

EIM Entities Presentation on EDAM Resource Sufficiency Design Feb 11, 2020

Preamble

- The EIM Entities emphasize that they are a diverse group and are sometimes differently situated based upon geography, resource portfolios, and jurisdictional status, among other potential differentiating factors.
- Some EIM Entities may not have yet formulated their own specific viewpoints on specific market design issues. Therefore, while this presentation represents consensus viewpoints of the group as a whole, they may not necessarily represent any individual EIM Entity.
- Some EIM Entities may choose to offer their own individual contributions where appropriate, either in comments or throughout the stakeholder process.

Agenda

1. Objectives and Principles
2. Proposed Test Structure
3. RS Requirements
4. RS Supply
5. Meeting RS
6. Consequences of Failure
7. Transparency
8. Other Considerations

1. Objectives and Principles

EDAM is a Significant Opportunity

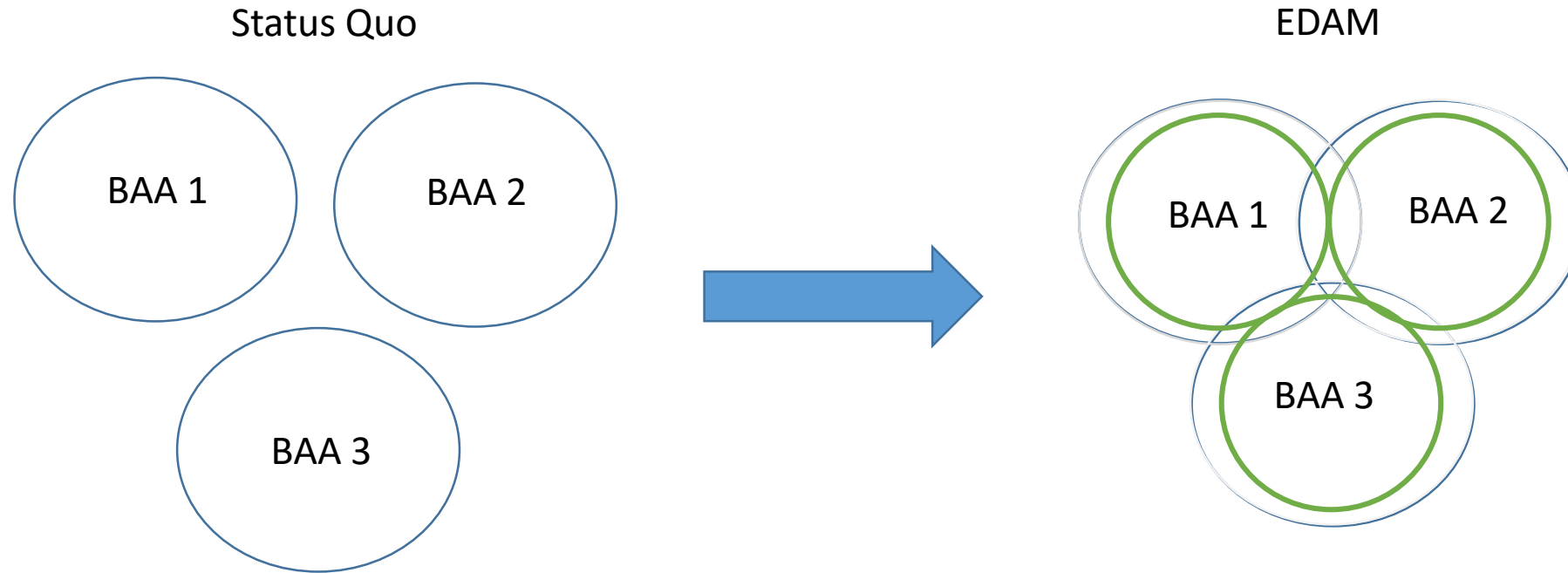
- A successful EDAM can provide **significant regional benefits**
 - Enable hourly DA transactions that better reflect the needs of a rapidly evolving grid
 - Support continued integration of renewables
 - More efficiently commit resources on a day-ahead basis
 - Strengthen and support system reliability
 - Allow entities to reduce costs and share diversity benefits in an equitable manner
- Resource Sufficiency is **critically necessary to achieve success**
 - EDAM volume will be **much larger** than EIM
 - EDAM will determine critical unit commitment across the West
 - Centralized market results in increased co-ordination and reliance on other BAAs
 - All participants must maintain sufficient resources to enable a reliable market solution

