Demand and Distributed Energy Market Integration (DDEMI) Working Group

March 3, 2025

Reminders

- This call is being recorded for informational and convenience purposes only. Any related transcriptions should not be reprinted without ISO's permission.
- The meeting is structured to stimulate dialogue and engage different perspectives.
- Please keep comments professional and respectful.
- Please try to be brief and refrain from repeating what has already been said so that we can manage this time efficiently.

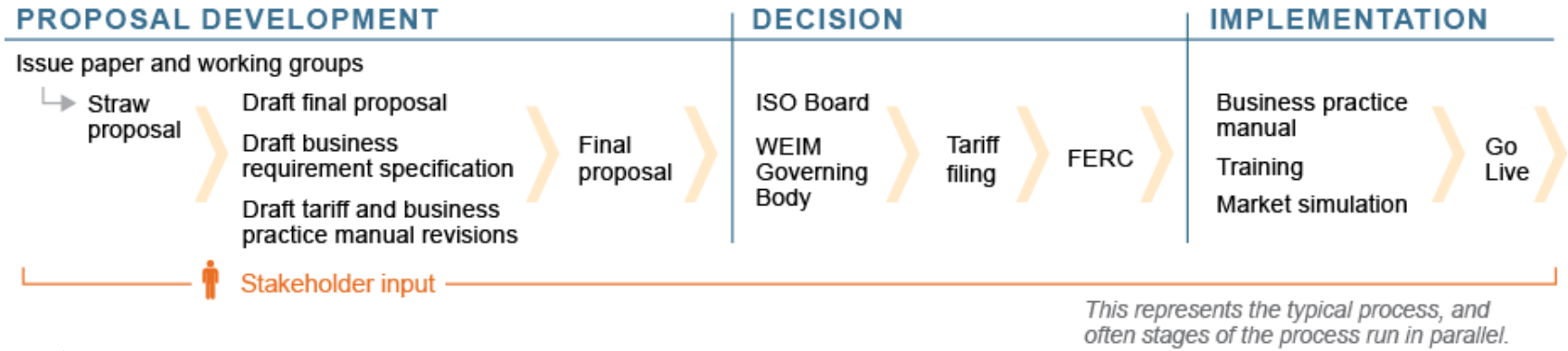
Instructions for raising your hand to ask a question

- Open the Participant and Chat panels from the bottom right.
- If you are connected to audio through your computer or used the “call me” option, select the raise hand icon  located on the bottom of your screen.
  - **Note**: *3 only works if you dialed into the meeting.
- Please remember to state your name and affiliation before making your comment.
- You may also send your question via chat to either **Brenda Marquez** or to all panelists.
- If you need technical assistance during the meeting, please send a chat to the event producer.

Today's Working Group Agenda

Time	Topic	Presenter
1:00 – 1:05	Welcome, Today's Agenda	ISO - Brenda Marquez
1:05 – 1:15	Today's Goals	ISO - Jimmy Bishara
1:15 – 1:40	Discussion Paper Overview & Upcoming WG sessions	ISO - Juan Buitrago
1:40 – 2:35	Review of Existing PEM	ISO - Ansel Lundberg
2:35 – 3:55	Stakeholder Presentations	Nostromo – Boaz Ur, Josh Arnold PG&E – Jahon Amirebrahimi Leap – Collin Smith
3:55 – 4:00	Close out	Brenda Marquez

CAISO Policy Initiative Stakeholder Process



Goals of Today's Working Meeting

The Working Group structure is meant to embrace flexibility to allow organic and robust conversation on the topics at hand – it is key for us to drive towards solutions collaboratively

- **Provide an Overview of the Discussion Paper and Upcoming Sessions**
  - Evolution of the Discussion Paper/Working Group Process
  - Principles
  - Theme/Topic areas identified to date
- **Review existing Performance Evaluation Methodologies**
  - High level review of existing CAISO demand response participation machanism (e.g., metering, performance evaluation methodologies), before listening to challenges and ideas from stakeholders
- **SH Presentations**
  - Pacific Gas & Electric
  - Nostromo
  - Leap
- **Stakeholder Discussion**
  - Stakeholder feedback on proposed Working Group plan and address open questions.

