

# **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

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***“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 3<sup>rd</sup> 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.

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## Summary of Recommendations

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



# Summary of Recommendations

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## 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

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# Statewide Platforms

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Essential facilities to ensure functional operations



# Statewide Platform: Data Hub

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- 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

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- Implements “API of APIs” across multiple utilities to standardize authorization, protocols, and data formats for 3<sup>rd</sup> 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 3<sup>rd</sup> parties
  - LSEs / DER providers can provide data from DERs through Data Hub too
- Neutral third-party vendor runs central portal / API and manages 3<sup>rd</sup> party registrations and permissions.
- Updates overseen by representative council of industry stakeholders.

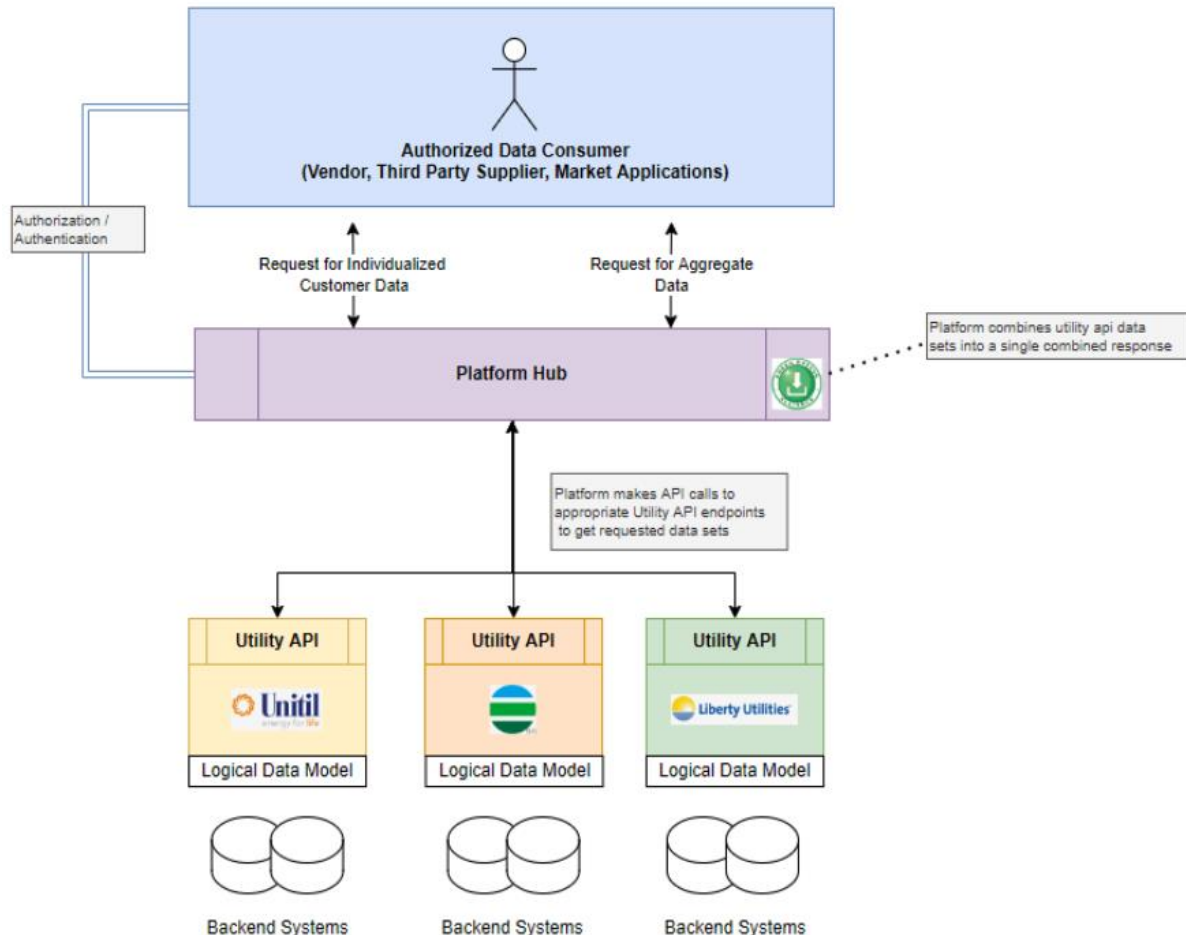


# Example: New England Regional Data Hub

## 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 + 3<sup>rd</sup> 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

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- 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)

The image shows a screenshot of the AEMO website. At the top left is the AEMO logo. To its right is a navigation menu with the following items: Energy systems, Initiatives, Consultations, Library, Learn, Newsroom, and About. On the far right of the navigation menu is a search icon. Below the navigation menu is a large banner image of solar panels. The main content area is divided into two columns. The left column has a large heading 'Distributed Energy Resource Register' and a paragraph of text. The right column has a lightbulb icon, a paragraph of text, and a button labeled 'DER Program' with a right-pointing arrow.

**AEMO**

Energy systems Initiatives Consultations Library Learn Newsroom About

## Distributed Energy Resource Register

AEMO's DER Register is a database of information about DER devices installed across Australia at residential or business locations, and is foundational to AEMO's DER Program.

Want more information about AEMO's Distributed Energy Resources (DER) Program? Click here.