All entities must be able to pass an **accurate and meaningful** Day-Ahead RS test that is **fairly applied** to all BAAs

Core Objectives of EDAM Resource Sufficiency

- Promotes **reliability**
 - Ensures sufficient capacity, energy and flexibility under a variety of real-time conditions
 - Ensures EDAM transfers can be relied upon to serve load
 - Provides confidence in market results
- Sustains robust market depth and **promotes participation**
 - Improves market flexibility and efficiency
 - Increases diversity benefits and supports an equitable allocation of **diversity benefits**
- Ensures **fairness**
 - Protects against leaning
 - Avoids holding entities to a higher or lower standard than necessary for reliability
 - Consistent application of RS to all BAAs in the footprint
- **Complements** individual Resource Adequacy/Resource Planning processes
 - Clear feedback on actions needed to meet future EDAM RS

EDAM RS Enables Diversity Benefits



- Each BAA plans on a stand-alone basis
- Individual unit commitment decisions may be sub-optimal

- EDAM facilitates “pooling” of resources
- Resources needed to meet reliability is reduced through diversity savings
- **Diversity Credit** can be fairly allocated to reduce each BAA’s RS requirement

Defining an Appropriate RS Standard



- Potentially **lower cost** for some entities
- **Less reliable** market outcome
- **Increased risk** of leaning
- **Decreasing** diversity benefits
- **More likely** to require a RT test

- Potentially **higher cost** for some entities
- **More reliable** market outcome
- **Decreased risk** of leaning
- **Increased** diversity benefits
- **Less need** to perform a RT test

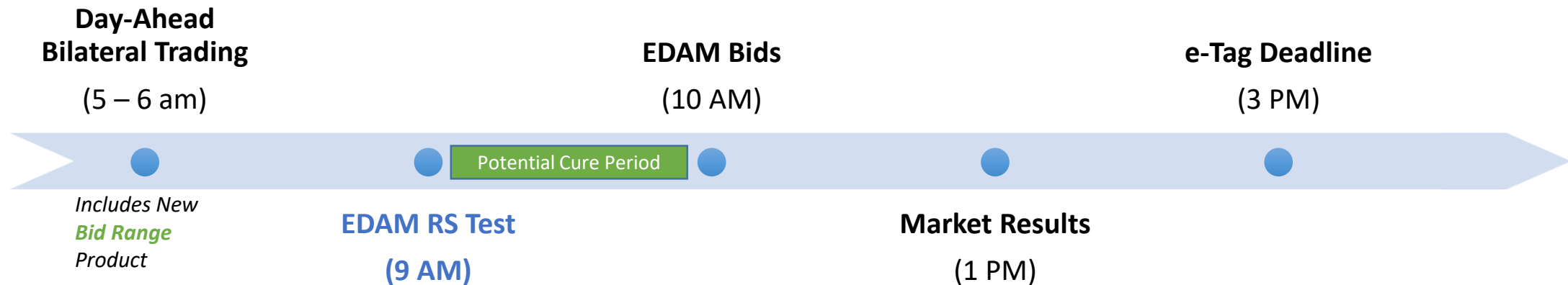
- First objective must be to determine an acceptable level of **reliability** of the EDAM footprint as a whole
 - Working backwards: what level (fairly applied to each BAA) would need to be contributed to achieve the desired footprint-wide reliability standard?
- Goal is to formulate RS test to require each BAA to provide its fair share of total RS needs without unduly incurring increased costs to EDAM participants
- EDAM RS requirements expected to be **lower** than stand-alone/status quo (due to diversity benefits of EDAM)

Key Principles

- RS **does not modify local control** over RA or replace BAA obligations
 - Complements long-term planning
- Test must be **accurate** and applied **consistently** to all participants
 - Qualifying supply that is real and capable of performing
 - No double-counting
- **Simple** and **workable**
 - Timely information and clear requirements
 - Compatibility with bilateral trading timelines
- **Preventative enforcement**
 - Prevents entities that fail RS from leaning on EDAM
- **Full transparency** and on-going review