California ISO

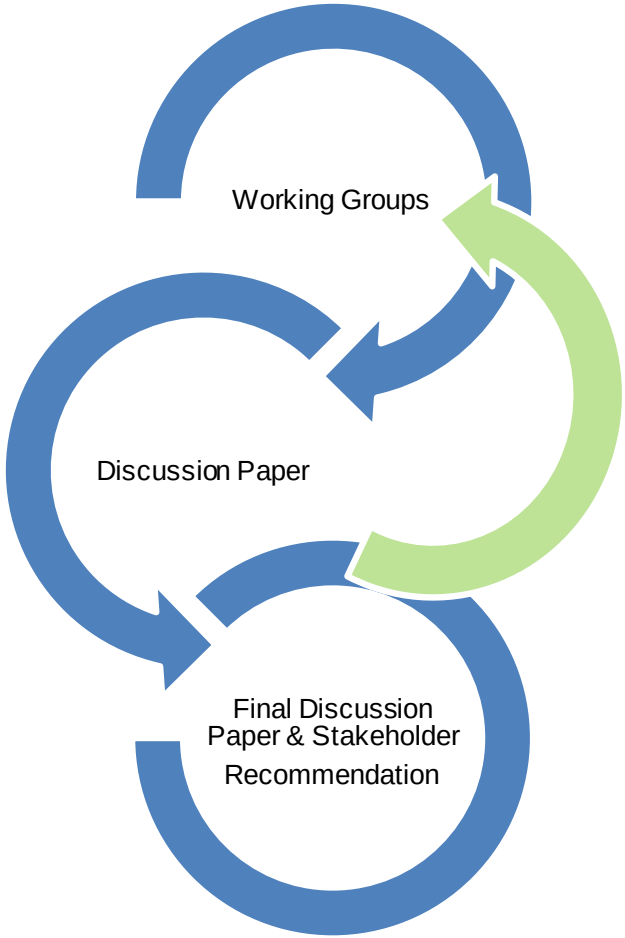
DDEMI Discussion Paper Overview

Working Group Deliverables

Demand and Distributed Energy Market Integration: Initial scoping discussions for this Working Group will be captured in a discussion paper, which will be iteratively updated as the Working Group progresses to reflect Stakeholder discussion.

The Discussion Paper will take an iterative approach, creating a history and providing opportunities to reflect, comment, and prepare for subsequent discussion.

Stakeholders will have opportunity to provide comments on the Discussion Paper during meetings, as well as written comments via the commenting tool.