[DER Program →](#)

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



# Statewide Platform: DER Market

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- 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:

The screenshot displays the Piclo Flex dashboard interface. On the left, a map of New York State is shown with various regions shaded in blue and purple, indicating asset eligibility. A legend titled 'Assets' shows a blue circle for 'Eligible / Qualified' and a black circle for 'Ineligible / Disqualified'. The map includes labels for major cities and regions such as Toronto, Buffalo, Rochester, Syracuse, Albany, and New York City. On the right side, a 'Competitions' panel lists several upcoming events, each with an 'Add assets' button and a time remaining indicator:

- Avenue A Auto-DLM Vintage Year 2025 (Add assets, 14 days left)
- Buffalo Station 126 Auto-DLM Vintage Year 2025 (Add assets, 14 days left)
- Grand St Auto-DLM Vintage Year 2025 (Add assets, 14 days left)
- Madison Station Auto-DLM Vintage Year 2025 (Add assets, 14 days left)
- Military Rd Auto-DLM Vintage Year 2025 (Add assets, 14 days left)
- Newark St Auto-DLM Vintage Year 2025 (Add assets, 14 days left)
- New Krumkill Load Relief (Add assets, 25 days left)
- North Lakeville Export VAR (Add assets, 25 days left)
- North Lakeville Import VAR (Add assets, 25 days left)

The dashboard also features a search bar, a 'Login' button, and a 'Register' button. A 'Filters' section is visible above the competition list, and a help icon (?) is located at the bottom right of the competition panel.

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# Market Reforms

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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.



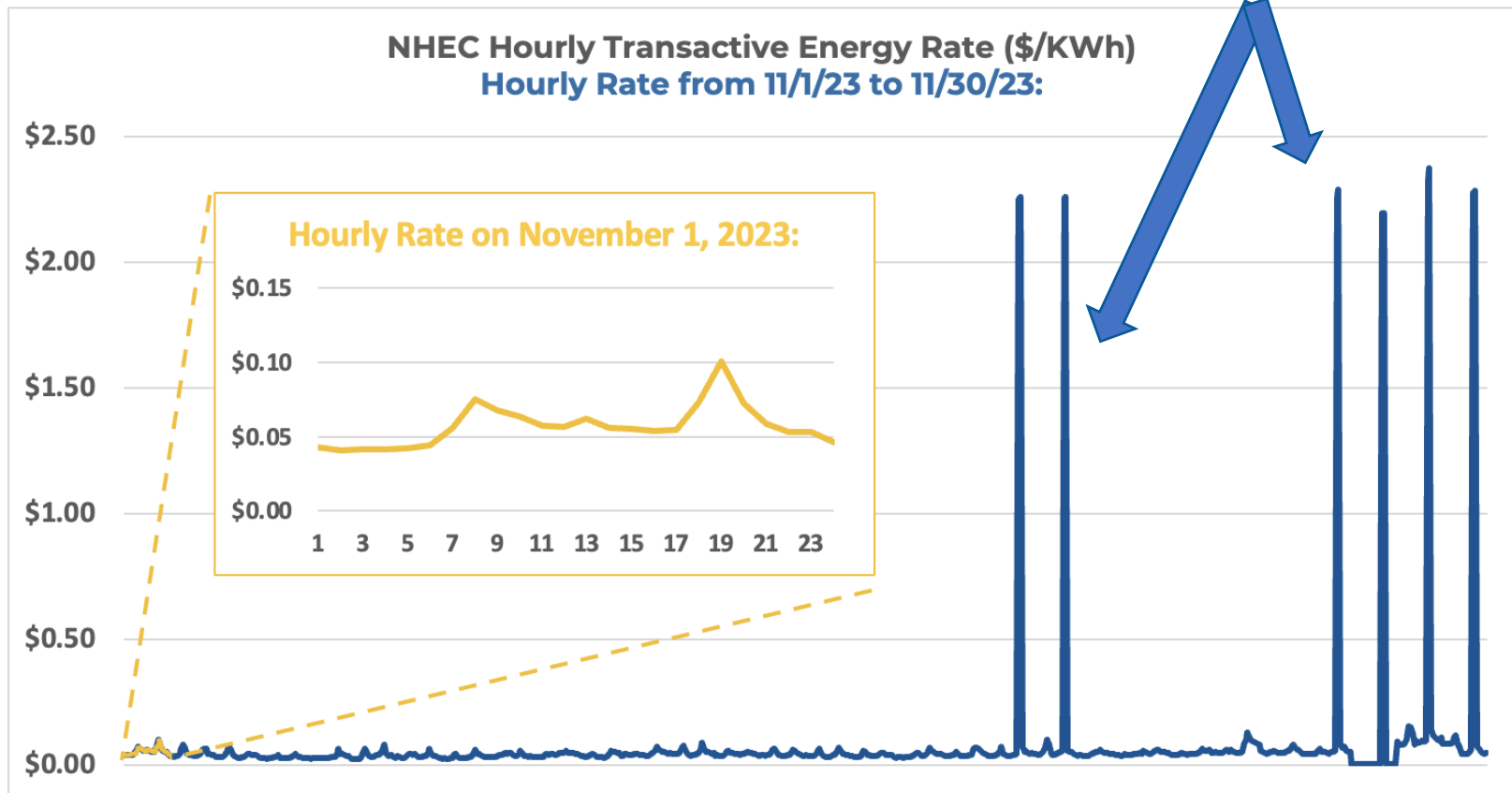
# Dynamic Pricing + LSE Transmission + DER Submetering

- 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)







# Supplier Consolidated Billing

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- 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)

octopus electric vehicles

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## DriveFree from Octopus EV

Octopus Electric Vehicles makes driving EVs in Texas easier and more affordable than ever. Powered by 100% renewable energy and delivered with exceptional customer service.

**Get a DriveFree EV**  
Choose your car and plan, pick it up and hit the road!

**Add Intelligent Octopus**  
Sign up for the Intelligent Octopus home energy plan from Octopus Energy.

**Enjoy unlimited free charging!**  
You'll automatically get a credit on your Octopus Energy bill for all your charging.



# Account for Community-Scale DER as Load Reducers

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- 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/ESP 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.