2. Proposed Test Structure

Illustrative Day-Ahead Timeline



- EDAM RS test performed at **approximately 9 am** (before bid deadline)
 - Could provide time to address/cure any RS-related issues prior to 10 am
- Test timelines require careful consideration with respect to:
 - Existing day-ahead trading and scheduling timelines
 - EDAM transmission requirements
 - Ability to verify external supply included in RS through day-ahead e-Tags
 - Ability for EDAM participants to have tools and [advance information](#) to meet RS

Proposed Test Structure

24-Hour Non-Binding Operating Plan

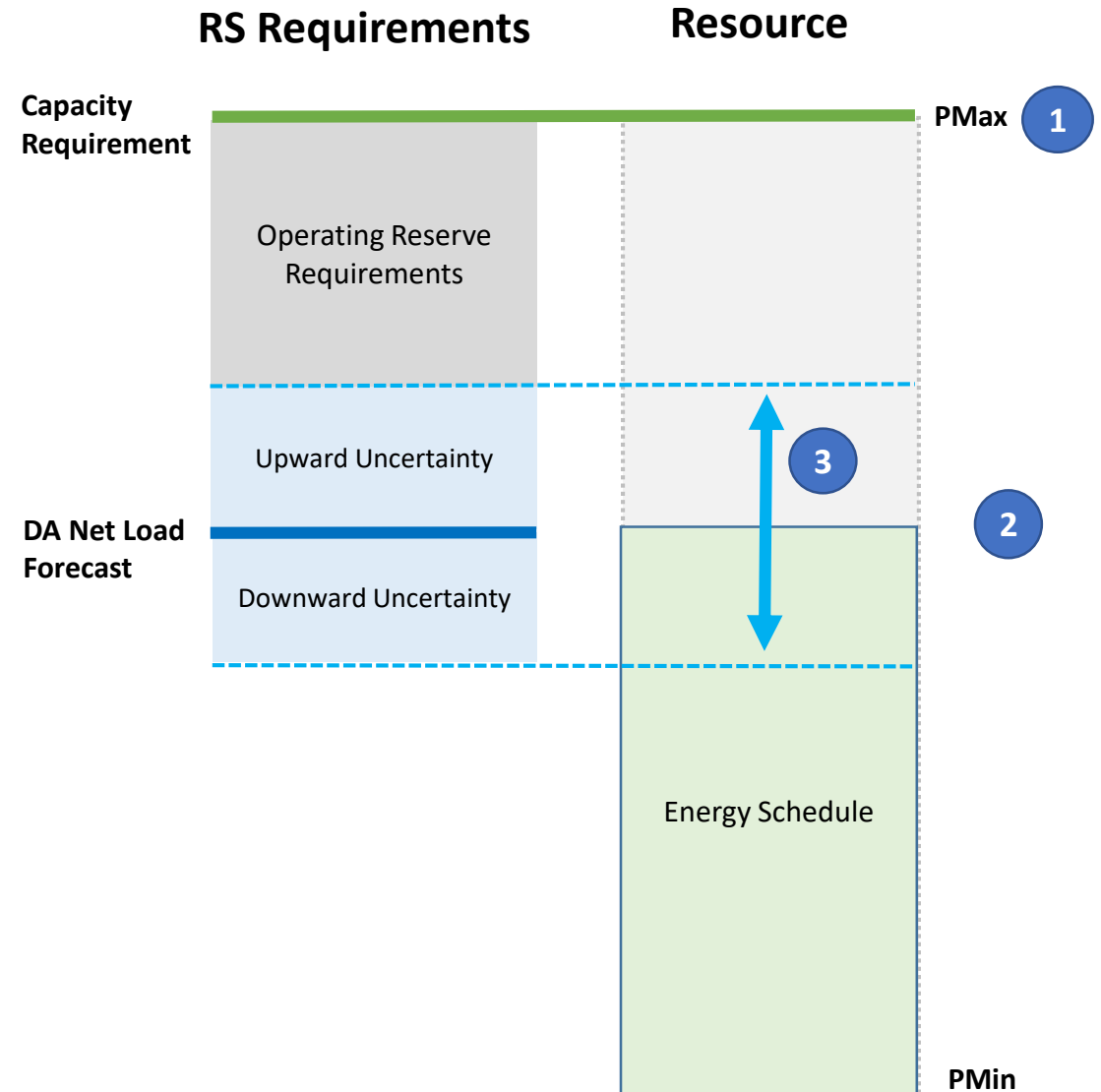
Each BAA's operating plan submitted to ensure feasibility and sufficiency from 4 perspectives:

1. **Energy** (and fuel) to meet load with a high degree of confidence for all hours of the operating day from portfolio resource(s)
2. **Capacity** to meet upward and downward load and reserves with a high degree of confidence
3. **Flexibility** to ramp within a single hour and across multiple hours
4. **Transmission** to deliver energy from external resources and to reliably meet load in any major constrained zones within a given BAA

Single Hour Example

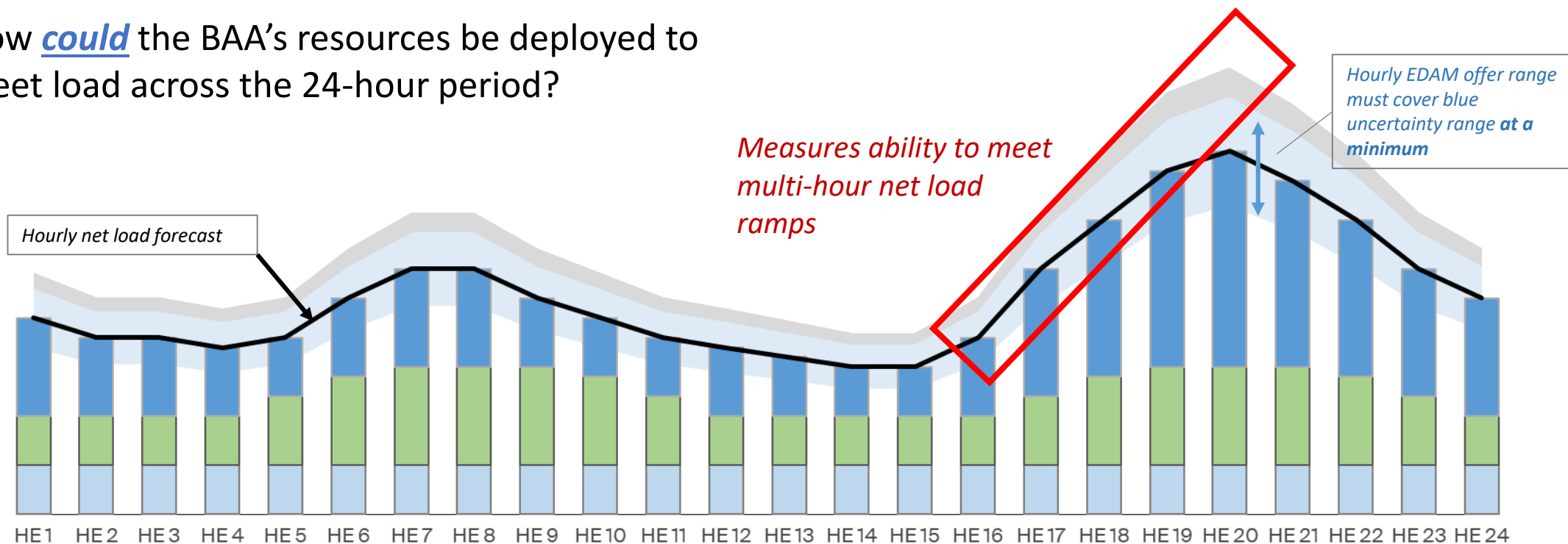
- ✓ 1 Do resources have sufficient **capacity** to meet load and reserve obligations?
 - DA Net Load Forecast
 - Upward and downward uncertainty
 - Operating Reserves (e.g., spin and non-spin)

- ✓ 2 Can resources provide **non-binding energy schedules** to balance against forecast net load?
 - Generally reflects minimum “offer range” that must be available to EDAM



24-Hour Example: Feasible Energy Schedules

How could the BAA's resources be deployed to meet load across the 24-hour period?