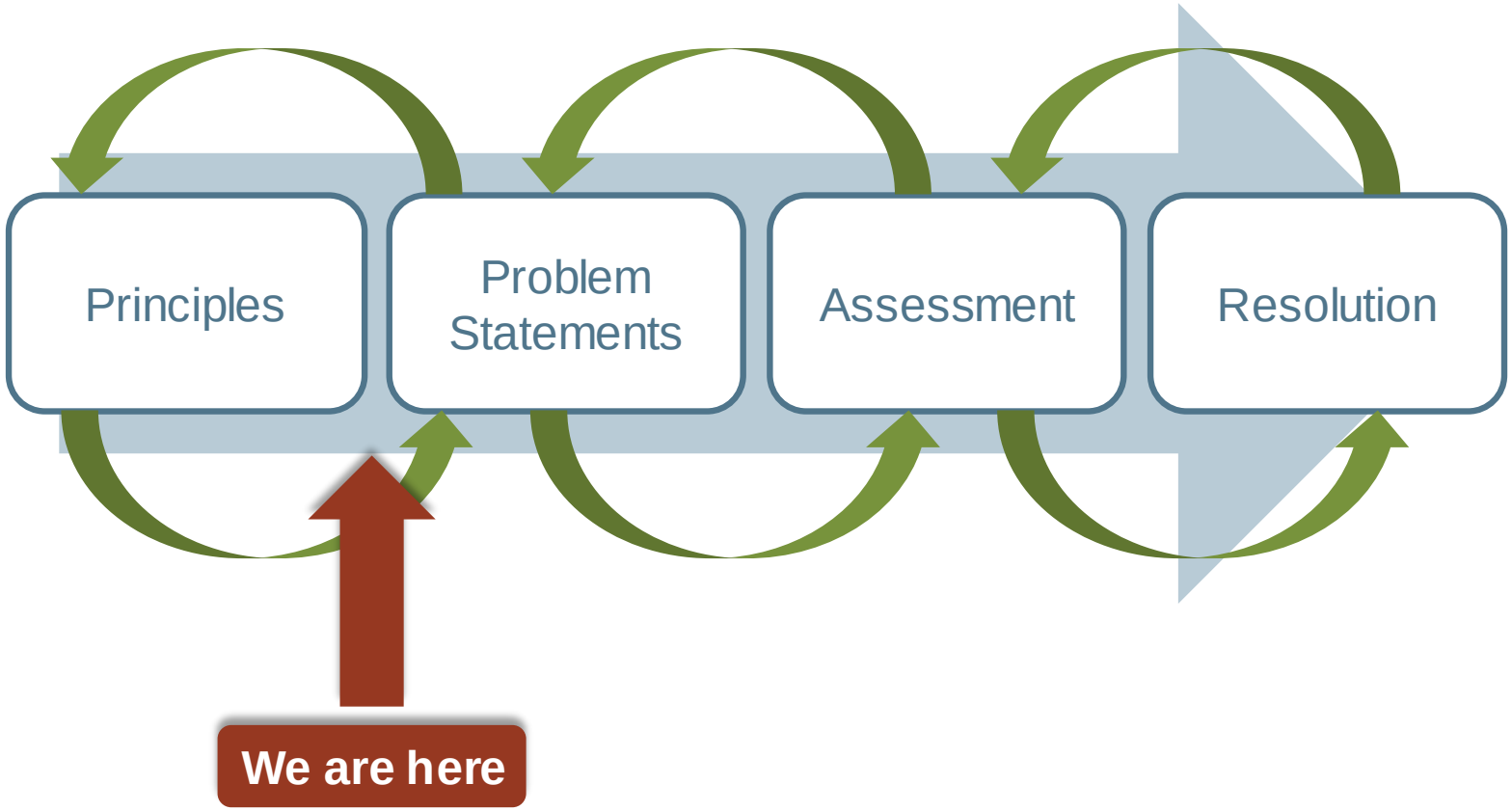
DDEMI Discussion Paper Overview

- **Evolution of the Discussion Paper**
  - Reflect Discussion and decisions from WG process
  - Iterative, living document
  - Feedback/comments on each iteration
    - As well as the layout and proposed evolution of Discussion Paper

DDEMI Discussion Paper Overview

- **Working Group process**
  - Identify areas of challenge/opportunity within scope of policy initiative
  - Form Problem Statements
    - Root cause related to intended market outcomes
  - Illustrate/Justify problem statements
    - Explore current market constructs meant to address
    - Develop methodology for analysis
  - Determine Action Items
    - Align on priorities
    - Serve as bridge to solution development

Working group process progression visual



DDEMI Discussion Paper Overview

- **Guiding Principles**
  - DDEMI Principles capture the spirit of market design
    - Are meant to illustrate, not dictate
  - Serve as a lens through which to view for problem statement development
    - Facilitate problem statement formulation, comparison, prioritization, and assessment of potential trade-offs when exploring solutions

DDEMI Discussion Paper Overview

- **Guiding Principles**
  - Efficiency
  - Competition
  - Feasibility
  - Simplicity
  - Reliability/Compliance
  - Facilitate states' public policies

DDEMI Discussion Paper Overview

Thematic Areas – these are stakeholder suggested items to be included in the discussion for problem statement formulation

- Performance Evaluation Methodologies PEM
- Demand response economic participation
- Demand response reliability participation
- Distributed energy resource participation
- Expanding demand side bidding options
- Demand flex direct market participation or indirect market optimization options

DDEMI Discussion Paper Overview

- **Expansion of current Performance Evaluation Methodologies options including recognition of registration and metering alternatives associated with them**

  - Modify tariff and BPM descriptions of control group settlement methodology.
  - Consider moving baseline methodologies to the BPM.
  - Explore the utilization of device level measurement and creation of alternative baseline methodologies.

DDEMI Discussion Paper Overview

- **New or expanded demand response economic participation model options**
  - Conduct a holistic refresh of PDR programs and update baseline methodologies to integrate DR programs for all WEIM and future EDAM entities.
  - Create new variant of PDR called mPDR to more accurately reflect load reductions of PDR participants with BTM storage and Rule 21 export permits.

DDEMI Discussion Paper Overview

- **New or expanded demand response reliability participation options**
  - Eliminate 100MW cap or change exception criteria for discrete RDRR resources above 100MW to participate in CAISO market
  - Allow for any RDRR bid option to utilize startup time listed in RDT.
  - Explore methods to consider fixed costs in economic dispatch decisions for RDRR.
  - Allow RDRRs to reflect minimum on times greater than one hour to more accurately reflect RDRR run times in CAISO's market optimization and dispatch.

DDEMI Discussion Paper Overview

- **Distributed energy resource direct participation or indirect market optimization options**
  - Explore DR/DER programs within WEIM and EDAM.
  - Explore behind-the-meter storage participation in wholesale markets

DDEMI Discussion Paper Overview

- **Expanding demand side bidding options**
  - Explore models to allow participating load resources to bid in demand in RT market.

