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

Gaps & Barriers for California's High DER Future

March 12, 2024

Future Grid Workshop #2: Gaps & Barriers

Workshop #1

"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?"

Workshop #2

"What are the existing gaps and barriers in achieving the needs identified above within our current Distribution System Operator (Utilities)?"

Workshop #3

"What are the potential solutions in overcoming these barriers?"

Summary of UCAN’s Recommendations

Statewide Platforms to enable operational requirements

- 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 to enhance operational efficiency

- Shift to 5-/15- minute smart meter and CAISO scheduling intervals
- Leverage AMI capabilities
- Implement LMS dynamic rates (Load Management Standards)
- Expand DER submetering
- Enable Supplier Consolidated Billing for CCAs + fix for ESPs
- Allocate transmission costs to LSEs
- Count Community-Scale DER as wholesale load reducers

Statewide Platforms

Functions to enable new operations:

1. Reliable data access & communications across market entities
2. Enhanced tracking & monitoring of DER assets
3. Distribution-level market to orchestrate DER dispatch & coordinate with CAISO

Underlying Data Exchange Requirements

- Substantial cost, friction, and lack of interoperability associated w/ accessing multiple data types siloed within each utility:
  - Advanced Metering Infrastructure (AMI) Network
  - Customer Information System (CIS) & billing
  - Meter Data Management System (MDMS)
  - Advanced Distribution Management System (ADMS)
  - Distributed Energy Resource Management System (DERMS)
- Similar challenges re: accessing useful data from aggregators / DERs.
- **Operations require standardized and extensible approach to ensure accurate data, efficient data access — at appropriate latencies — and data interchange across entities (utilities, LSEs, DER providers, CAISO, regulatory agencies).**

Smart Grid: Legislative Intent

- **Community Choice**: AB 117 (Migden, 2002) directed IOUs to provide "*metering, billing, collection, and customer service*" for CCAs, predicated on the assumption that IOUs "*cooperate fully*" with CCAs (and that the CPUC "*enforce the requirements*").
- **Smart Grid**: SB 17 (Padilla, 2009) charged the CPUC with adopting "*standards and protocols to ensure functionality and interoperability developed by public and private entities*", recognizing that "*products, technologies, and services*" could be provided "*by entities other than electrical corporations*".
- **Customer Authorization:** SB 1476 (Padilla, 2010) established privacy requirements for sharing customer data with 3rd parties (DER aggregators), requiring IOUs to exercise "*reasonable*" processes for customers to authorize 3rd parties.
- **CCA Bill of Rights**: SB 790 (Leno, 2012) recognized that "*The exercise of market power by electrical corporations is a deterrent to [CCAs]... It is therefore necessary to establish a code of conduct, associated rules, and enforcement procedures, applicable to electrical corporations in order to facilitate the consideration, development, and implementation of [CCAs], to foster fair competition, and to protect against cross-subsidization by ratepayers.*"
- **PUC § 366.2(c)(9) and PUC § 8380 require the IOUs to provide CCAs with *"incremental... meter-specific electricity data to the extent produced by [advanced metering] infrastructure".***

Customer Data Access Barriers (CCAs)

R.20-11-003 (Extreme Weather OIR):

- January 2021 – CAISO Final Root Cause Analysis confirmed UCAN's testimony that IOU non-provision of daily interval data to CCAs contributed to August 2020 rolling blackouts; CalCCA clarifies that PG&E ShareMyData Platform is unreliable and that SCE & SDG&E have ignored CCA requests.
- February 2021 - UCAN demonstrates that the IOUs: (1) collect/validate Smart Meter data daily, finishing 2+ hours prior to CAISO's 10AM demand-bid window, and (2) technically able to provide 3rd parties daily Smart Meter data updates — which they transmit to IOU contractors — but have "*chosen to disregard their statutory obligation, Commission orders and requests by CCAs to do so*."

R.22-07-005 (Demand Flexibility OIR):

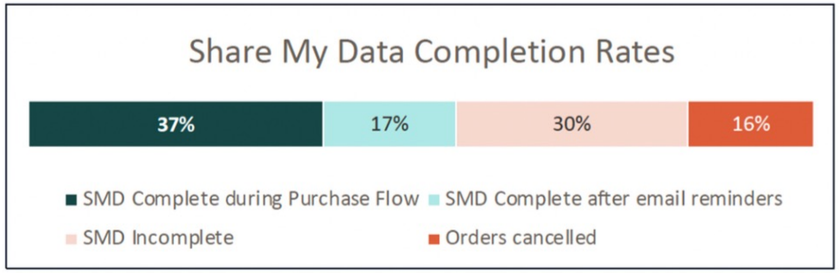
- October 2023: Working Group report clarifies that SCE and SDG&E are implementing platforms to provide Smart Meter interval data to CCAs.
- December 2023: CalCCA agrees w/ PG&E's recommendation to hire "*neutral independent consultant*" to resolve PG&E ShareMyData platform data access problems (proposed decision pending).

