



California ISO

# Extended Day-Ahead Market (EDAM) Bundle 1 Straw Proposal

Stakeholder meetings

July 27 & 29, 2020

ISO PUBLIC

# Agenda

## Monday, July 27

Time	Topic	Presenter
1:00 – 1:10	Welcome and introduction	Kristina Osborne
1:10 – 2:10	Overview	Don Tretheway
2:10 – 3:50	Resource Sufficiency Evaluation	Don Tretheway George Angelidis
3:50 – 4:00	Next Steps	Kristina Osborne

## Wednesday, July 29

Time	Topic	Presenter
1:00 – 1:10	Welcome and introduction	Kristina Osborne
1:10 – 2:30	Transmission Provision	Don Tretheway
2:30 – 3:50	Transfer and Congestion Revenue Distribution	Don Tretheway
3:50 – 4:00	Next Steps	Kristina Osborne

# Stakeholder process



The ISO will brief EIM Governing Body and Board of Governors after each bundle is completed. All bundles will be brought together for decision.

# OVERVIEW

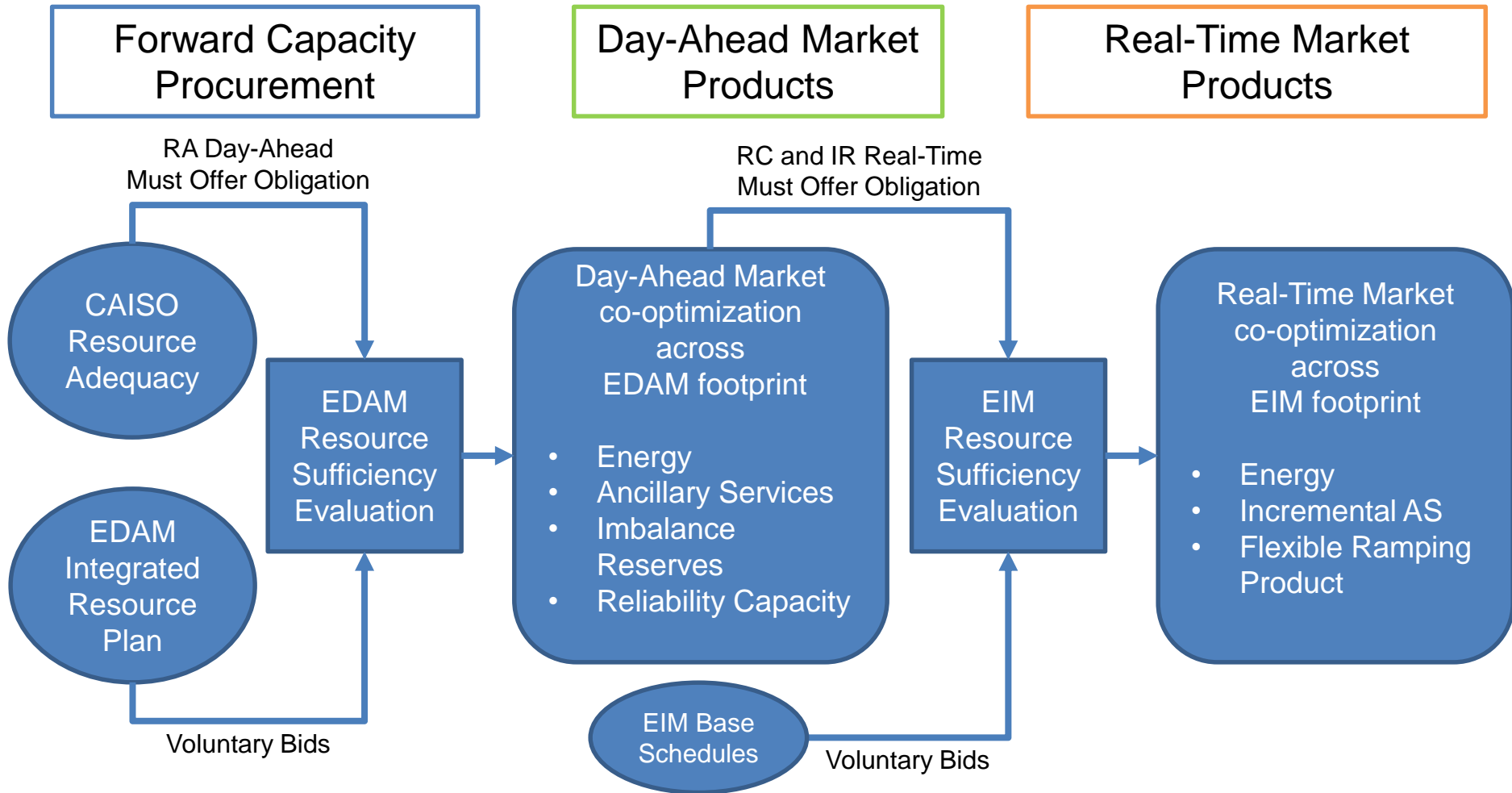
# Extending the day-ahead market to EIM entities provides regional benefits

- Key principles:
  - Each balancing authority retains reliability responsibilities
  - States maintain control over integrated resource planning
    - Resource adequacy procurement decisions remain with local regulatory authority
    - Transmission planning and investment decisions remain with each balancing authority and local regulatory authority
  - Voluntary market, like EIM
- Key benefits:
  - Day-ahead reduction of commitment and dispatch costs
  - Market efficiencies include optimized use of transmission and hourly energy shaping
  - Diversity benefits help with renewable integration, load and supply viability and uncertainty