DDEMI Discussion Paper Overview

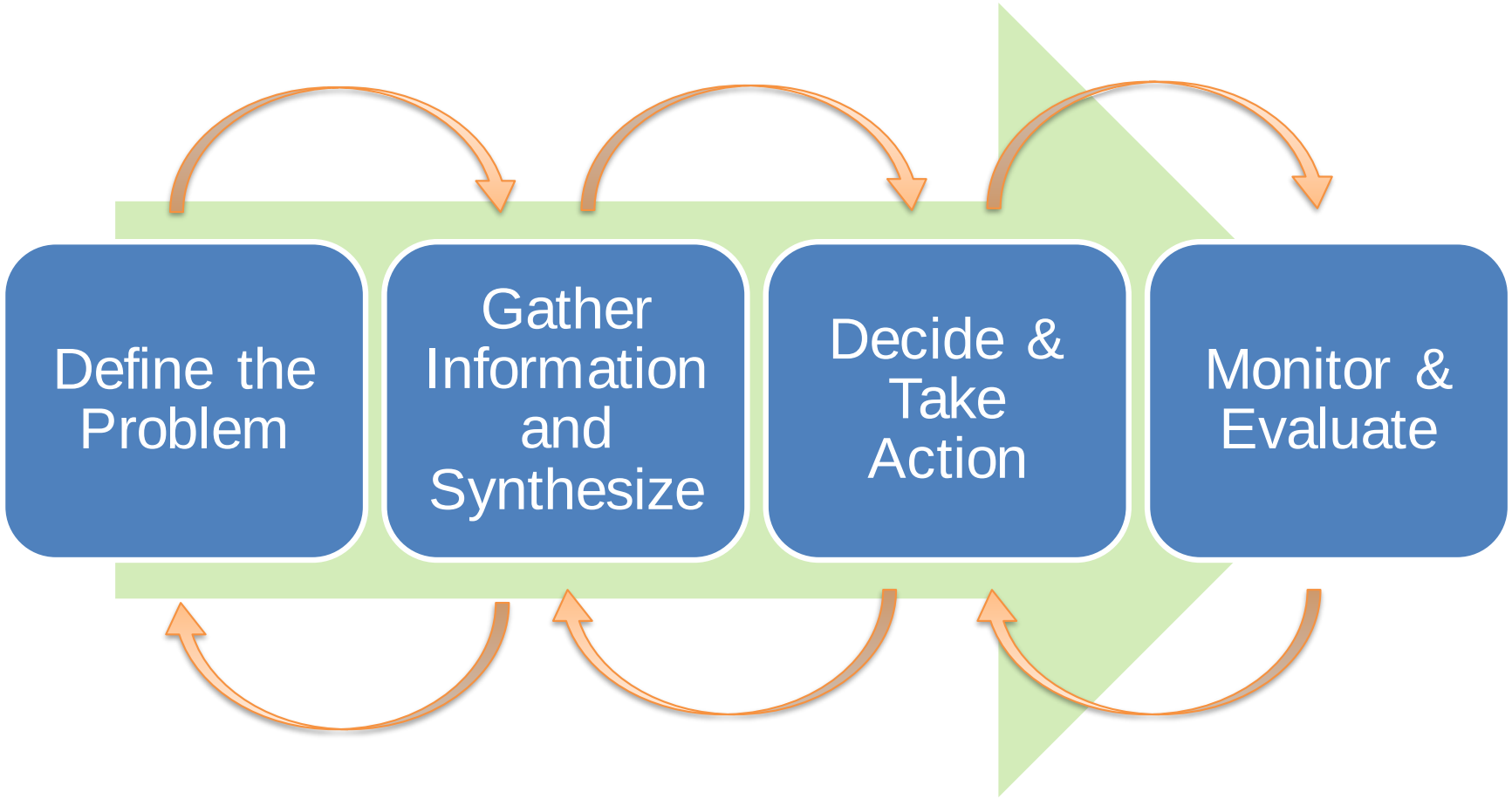
- **Enhancing demand flexibility market options**

  - Develop market rules for use of hydrogen electrolyzer technology, and enable hydrogen electrolyzer technology to participate in CAISO markets as a participating load resource.
  - Explore utilization of NGR participation model by WEIM entities.
  - Explore the representation of DR via base schedules for WEIM entities.

How a problem is defined influences how it is solved

- There may be many ways to define a problem when there is
  - More than one relevant policy
  - More than one principle trade-off
  - More than one impacted market outcome or function
- Stakeholders will have different perspectives and experiences that can illustrate potential root causes of a problem
- Working groups are a collaborative process to build problem statements

Problem statement development is an iterative process



How to build a Problem Statement

What's a problem statement? An issue, challenge, or opportunity related to CAISO market policy or processes that impacts market outcomes.