Firm Import
Resource A
Resource B

25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
25	25	25	25	35	45	50	50	50	45	35	25	25	25	25	25	25	35	45	50	50	50	50	45	35	25	25
50	40	40	35	30	40	50	50	35	30	30	35	30	25	25	40	65	80	100	110	95	80	65	60			

Proposed Test Structure

24-Hour Non-Binding Operating Plan

- **Simple** and **effective**
 - Ensures portfolio is feasible for the day, including how resources would meet multi-hour changes in net load
- **Conceptually similar** to existing planning approach for many BAAs
- Interface could allow entities to submit plan and verify RS status **at any time** prior to test deadline (for a given net load forecast)

EIM Real-Time Test

- To the extent possible, EDAM participants should **not** be held to an additional RS test in the EIM once they have met a Day-Ahead requirement
 - If uncertainty is properly planned for in day-ahead, an entity should not be required to supply additional resources as such uncertainty materializes in real-time
- **Simplified RT test** for EDAM participants may be required to ensure entity hasn't taken actions in real-time to undermine DA test results
 - E.g., new real-time bilateral transactions / obligations
- Will require further discussion to ensure that EDAM and EIM RS tests are reconciled to ensure appropriate outcomes
 - Depends on confidence level of EDAM RS and which elements of uncertainty are planned for on a day-ahead basis
 - Should also recognize that not all EIM participants may be in EDAM

3. RS Requirements

Components of Hourly RS Capacity Requirement

Component	Description	Considerations
Hourly Net Load Forecast	DA Forecast of Load and VERs for each BAA for each hour of the day	<ul style="list-style-type: none"> Allow EDAM BAAs to provide their own net load forecasts Determine appropriate time to lock in DA forecast
Contingency Reserves & Regulation	Existing NERC obligations	<ul style="list-style-type: none"> Consistent with contingency reserve sharing groups and BA real-time obligations
Upward / Downward Uncertainty	Capacity needed to respond to variable real-time conditions <ul style="list-style-type: none"> DA Load Forecast error DA VER Forecast error Interchange curtailments Resource non-performance 	<ul style="list-style-type: none"> Uncertainty calculations must be improved to reflect actual system conditions and align with CAISO's proposed DA Imbalance Reserve product Standard must ensure sufficient capacity under a wide range of real-time conditions Hourly bid-range products Requirement will be reduced by a diversity benefit Must consider treatment of accounting for VERS resources scheduled between EDAM entities
Replacement Reserve Product (New Opportunity)	Additional supply offered to EDAM that would support real-time forced outages that extend beyond 60-minute contingency period	<ul style="list-style-type: none"> Opportunity to increase diversity benefits through pooling of "replacement reserve" within EDAM footprint Enables additional efficiency of unit commitment

RS Flexibility Requirements

- Hour-to-hour flexibility measured by providing feasible hourly energy schedules across the day
- Remaining flexibility requirements based on **uncertainty** and **intra-hour ramping requirements**
 - Connected to Day-Ahead Imbalance Reserve being developed in CAISO's Day-Ahead Market Enhancements (DAM-E) Initiative
- Should recognize that a portion of DA uncertainty may materialize well in advance of the operating hour
 - What amount of DA uncertainty could be met by deploying slower resources in advance of hour?
 - What amount of DA uncertainty materializes within an hour? Within a 15-period?