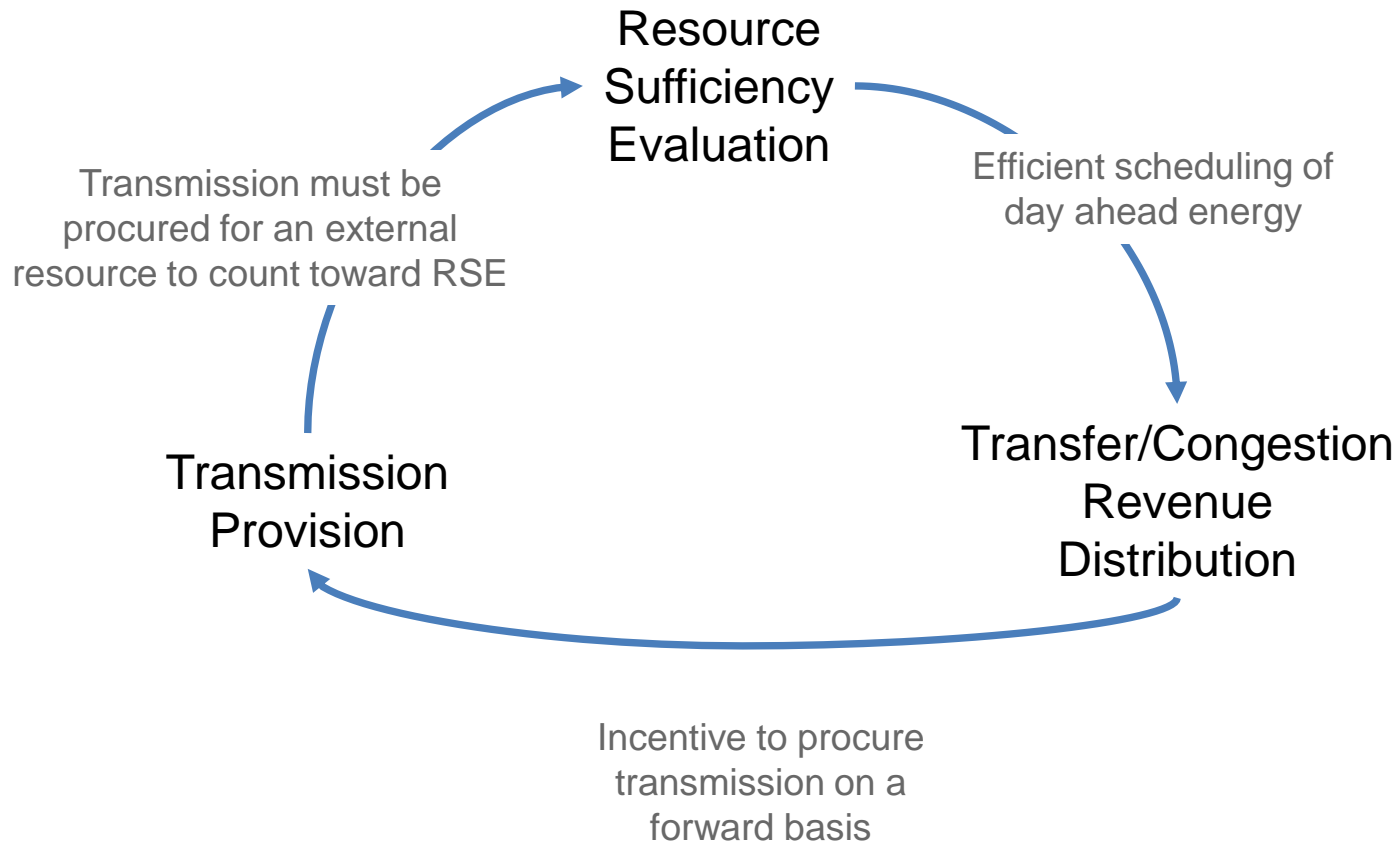
# EDAM separated into three bundles

- **Bundle 1** – Resources sufficiency, distribution of transfer and congestion revenues, and transmission provision
- **Bundle 2** – GHG accounting, inclusion of ancillary services, FNM Phase 2, and the EDAM administrative fee
- **Bundle 3** – Price formation, convergence bidding, external resource participation, market power mitigation enhancements, other issues identified in prior bundle discussions

# Overview of RA, DAME, EDAM and EIM relationship with CAISO market runs



# CAISO vision on how bundle 1 topics work together





# Participation is voluntary, but all BAAs have the same day-ahead obligation to meet resource sufficiency

- Objective is to incentivize increased participation versus mandate, but same rules apply to all
- Differences between CAISO balancing authority area (BAA) participants and EDAM BAA participants may also affect what voluntary participation means with respect to certain EDAM design elements
- What are stakeholders perspective?