What makes a good problem statement?

- Identify a root cause in terms of existing market design policy or processes
  - If the root cause is not known:
    - Explore how current ISO market policy and processes reflect principles and support market objectives
    - Determine how these policies and processes may not meet their intended goals
- Determine possible trade-offs associated with principles
- Illustrate how problems create a measurable impact on market outcomes

California ISO

Today's DR metering and performance evaluation methodologies

What we'll cover today

Goal: provide high level review of existing CAISO demand response market participation mechanics (metering, performance evaluation methodologies) before hearing directly from stakeholders about challenges and ideas

- Review: DR market participation models
- Characterize relationship between telemetry, metering, performance evaluation methodologies, and settlement quality meter data
- Brief review: metering & telemetry in the demand response context
- Cover performance evaluation methodologies
- Working group expectations

Today's DR metering and performance evaluation methodologies

OVERVIEW: DR MARKET PARTICIPATION MODELS

The CAISO offers several market models to enable supply-side load participation

Model	General Application
Participating load	• Large pumps • Loads
Pumped storage	• Large pumped storage • Small storage devices
Proxy demand resource (PDR)	• Aggregated, economically bid demand response
Reliability demand response resource (RDRR)	• Aggregated, emergency demand response

Overview: DR market participation models

PDR and RDRR rely on the same technical functionality and infrastructure but have different participation options and requirements

Design	Services	Market dispatch	Description
Proxy Demand Resource	Energy, A/S non-spinning, A/S spinning, and residual unit commitment (RUC)	Economic day-ahead and real-time	Bids into ISO markets as supply
Reliability Demand Response Resource	Energy	Economic day-ahead Reliability real-time	Bids into ISO markets as supply Used for reliability purposes

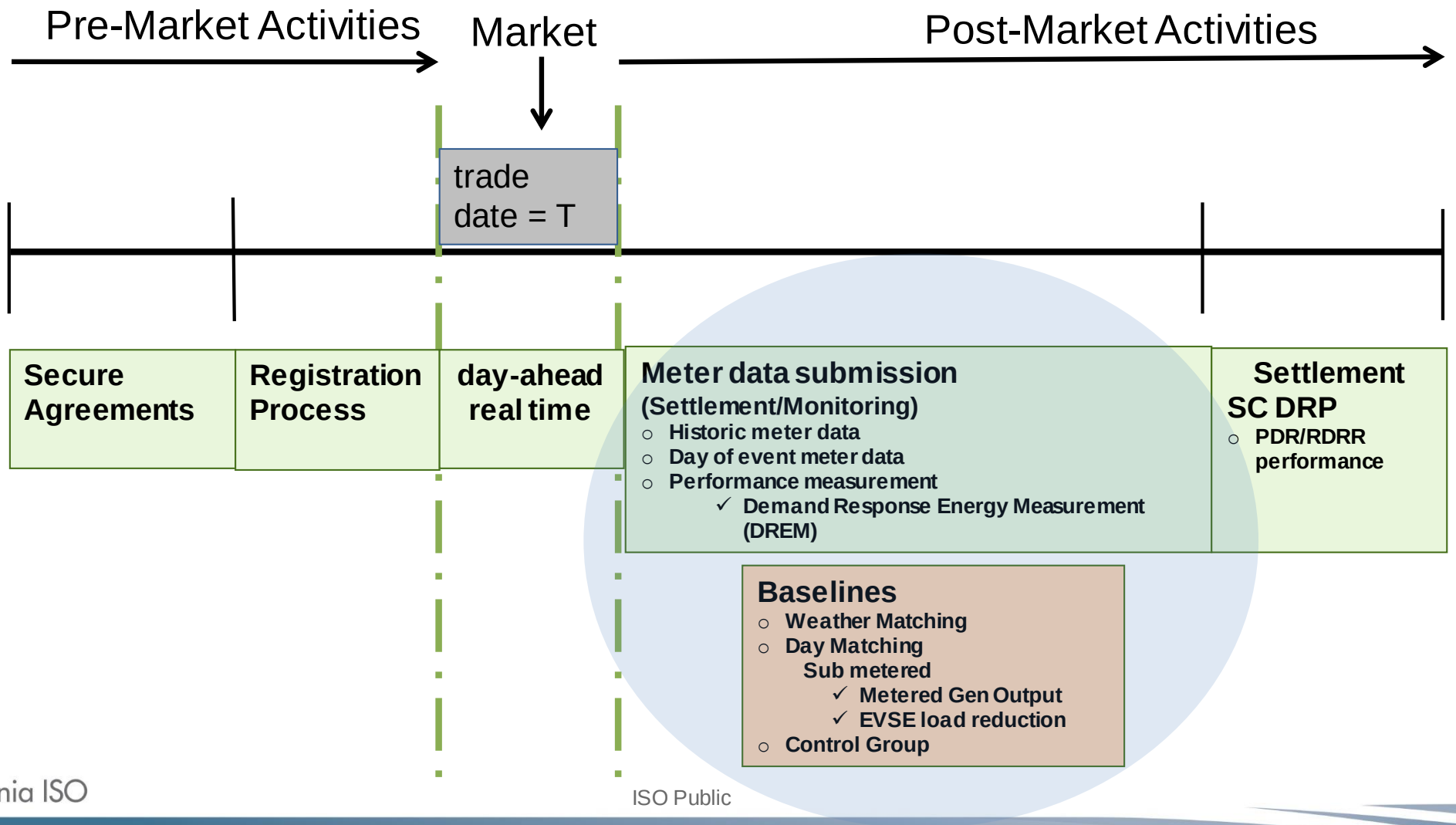
Today's DR metering and performance evaluation methodologies