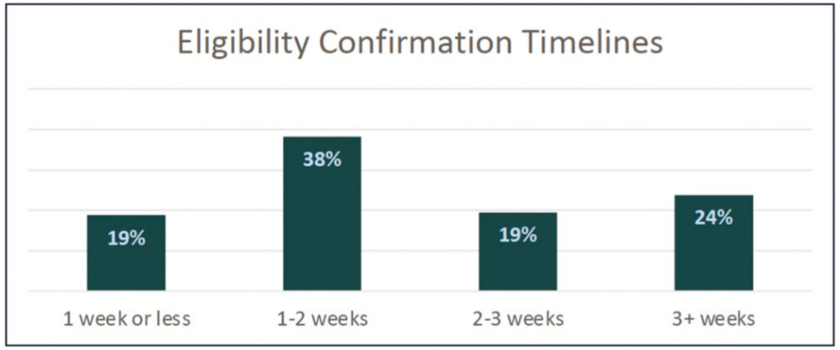
Customer Data Access Barriers (DER Aggregators)

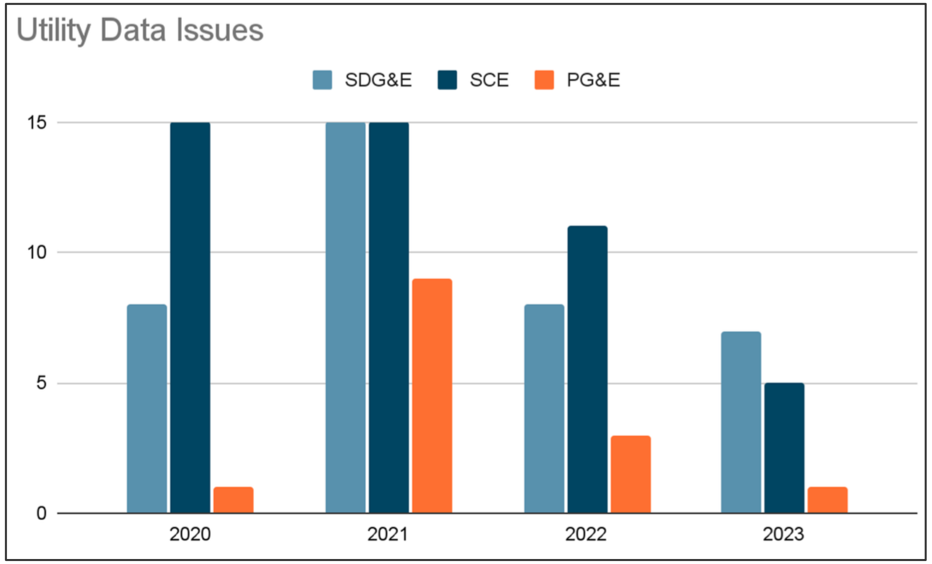
- Broken data authorization process: ~50% customers drop out & fail to authorize sharing.
- Broken IOU Green Button Connect platforms: inconsistent, often unreliable, burdensome.
- Poor, delayed customer service by IOUs.
- No service-level performance requirements.
- Data shown is tracked by ecobee, Ohmconnect, self-reported by customers.

Utility Outage Hours by Year

	YEAR	PGE	SCE	SDGE
1	2018	30.25	68	93.5
2	2019	166.1667	489.7833	1741.85
3	2020	136	194.3	83.7833
4	2021	248.0833	435.55	703.9167
5	2022	60.4167	133.1667	164.2333







Source: 23-LMS-01, 1/17/24 workshop, UtilityAPI slides and recording (at 59:00) & CEDMC comments

Customer Data Gaps (Phase 1 Kevala Study)

- AMI measurement anomalies and collection gaps examples provided:
  - General need to ID invalid reads & clean up “outliers and missing data” in IOU datasets.
  - Physically impossible level of load recorded across most PG&E meters on April 7, 2018.
  - 1 million SCE meters missing observations in March 2020.
  - Similar gap in SDG&E meter reads in April 2020.
- Noted inaccuracies in customer information (e.g., misaligned NAICS codes, residential coded as nonres)

Distribution System Data Gaps (Phase 1 Kevala Study)

Accurate mapping between feeders and transformer banks is critical information to enable identification of points of potential distribution grid overload & opportunities to manage via DER services and load transfers.