# Benefits of EDAM

- Aggregate benefits study showed sufficient benefits to move forward with stakeholder initiative
- After market design completed, BAAs may review or re-assess cost/benefit analysis to determine if they join
- Will assess at the end of the stakeholder process, if we need to review aggregate benefits study

# RESOURCE SUFFICIENCY EVALUATION

## CAISO proposed principles for EDAM resource sufficiency evaluation (RSE)

1. Ensure all BAAs can individually meet their capacity, flexibility and transmission needs with equivalent quality of resources while sharing in diversity benefit
2. Incent making transmission and bid range available for optimal and efficient scheduling
3. Enable forward trading of capacity and flexibility while accurately accounting for resources
4. Apply transparent tests equally across CAISO, EDAM and EIM footprint
5. Ensure feasible day-ahead schedules while each BAA remains responsible for its reliability and resource adequacy in coordination with its load serving entities (LSEs)

# Objectives

- Prevent leaning
- Reliability of day-ahead awards for EDAM transfers of energy and capacity
- Sharing in diversity benefits

# The primary purpose of the resource sufficiency evaluation is to prevent leaning

- BAAs should not be able to lean on the capacity, flexibility and transmission of other BAAs to meet their own load serving obligations
- As an example:
  - If a BAA has demand of 10,000 MW and supply of 8,000 MW, expecting EDAM to cover the 2,000 MW shortfall is leaning
  - BAA should not be able to procure additional energy or capacity beyond the offered 8,000 MW supply
  - BAA should bilaterally contract prior to start of the market for 2,000 MW short term supply, either as capacity or imbalance reserves, to transfer the bid range obligation from the selling BAA

# Reliability of day-ahead awards

- EDAM energy transfers out have same priority as serving internal load
- EDAM imbalance reserve/reliability capacity transfers have same priority as serving internal load
- Day-ahead awards between EDAM BAAs are not recallable

## Resource sufficiency evaluation - diversity benefit

- Imbalance reserves requirement calculated for each BAA independently as well as entire EDAM footprint
- Diversity benefit is the difference between the EDAM footprint requirement and sum of individual BAA requirements
- Distribute diversity benefits pro-rata to each BAA
- Diversity benefit cannot exceed the EDAM transfer limits
- Deliverability of imbalance reserves and reliability capacity ensures diversity benefit can be realized



## While load serving entities contract for supply, resource sufficiency is determined at the BAA level

- LSEs contracted supply is used to pass the resources sufficiency evaluation
- But, EDAM transfers occur between BAAs and not between LSEs
- Each BAA will need to develop its own rules if it wants to evaluate LSEs performance

# Resource sufficiency evaluation - trading capacity and flexibility obligations

- LSEs can contract with resources in other EDAM BAAs. This results in an obligation at the BAA level
- Trading “bid range” transfers BAAs sufficiency obligation in the resource sufficiency evaluation
  - Increases capacity requirement of source BAA and reduces capacity requirement of sink BAA
  - Increases imbalance reserve requirement (up or down) of source BAA and reduces requirement of sink BAA

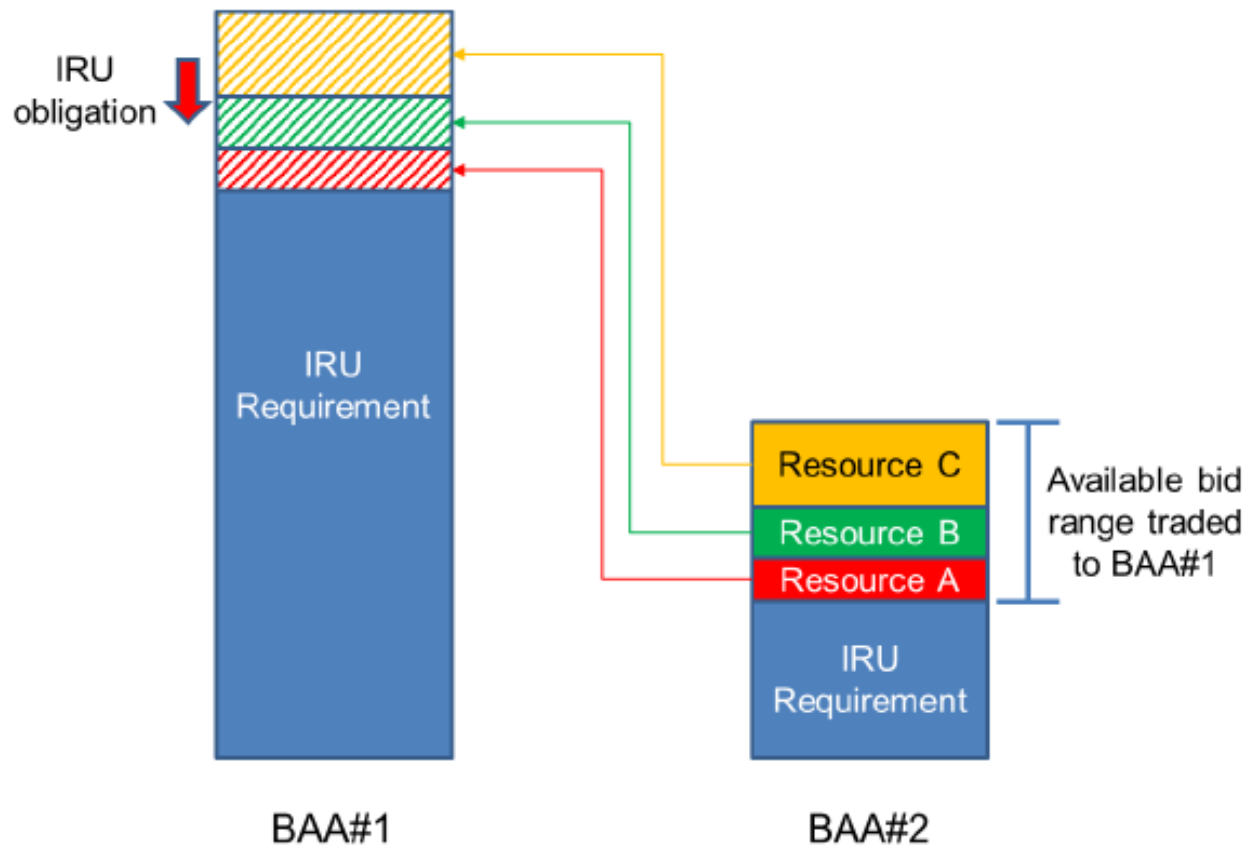
# Resource sufficiency evaluation - trading capacity and flexibility obligations