HOW IT ALL FITS TOGETHER

How it all fits together for demand response: metering, telemetry, performance evaluation, and settlement

1. Telemetry: not required for most DR aggregations (unless greater than 10 MW or providing Ancillary Services)
   - RDRR has no telemetry requirements
   - Section 12 of the Direct Telemetry BPM outlines special provisions on meeting telemetry requirement from PDR
2. Metering: data to CAISO
3. Performance Evaluation Methodology: uses meter data to produce DR settlement quality meter data
   - Monitoring data vs Settlement data
4. Settlement data calculated and submitted by Scheduling Coordinators

DR resources are SC metered entities and require meter data submittal of resource performance



Today's DR metering and performance evaluation methodologies

BRIEF REVIEW: METERING & TELEMETRY IN THE DEMAND RESPONSE CONTEXT

ISO Metered Entity (ISOME) Vs SC Metered Entity (SCME)

- ISOME: The CAISO directly polls the meters, and the ISO performs the validation, estimation and editing to produce Settlement Quality Metered Data (SQMD).

- SCME: The Scheduling Coordinator polls the meters, performs the validation, estimation and editing and submits the resulting SQMD to the CAISO.

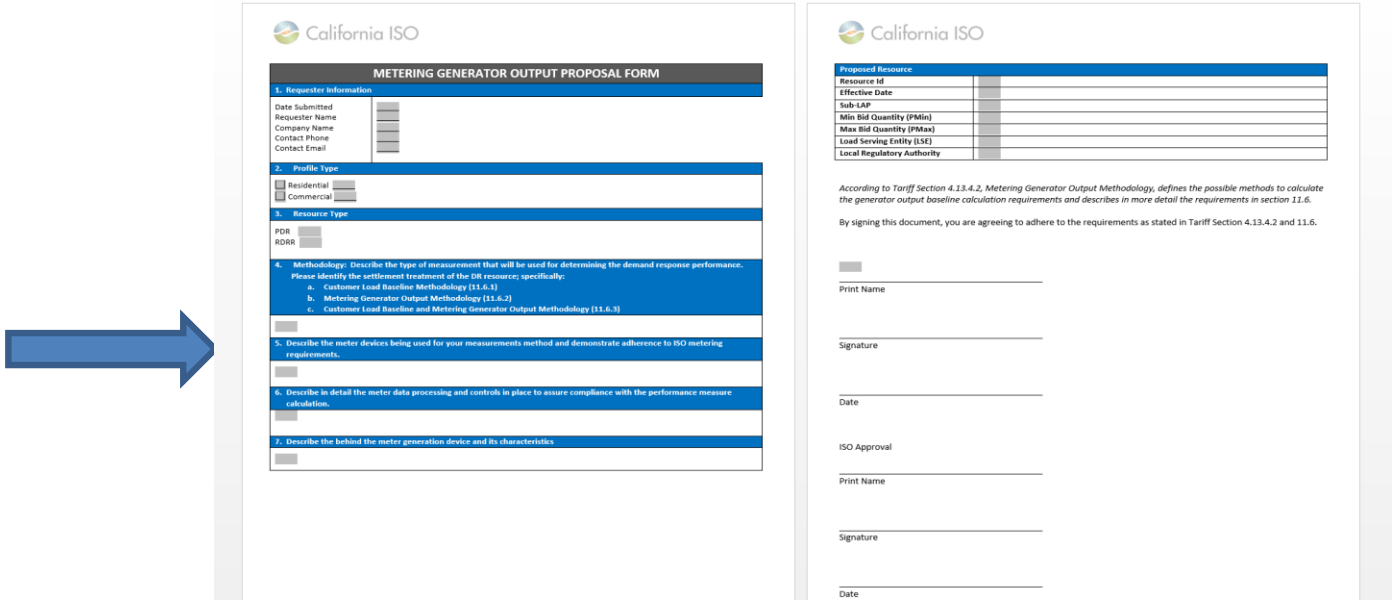
Applies to all demand and distributed energy resource aggregations