- Feeders missing a join to a substation bank:
  - PG&E = 13% missing
  - SCE = 14% missing
  - SDG&E = 17% missing
- Transformer bank ratings incomplete for SCE.

Table 11: Summary of number of substations, transformers, feeders, and related data, missing data highlighted orange *(Source: Kevala)*

	PG&E	SCE	SDG&E
Unique Service Transformers	838,170	562,534	159,686
Service Transformers Missing a Rating	38,506	168	1,594
Service Transformers Missing a Parent Feeder	0	0	0
Service Transformers Missing a Parent Substation	0	3,274	0
Unique Feeders	3,131	4,140	995
Feeders Missing a Rating	**460**	**104**	**216**
Feeders Missing a Parent Substation Transformer	**402**	**580**	**169**
Feeders Missing a Parent Substation	0	72	0
Unique Substation Transformers	1,035	843	176
Substation Transformers Missing a Rating	6	**208**	0
Substation Transformers Missing a Parent Substation	0	15	0
Unique Substations	747	714	282

Note: notable data issues related to grid connectivity and ratings are denoted with **bold** text.

DER Data & Integration Gaps (Phase 1 Kevala Study)

- Poor battery storage interconnection records:
  - Energy rating (KWh) — 80% of records missing.
  - Capacity rating (KW) — instances of “clearly erroneous” ratings (e.g., zeros or MW-scale capacities on residential homes).
- Electric Vehicle records sourced from DMV.
- Challenges in linking DER interconnection data, service points, premises, and meters — examples provided:
  - Single meters mapped to multiple end points.
  - Bad dates for meter IDs (read dates were flipped or mismatched).
  - DER interconnection data that could not be matched to premises.
  - Meters or service points that lacked corresponding distribution data (downstream feeders or substations).

Market Reforms

Actions to promote efficient operations

Leveraging AMI Networks + Wholesale Alignments

- CAISO previously proposed — and then withdrew — shifting the day-ahead market from hourly to 15-min intervals (see 2nd Revised Straw Proposal for Day-Ahead Market Enhancements Phase 1: Fifteen-Minute Granularity, August 2018)
- Current market rules permit LSEs to settle load in 15-minute **or** hourly intervals, based upon underlying meter interval granularity.
  - Mass market (residential, most commercial) records hourly intervals.
  - Prior IOU reports show AMI communications networks have excess capacity & that backhaul reporting frequency / meter sampling rates could be shortened at low-cost — with shorter intervals supporting advanced services for DER customers.
- CPUC oversight required to ensure that AMI deployments & GridMod plans support enabling CCA / ESP / DER aggregator innovation.

Supplier Consolidated Billing

- Consolidated ESP Billing requirements impose barriers to adoption. Example from PG&E Rule 25: Direct Access*
  - Consolidated PG&E Billing: “*PG&E will not forward any amounts owed to the ESP that have not been received from the customer.*”
  - Consolidated ESP Billing: “*Under this option the ESP must pay all undisputed PG&E charges to PG&E regardless of whether the customer has paid the ESP.*”

  *Similar language in SCE Rule 22 and SDG&E Rule 25

Billing Method for Direct Access Customers

	PG&E	SCE	SDG&E
Consolidated IOU Billing	16.80%	15.14%	19.60%
Consolidated ESP Billing	0%	0.26%	<1%
Dual Billing	83.20%	84.60%	80.30%

Source: R.20-11-003, IOU responses to UCAN data requests (Feb 2021)

- CPUC authorization need to enable Consolidated CCA Billing — also dual billing — while addressing Consolidated ESP Billing barriers.