- Example for imbalance reserves up:

	BAA#1	BAA#2
BAA Imbalance Reserve Up Requirement (MW)	1000	150
BAA#1 Procures IRU Resource A		40
BAA#1 Procures IRU Resource B		50
BAA#1 Procures IRU Resource C		80
		170
BAA Imbalance Reserve Up Obligation (MW)	830	320

- Trade obligations for source/sink BAAs pay transmission rates pursuant to their relevant OATT
  - Compensates source BAA for incremental use of transmission

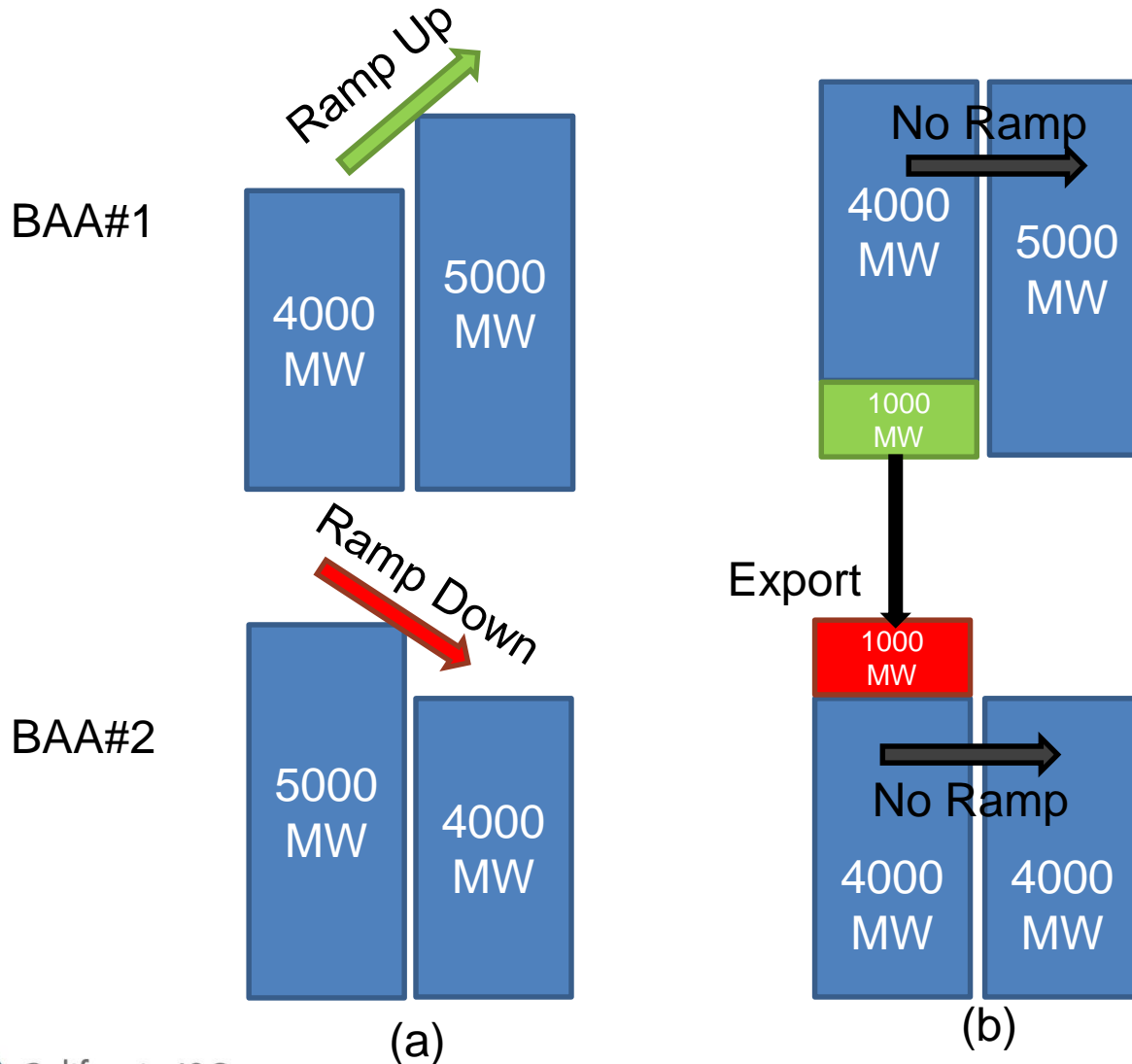
# Example: Transferring imbalance reserve obligations



# Others benefits must be realized bilaterally because of transmission that must be procured

- Additional diversity: ramping, non-coincident peak across larger geographic footprint
  - EDAM transfer capability needed
- Example
  - BAA #1 net load moving from 4,000 MW to 5,000 MW
  - BAA #2 net load moving from 5,000 MW to 4,000 MW
  - There is zero ramp required collectively
  - Many options for obligation trade
    - BAA#1 exports in first hour 1,000 MW
    - BAA#2 exports in second hour 1,000 MW
    - BAA#1 exports 500 MW in first hour, BAA#2 exports 500 MW in second hour