Metering Rules

- SCME option is available to:
  - Participating Generators
  - Qualifying Facility
  - Metered Subsystem
  - Utility Distribution Company
  - Tie Point meters
  - WEIM entities
- ISOME option can be costly — SCME provides a few advantages
  - Installing ISO Approved meters is not required
  - ISO Metering Inspection services are not required

For demand response resources, the SQMD plan is met through the registration process

- Approval required for use of sub-meter options – ensures SCME sub-metering requirements are met



California ISO

METERING GENERATOR OUTPUT PROPOSAL FORM

1. Requester Information

Date Submitted
Requester Name
Company Name
Contact Phone
Contact Email

2. Profile Type

Residential
Commercial

3. Resource Type

PDR
RDRR

4. Methodology: Describe the type of measurement that will be used for determining the demand response performance. Please identify the settlement treatment of the DR resource; specifically:

a. Customer Load Baseline Methodology (11.6.1)
b. Metering Generator Output Methodology (11.6.2)
c. Customer Load Baseline and Metering Generator Output Methodology (11.6.3)

5. Describe the meter devices being used for your measurements method and demonstrate adherence to ISO metering requirements.

6. Describe in detail the meter data processing and controls in place to assure compliance with the performance measure calculation.

7. Describe the behind the meter generation device and its characteristics

California ISO

Proposed Resource	
Resource Id	
Effective Date	
Sub-LAP	
Min Bid Quantity (PMin)	
Max Bid Quantity (PMax)	
Load Serving Entity (LSE)	
Local Regulatory Authority	

According to Tariff Section 4.13.4.2, Metering Generator Output Methodology, defines the possible methods to calculate the generator output baseline calculation requirements and describes in more detail the requirements in section 11.6.

By signing this document, you are agreeing to adhere to the requirements as stated in Tariff Section 4.13.4.2 and 11.6.

Print Name

Signature

Date

ISO Approval

Print Name

Signature

Date

Today's DR metering and performance evaluation methodologies

COVER PERFORMANCE EVALUATION METHODOLOGIES

Three baseline types are supported for PDR and RDRR supply side performance measurement

1. **Control Groups** – Establishes baseline of load patterns during curtailment event using non-dispatched customers with similar profiles
2. **Day Matching** – Estimates what electricity use would have been in absence of DR dispatch, using electricity use data on non-event but similar days
3. **Weather Matching** – Estimates what electricity use would have been in absence of dispatch during non-event days with most similar weather

Day and Weather matching baselines employ use of adjustment factors with caps (20% and 40%)

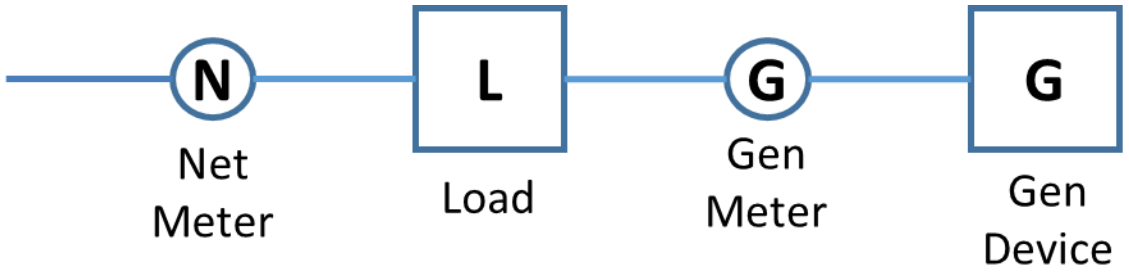
Performance Evaluation Methodology

There are several available Performance Evaluation Methodology identified in the Demand Response BPM and the ISO Tariff Section 4.13.4:

- Weather Matching
- Control Group
- Day Matching 10-in-10
- Day Matching 5-in-10 (residential only)
- Day Matching Combined
- Meter Generator Output
- Meter Generation Output with Day Matching 5-in-10
- Meter Generation Output with Day Matching 10-in-10
- Meter Generation Output with Day Matching Combined
- Meter Generation Output with Weather Matching
- Electric Vehicle Supply Equipment (EVSE) non-residential
- Electric Vehicle Supply Equipment (EVSE) non-residential with Day Matching 10-in-10
- Electric Vehicle Supply Equipment (EVSE) non-residential with Day Matching Combined
- Electric Vehicle Supply Equipment (EVSE) non-residential with Weather Matching
- Electric Vehicle Supply Equipment (EVSE) residential
- Electric Vehicle Supply Equipment (EVSE) residential with Day Matching 5-in-10
- Electric Vehicle Supply Equipment (EVSE) residential with Day Matching 10-in-10
- Electric Vehicle Supply Equipment (EVSE) residential with Day Matching Combined
- Electric Vehicle Supply Equipment (EVSE) residential with Weather Matching
- PDR-LSR
- PDR-LSR with Day Matching 5-in-10
- PDR-LSR with Day Matching 10-in-10
- PDR-LSR with Day Matching Combined
- PDR-LSR with Weather Matching

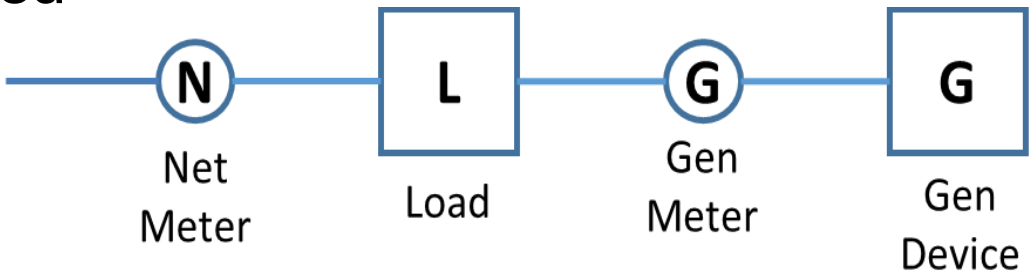
Sub-metering configuration of behind the meter generation enables use of the MGO performance evaluation methods for PDR/RDRR

- Demand response at the location can be separated into a pure load (facility) response and a behind-the-meter generation device's response.
- Measurement of the load's response would employ a standard ISO Type 1 baseline using N minus G as a derived "virtual" meter quantity.
- Measurement of the load offset by the generation device would use the MGO method using physical meter G.



Three options are supported with a sub-meter configuration

- Option 1 – load reduction only
  - Load baseline is established using a derived meter value (N-G)
- Option 2 – generation offset only
  - Performance is attributed to response of generation device (G)
- Option 3 – load reduction and generation offset
  - Response of the load and generation device can be measured separately and combined



Today's DR metering and performance evaluation methodologies

WORKING GROUP EXPECTATIONS

California ISO

Stakeholder Discussion and Q&A

Next steps

1. **Identify additional areas which would benefit from more information**
2. **Stakeholder comments on DDEMI discussion paper due March 28th**
3. **Future meetings** – see next slide
   – **Next meeting:** Finish discussion on PEM

Next steps

- Next working group meetings (*tentative – all afternoon timeslots)
  - WG session 2: Mar 19, 2025
    - Finish PEM discussion
  - WG session 3: Apr 07, 2025
    - **Demand Response Economic Participation
  - WG session 4: Apr 29, 2025
    - **Enhancing demand flexibility market options

- Please submit written comments regarding today's meeting and the discussion paper by end of day March 28th, using the template provided in the initiative webpage at the ISO's commenting.

For reference

- All meeting material and notices are available on the Demand and Distributed Energy Market Integration working group webpage: https://stakeholdercenter.caiso.com/StakeholderInitiatives/Demand-Distributed-Energy-Market-Integration

- If you have any questions, please contact Brenda Marquez bmarqez@caiso.com , or ISOStakeholderAffairs@caiso.com

Energy Matters blog provides timely insights into ISO grid and market operations as well as other industry-related news.

https://www.caiso.com/about/news/energy-matters-blog

Story | Operations

ISO now has expanded training and emergency operations facilities

By Tricia Johnstone

02/20/2025

Story | Inside the California ISO

You can now follow the ISO on Bluesky

01/27/2025

Story | Operations

The growing importance of winter readiness and the outlook for 2025

By Dede Subakti

12/20/2024

Subscribe to Energy Matters blog monthly summary