Calculating RS Requirements

- RS calculations should be calibrated to reflect anticipated system conditions
 - *e.g.*, uncertainty based on the current forecast of wind, solar, and load conditions
 - Current EIM method (time of day approach) must be improved before EDAM
- RS requirements will likely incorporate multiple uncertain outcomes such as load, VER output, and forced unit outages
 - Resulting requirements could be over-stated if simply added together (*e.g.*, load and VER changes may be offsetting)
 - Determining those relationships will be complex and take time to work through
- CAISO and stakeholders should establish a **comprehensive process** on an annual basis to assess whether the methodology is achieving desired goals and make changes as needed

4. Qualifying Supply

RS Qualifying Supply: Internal Resources

- Internal resources must be capable of **performing** when **dispatched**
 - Must be **realistic** and reflect actual operating capability
 - May consider fuel, ambient de-rates, outages, and other restrictions
 - Not simply nameplate or Master File values
 - Ongoing metrics should include historical performance measures
- Deliverability assessment:
 - Internal resources should be deliverable to major load zones within a BAA
 - May require a zonal RS test for some BAAs

RS Qualifying Supply: External Resources

- External resources must be **real, identified** and **non-recallable**
- Supported by **highly reliable transmission**
- DA E-Tags are **critical** to confirm supply meets RS criteria and identify:
 - Resource (or system resource) used to meet RS
 - Source and Sink BAA
 - Transmission path and priority
- Ensures **no double-counting** between BAAs

RS Qualifying Supply: External Resources

- External supply types may include a variety of transactions:
 - Bilateral transactions between EDAM participants
 - Imports from outside EDAM footprint
 - Import supply offers into CAISO/EDAM intertie bidding framework
- Different “types” may require different approaches:

Type 1: Firm Energy Transactions

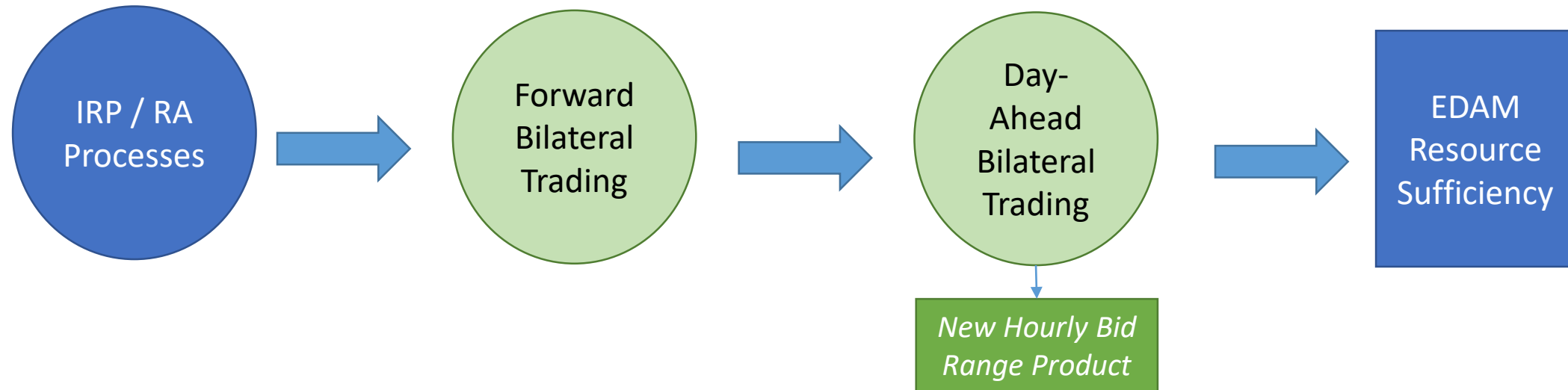
- Most easily verifiable (it is clear if energy is not tagged)
- Finalize e-Tag information by 3 PM [at the latest](#)

Type 2: Import offers into CAISO/EDAM intertie bidding framework

- More difficult to verify an ‘offer’ that may never be dispatched
- [Requires e-Tag by time of RS Test](#) to verify Source BAA, Resource(s), Transmission Path and associated reservations