# Example: Capacity transfer to reduce ramping



## Resource sufficiency evaluation - additional information on bid trading

- All obligation trades pay transmission rates from source BAA to sink BAA boundary
  - Load in sink BAA has already paid for transmission from boundary
- DA obligation trades up to 10:00 AM
- RT obligation trades up to T-75
  
- The CAISO plans to address in bid trading on CAISO RA resources beyond what is required by the RSE in more detail in a future straw proposal – stakeholder comments / proposals are welcome

# Resource sufficiency evaluation – bidding at CAISO interties

- Bids and self-schedules for imports/exports at ISO interties would not be permitted from or to EDAM BAAs
- EDAM participation would be at resource level
  - Accurate modeling of physical flows
  - Does not limit BAA from providing RA capacity to CAISO LSEs
  - RA resources translate into obligation for capacity or imbalance reserves in source BAA
  - CAISO's BAA capacity or flexible obligation is reduced

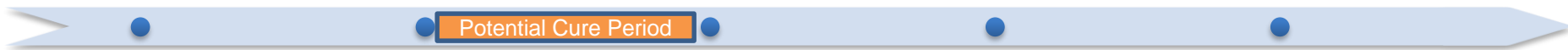


# Resource Sufficiency Evaluation - Timeline

**Day-Ahead  
Bilateral  
Trading**  
(5 – 6 am)

**EDAM Bids**  
(10 AM)

**e-Tag  
Deadline**  
(3 PM)



*Includes New  
Bid Range  
Product*

**EDAM RS  
Test**  
(9 AM)

**Market  
Results**  
(1 PM)

- Preliminary target at 5:00am to inform bilateral trading
- Final requirement for load, VER at 8:00 or 9:00
- Final test set at 10:00am, but can no longer react
- Same forecast used in the market or earlier forecast pros and cons. More accurate if done at 9:00 than 8:00, but less time to react
- Fixing between 5 a.m. and 8 a.m. would give more time to react but may be less accurate. Seeking feedback.
- Informational test at 9:30 and 9:45

# Resource sufficiency evaluation – supply and demand

- Supply to meet demand and upward flexibility
  - All internal generation
  - Trade obligations of capacity or flexibility from another EDAM BAA
  - RSE import schedule (not bids) from non-EDAM BAA
  - Firm, non-recallable imports to CAISO
- Increased demand and downward flexibility
  - Trade obligation for capacity or flexibility to another EDAM BAA
  - RSE export schedule (not bids) to non-EDAM BAA
  - Firm, non-recallable exports from CAISO

# Resource sufficiency evaluation– not considered

- Virtual supply
- Virtual demand
- CAISO spot recallable imports\*
- CAISO spot recallable exports\*

\* Propose similar rules in EIM for imports/exports for RT RSE

# Resource sufficiency evaluation - passing thresholds

- Bid-in demand
- Bid-in supply with ramp capability to meet 24 hour net demand variation
- 100% forecasted ancillary services
- Reliability capacity up/down (P50 net load forecast)
- Imbalance reserve up/down (P95 net load forecast) less diversity benefit

