervals.
- Going forward: enhanced framework should be devised to coordinate the evolution of utility AMI networks, statewide DER Market Platform, and CAISO markets in tandem with one another.
  - AMI networks & smart meters are significantly under-utilized assets in CA.

Dynamic Pricing + LSE Transmission + DER Submetering

- Retail pricing structures for DERs and consumers should accurately reflect network limitations and the marginal costs associated with importing and exporting energy at specific times and locations.
  - Baseline: LMS-compliant rates implemented in 2027+
  - Enhancement: transmission costs should be allocated to CCAs / ESPs based on their individual monthly coincident peak demand (12CP basis)
- Submetering protocols should be expanded:
  - Expansion from EVSE to inverter-based resources and smart devices.
  - Requires standardized integration into data management, electronic data interchange (EDI), billing, load settlement functions.
- Combination allows controllable loads & DERs to be exposed to meaningful dynamic rates (including bypassable transmission costs) while non-controllable loads remain on customer's otherwise-applicable rate.

Example: Transactive Energy Rates (New Hampshire)

- NH Electric Coop "prices to devices" dynamic rate (import & export)
- Eligible technologies: submetered EVSE + battery inverters
- 4 to 12 price spikes/ month = pass-through **transmission costs** (12CP)

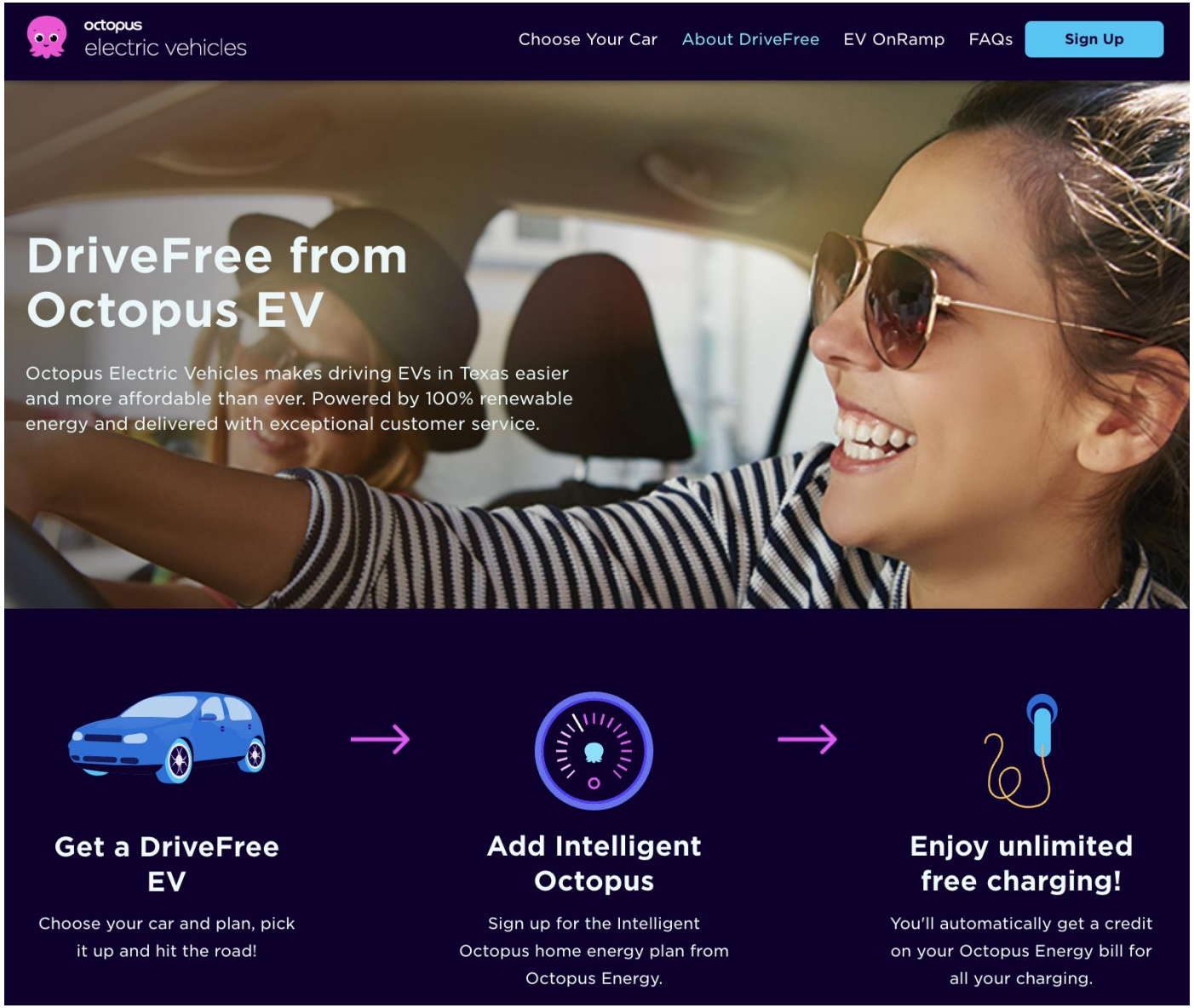


https://www.nhec.com/energy-management/transactive-energy-rate-program/

Supplier Consolidated Billing

- Supplier consolidated billing should allow CCAs / ESPs to assume responsibility for presenting a single bill to customers (inclusive of energy, capacity, distribution, transmission, and policy adders).
- Significant mitigation of utility market power (CCAs / ESPs no longer limited by what utilities cannot or will not enable).
- Positions CCAs / ESPs to intermediate complex T&D rates and provide simpler pricing structures with cost-saving services for customers.

Example: Octopus Energy (Texas)



Account for Community-Scale DER as Load Reducers

- DER connected to distribution grid can operate under PUC jurisdiction (instead of registering as a supply resource w/ CAISO).
- CCAs / ESPs should be allowed to fully count community-scale DER (<5MW) as wholesale load reducers to lower wholesale energy + RA obligations + transmission costs.
  - Market mechanism incentivizes CCAs / ESP to contract to build out DER fleet.
  - Dynamic pricing structure ensures DER dispatched to lower peak loads.
- Integration with DER Market & DER Register lowers costs and ensures T-D coordination.

Questions?

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Appendix: Summary of Recommendations

Statewide* Platforms to Enable Functional Operations:

1. **Data Hub:** "API of APIs" ensures data interchange between all entities.
2. **DER Register:** database tracks location & capabilities of DERs.
3. **DER Market:** facilitates scheduling & trading DERs → islanding → T-D coordination w/ CAISO markets and operations.

*** Deployed across IOU territories but open to municipals to join (lowers costs / standardizes market)**

Market Reforms to Promote Efficient Operations:

1. **Shift smart meters & wholesale settlements to 5- / 15-minute intervals:** strengthens price-based supply/ demand balancing capacity of market.
2. **Implement LMS dynamic rates:** ensures de minimis price optimization opportunity for DER aggregators serving utility supply customers.
3. **Expand DER submetering:** enhances consumer protection by allowing only controllable loads & DERs to be exposed to dynamic pricing (avoids forcing whole house / business onto dynamic rate).
4. **Allocate transmission costs to LSEs on a 12CP basis:** boosts price signal + incentivizes CCAs / ESPs to promote year-round DER and demand flex.
5. **Implement Supplier Consolidated Billing:** frees CCAs/ESPs to provide innovative DER services & products (mitigates utility market power).
6. **Count Community-Scale DER as load reducers:** incentivizes LSEs to build out distribution-connected DER & dispatch to minimize peak loads.