LMS Implementation & Retail Transmission Rates

- SCE proposed delaying LMS implementation by 5 years.
  - UCAN protested and prevailed in D.24-01-032.
- PG&E + SDG&E attempted to avoid CPUC oversight of how transmission costs are recovered via dynamic retail rates:
  - UCAN recommended CPUC first approve PG&E and SDG&E dynamic transmission rates <u>prior to</u> submission to FERC — as SCE has proposed — plus updates to Resolution E-3930 to clarify and standardize the process for all IOUs.
  - FERC Order 888 indicated that FERC would defer to state regulators to "*accommodate the design and special needs*" of retail transmission rates in states that allowed customer choice.
  - UCAN cited to legal precedent & examples where other state regulators implemented dynamic transmission pricing and/or had shifted transmission cost recovery to LSEs (permitting retail rate innovation so long as total transmission costs were recovered).
  - Issue is pending a decision in R. 22-07-005 (OIR to Advance Demand Flexibility Through Electric Rates).
- CPUC action required to exercise oversight over dynamic transmission retail rate design and/or allocating transmission costs to LSEs for recovery in rates.

Accounting 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).
- SCE recently proposed* utility-owned storage projects that would:
  1. *"be interconnected to non-CAISO-controlled portions of the electric system under the jurisdiction of the Commission and the operational control of SCE and operate outside of the CAISO wholesale market."*
  2. *"be located at or near substations with the purpose of providing benefits to the overall system, such as within load pockets, local capacity requirement areas, or substations in areas with significant solar generation, and would provide reliability by discharging to the grid during the peak and net peak periods and charging during high solar or low load periods."*

  **See R. 20-11-003, SCE Reply Brief, 27 September 2021*
- CPUC action required to "level the playing field" via new mechanism allowing CCAs / ESPs to fully count community-scale DER as wholesale load reducers (to lower wholesale energy + RA obligations + transmission costs).

Questions?

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References and Citations

- R.21-06-017, Electrification Impacts Study Part 1 ("Kevala Study"), 9 May 2023, Appendix 3: Data Challenges and Solutions. Report online: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M508/K423/508423247.PDF
- Docket 23-LMS-01, UtilityAPI presentation for 1/17/24 LMS workshop. Slides and recording (see 00:59:00 to 01:17:00) online:
  - https://efiling.energy.ca.gov/GetDocument.aspx?tn=253913&DocumentContentId=89215
  - https://efiling.energy.ca.gov/GetDocument.aspx?tn=254040&DocumentContentId=89357
- Docket 23-LMS-01, California Efficiency + Demand Management Council Comments on 1/17/24 LMS Workshop. Comments online: https://efiling.energy.ca.gov/GetDocument.aspx?tn=254279&DocumentContentId=89627
- R.20-11-003, Reply Brief of the Utility Consumers' Action Network, 12 February 2021. Online with supporting data request responses: https://www.dropbox.com/sh/bs0glj3dzu3ni2c/AACTYpVhDJlSviUer7zlND79a?dl=0
- R.22-07-005, Demand Flexibility OIR Track B Working Group Report, 11 October 2023. Report online: https://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=520541672

References and Citations

- Senate Bill 17 (Stats. 2009, Ch. 327), Legislative Counsel's Digest. http://www.leginfo.ca.gov/pub/09-10/bill/sen/sb_0001-0050/sb_17_bill_20091011_chaptered.html
- CAISO, Second Revised Straw Proposal for Day-Ahead Market Enhancements Phase 1: Fifteen-Minute Granularity, 27 August 2018. Online: http://www.caiso.com/Documents/SecondRevisedStrawProposal-Day-AheadMarketEnhancementsPhase1-Fifteen-MinuteGranularity.pdf
- PG&E, EPIC Report 1.14: Next Generation SmartMeter Telecom Network Functionalities, 30 Nov 2016. https://www.pge.com/content/dam/pge/docs/about/corporate-responsibility-and-sustainability/PGE-EPIC-Project-1.14.pdf
- PG&E / Veregy Consulting, Assessment of Technologies Available to Meet California Independent Systems Operator (CAISO) Telemetry Requirements for PDR – Final Report, May 2016. https://www.etcc-ca.com/reports/assessment-technologies-available-meet-caiso-telemetry-requirements-pdr

References and Citations

- R. 22-07-005, Joint IOU Reply Comments on Track B Working Group Report, 22 December 2023. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M521/K999/521999712.PDF
- R. 22-07-005, UCAN Reply Comments on Track B Working Group Proposals, 22 December 2023. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M521/K895/521895581.PDF
- R. 22-07-005, UCAN Opening Comments on Track B Working Group Proposals, 13 November 2023. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M520/K881/520881370.PDF
- R. 20-11-003, SCE Reply Brief, 27 September 2021. Online: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M410/K467/410467128.PDF