# Resource sufficiency evaluation - tests

- Hourly capacity test
- Cumulative ramp test

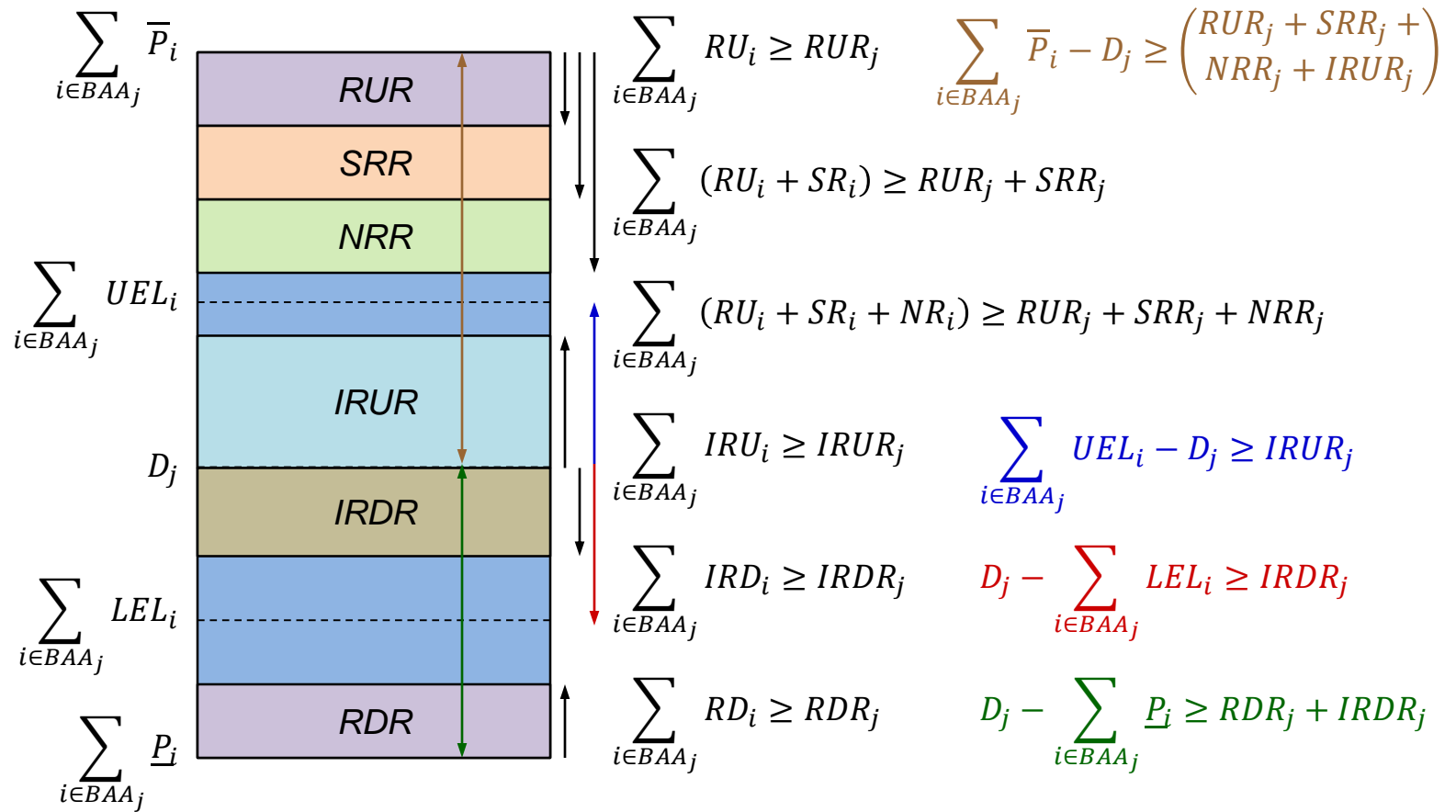
# Objective

- Present a proposal for the RSE in EDAM to facilitate the development of ideas toward formalizing an ISO position
- Guiding principles
  - Simple
  - Comprehensive
  - Transparent
  - Just and reasonable
  - Easy to implement

# Purpose of the resource sufficiency evaluation

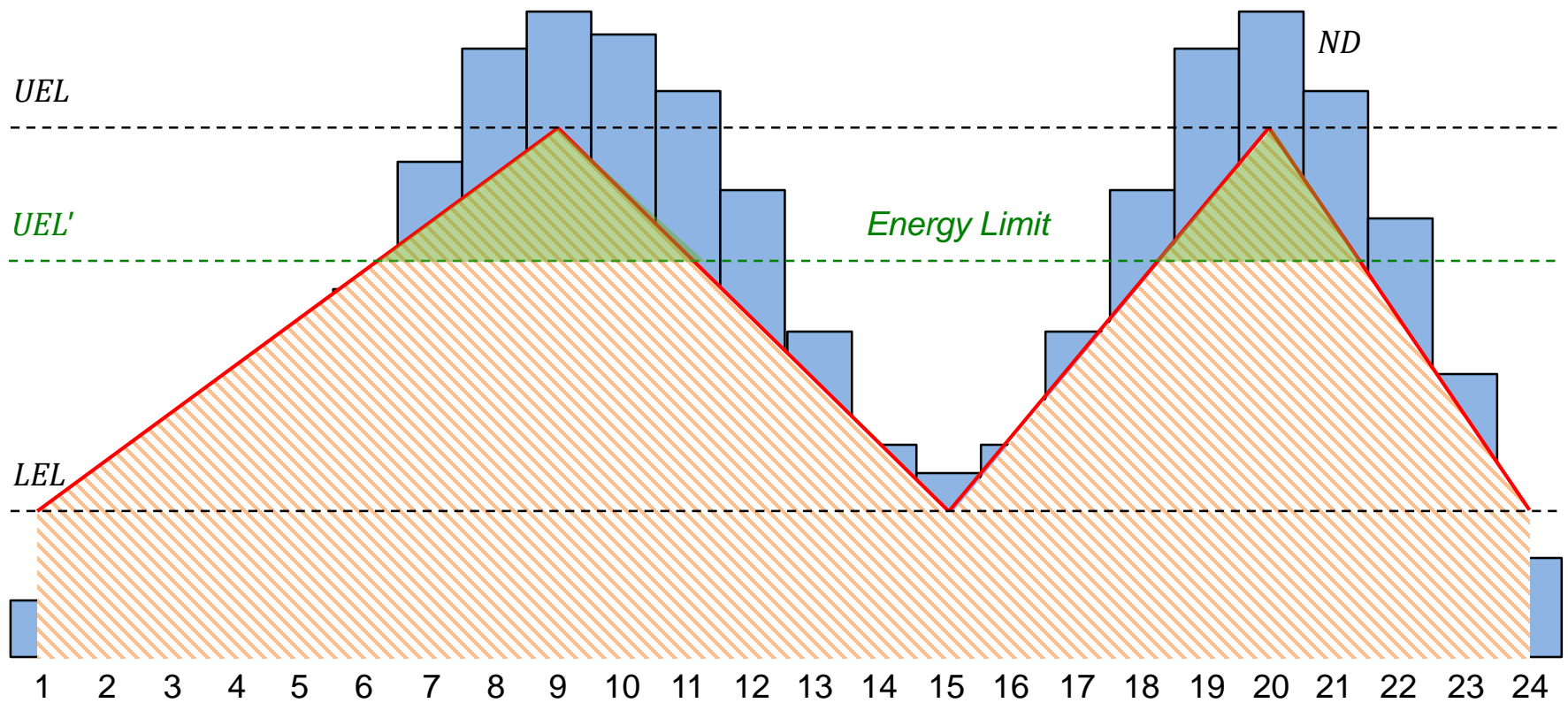
- Ensure that each EDAM BAA submits physical schedules and bids with sufficient capacity and ramp capability to meet all its requirements
  - Hourly ancillary services requirements
  - Hourly demand forecast and uncertainty requirements
  - Cumulative net demand forecast and uncertainty requirements variation across consecutive hours
- BAA requirements adjusted by declared bilateral energy/capacity transfers with bucket-1 transmission
- Uncertainty requirements reduced by pro-rata allocation of diversity benefit
- **Daily energy limits apply to energy-limited resources**