5. Meeting RS

Bilateral Products Enabling EDAM RS

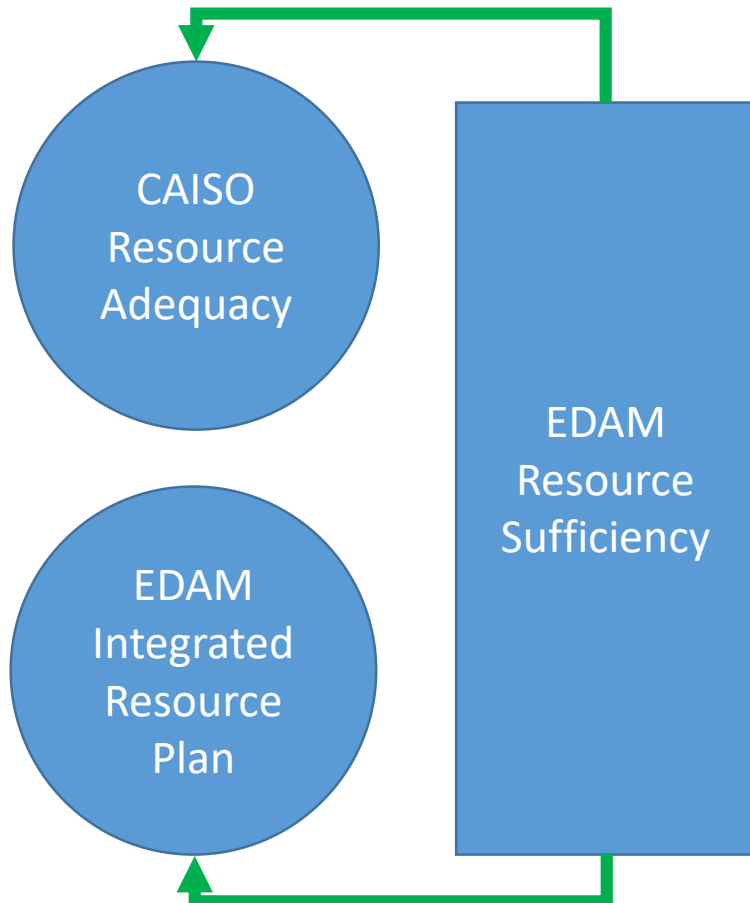


Opportunity to develop a new **hourly bilateral “bid range”** product

- Could be used to transfer flexible capacity from one BAA to another to help meet EDAM RS requirements
- Both upward (import) and downward (export) directions
- Seller would be obligated to offer resource flexibility into EDAM
- Transmission requirements similar to other external supply (firm transmission and DA e-Tags)
- Similar product(s) could be enabled for real-time

6. Failure Consequences

Failure Consequences



- Core objectives of EDAM RS
 - A **reliable** market solution
 - Robust market depth / maximum participation
 - A fair allocation of diversity benefits
 - No leaning on the capacity and flexibility of others
- Financial penalties and/or the current EIM freezing approach will **not achieve these objectives**
 - **Preventative** enforcement is critical
- An effective EDAM RS will also provide a **feedback mechanism** to complement forward planning

7. Transparency

Transparency

- EDAM RS requires a commitment to **ongoing review** and **continued improvement** as experience is gained
- Both RS requirements and results should be **transparent** to all participants, with extensive after-the-fact analysis to ensure the tests are applied accurately and equitably to all BAAs
- Determined **standardized** metrics
 - Are the RS requirements being calculated correctly?
 - Are entities being held to an appropriate standard?
 - Are resources performing when needed?

8. Other Considerations

Sub-Allocation Within BAAs

- EIM entities may need to develop tariff requirements, rate schedules and business practices associated with the allocation of day-ahead resource sufficiency requirements
- RS design framework must be flexible to allow entities to determine how to accomplish this

Fuel Adequacy

- In order to maintain reliability, resources need to have adequate fuel supplies with deliverability and flexibility.
 - These fuel supplies include natural gas, liquid fuels, hydrogen, water, battery state of charge, etc.
- Having sufficient fuel supplies to support the BAA's submitted RS operating plan is necessary to ensure an accurate RS demonstration
- Explore measures that could be needed during periods when fuel constraints may exist in certain areas

Fuel Adequacy – Market Optimization

- Fuel supplies and associated transportation can vary by season or day-to-day
- Some entities may face challenges with current market optimization
 - Few tools to limit use of resources based upon fuel supply over the course of the operating day
 - Existing Use Limited provisions may not provide the needed capability for some entities
- EDAM market design should explore mechanisms to allow participants to provide limits based upon fuel availability to prevent overruns
 - Scheduling coordinators could set daily limits at a portfolio, as well as individual unit level and provide during RS or DA bid submission