# Hourly capacity test





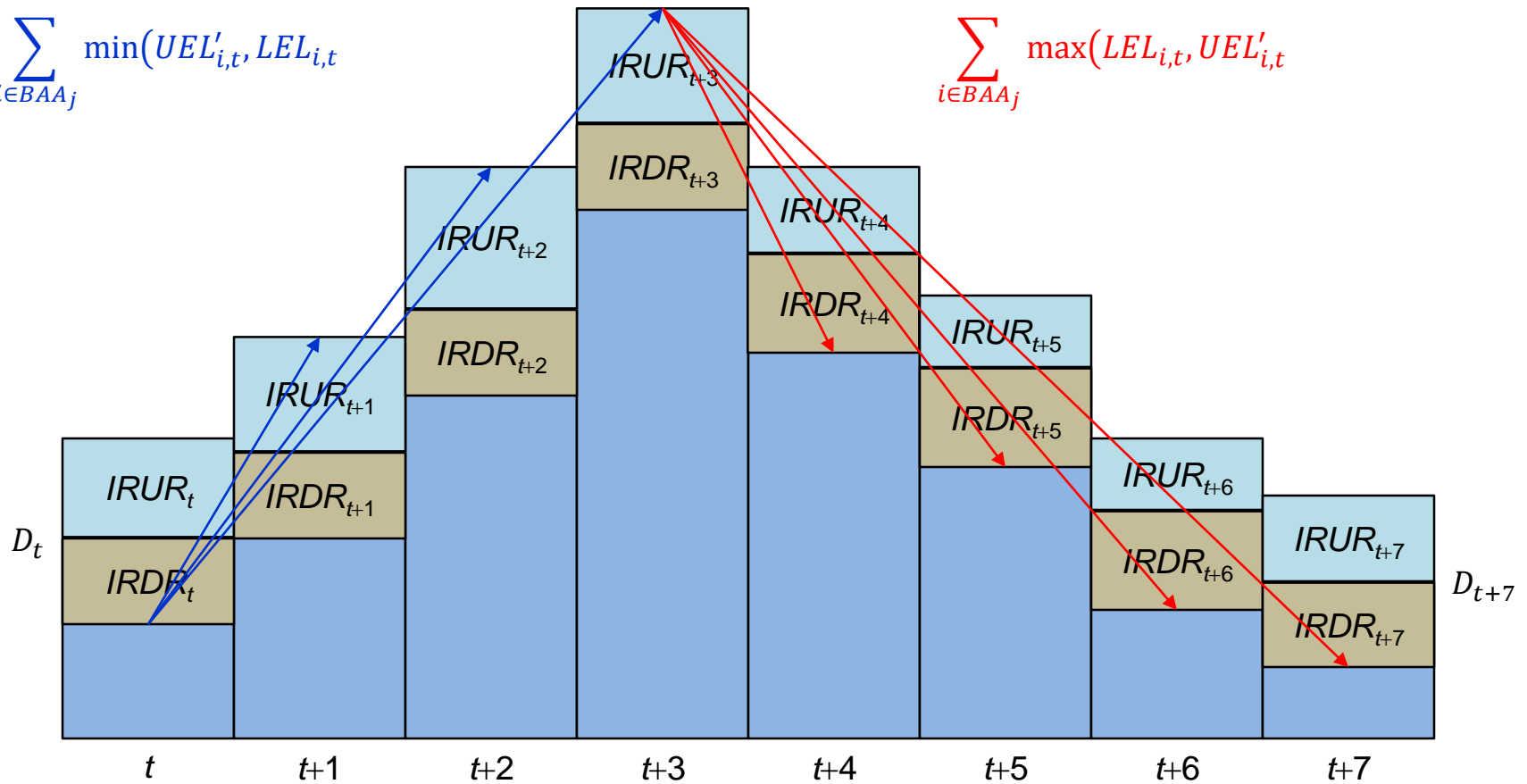
# Daily energy limit



# Cumulative ramp capability test

$$\sum_{i \in BAA_j} \min(UEL'_{i,t}, LEL_{i,t})$$

$$\sum_{i \in BAA_j} \max(LEL_{i,t}, UEL'_{i,t})$$



# Resource sufficiency test failure consequence

- Failing the up/down capacity test for an hour would fail the up/down ramp capability test for that hour
- Failing the up/down ramp capability test for an hour
  - Net of all Energy+IRU/Energy-IRD transfers (exports minus imports) is limited from below/above in that hour to the net of declared Energy+IRU/Energy-IRD transfers on bucket-1 transmission
  - Net of up/down AS transfers (exports minus imports) is limited from below/above in that hour to the net of declared up/down AS transfers on bucket-1 transmission

## Resource sufficiency test failure consequence – potential solutions

- Enter into obligation trades with EDAM BAAs prior to operating hour
- Manually dispatch/exceptionally dispatch internal supply that did not offer into day-ahead market
- If a BAA fails the day-ahead RSE, may need to test for balance in real-time

# Resource sufficiency evaluation test failure – intra BAA compliance

- Test will be conducted on a BAA level
- If multiple LSEs are present in a BAA, their diversity may allow the BAA as a whole to pass while individual LSEs are deficient
  - Up to BAA to track compliance of individual LSE
  - CAISO proposes to offer sub area load aggregation points and separate resources ID's to allow BAAs to administer more granular compliance within their area

# EIM resource sufficiency evaluation

- EDAM BAA will be subject to same real-time standards as EIM only BAA
  - Will benefit from EDAM having already established feasible schedules
- Imbalance reserves cover uncertainty that may materialize between day-ahead and real-time across the EDAM footprint
- Proposal only if EDAM footprint exhausted all imbalance reserve awards in real-time, would we test individually for EIM resource sufficiency

# EIM resource sufficiency evaluation – interaction with EDAM

	EIM balancing authority area only	EDAM balancing authority area
<b>Feasibility</b>	Advises if there is unresolved congestion in base schedule	N/A because EDAM day-ahead schedules resolve congestion
<b>Balance</b>	Determines if balancing authority area is subject to over- or under-scheduling penalties	N/A because EDAM day-ahead schedules are balanced
<b>Capacity</b>	Tests for sufficient economic bids to meet 15-minute load forecast. Transfers are limited if failed.	Tests for sufficient economic bids to meet 15-minute load forecast. EIM transfers limited if failed, day-ahead schedules allowed.
<b>Flexibility</b>	Tests for sufficient ramping capability to meet 15-minute load forecast + flexible ramping product. Transfers are limited if failed.	Tests for sufficient ramping capability to meet 15-minute load forecast + flexible ramping product. EIM transfers limited if failure, day-ahead schedules allowed.

# Resource sufficiency evaluation – review process

- Market performance planning forum to review metrics
- Include RSE assessment in CAISO market performance reports



# Resource sufficiency evaluation - related topics to be addressed in revised straw proposal

- Need for replacement reserves
- Losses
- Geographic fuel adequacy
- Clear role of LSEs vs. BAA

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2:30 – 3:50	Transfer and Congestion Revenue Distribution	Don Tretheway
3:50 – 4:00	Next Steps	Kristina Osborne

- Meeting participation details for this call can be found on the initiative webpage or ISO public calendar.
- Recordings of the EDAM stakeholder calls will be available for a limited time on the initiative webpage. Please request permission from the ISO before reprinting any related transcriptions.

# TRANSMISSION PROVISION

# CAISO proposed principles for EDAM transmission design

1. Fair and open access while maximizing transmission system usage while respecting long-term scheduling rights and other contractual arrangements
2. Support efficient transmission investment while maintaining local control over transmission planning and investment decision
3. Incent transmission availability while maintaining voluntary participation
4. Maximize efficient scheduling of energy and reserves
5. Complementary to bilateral trading and provide additional transparency to improve forward resource planning

# Transmission provision - internal BAA transmission limits

- Determined and offered at discretion of EDAM BAA
  - EDAM BAA retains ability to utilize transmission in bi-lateral markets
  - May limit transmission recognizing that transmission customer can use transmission up until T-20
  - If transmission used day-ahead, scheduling priority will be honored by re-dispatching resources which can lead to real-time congestion offset
- CAISO does not limit or compensate for unused transmission rights in its day-ahead market
  - Provide perfect hedge into real-time and honor scheduling priority
  - Day-ahead schedules more accurately reflect day-ahead use of transmission system

# Transmission provision - transmission to enable EDAM transfers

- Bucket 1: Resource sufficiency evaluation transmission
- Bucket 2: Non-resource sufficiency evaluation transmission in return for transfer revenue
- Bucket 3: Non-resource sufficiency evaluation transmission from transmission provider (Usage Fee)

## Transmission provision - bucket 1 transmission

- Transmission customer has procured transmission for external resource to count towards resource sufficiency
- Sunk cost, therefore no hurdle rate or usage fee
- Eligible for transfer revenue under appropriate CAISO or BAA OATT rules

## Transmission provision - bucket 2 transmission

- Transmission customer has procured transmission willing to allow EDAM use in return for transfer revenue
- Sunk cost, therefore no hurdle rate or usage fee
- Eligible for transfer revenue under appropriate CAISO or BAA OATT rules



## Transmission provision - bucket 3 transmission

- Transmission provider makes available unsold transmission for usage fee
- Hurdle rate or usage fee in export direction
  - Set by each BAA consistent with their OATT
  - CAISOs will be based on variable portion of wheeling access charge proposed in TAC enhancements
- Eligible for transfer revenue
  - Includes the usage fee and additional price differentials

## Transmission provision - bucket 3 transmission (cont.)

- Consistent incentive for forward contracting between day-ahead market and real-time market
- Market may determine it is more economic to schedule a different external resource and incur transmission charge
  - If non-RSE transmission cost not in the market, may be lower cost to schedule a higher cost generator and not pay transmission
- Charging different transmission rate in forward market, day-ahead market and real-time market can lead to leaning on transmission by not forward contracting with the lowest cost resources, internal or external, to serve BAA load

# Transmission provision – EIM net wheeling

- The bucket 3 usage fee can be used to address net wheeling in EIM
- Consistency between day-ahead and real-time market

## Transmission provision - transfer limits (inter-BAA)

- The lower of the import/export transmission capability provided by neighboring BAA's will become the transfer limit
- Multiple entities owning transfer rights across an intertie will be modeled as an intertie scheduling constraint
  - Will be discussed further in the transfer and congestion revenue section

# Transmission provision – diversity benefit

- All transmission (buckets 1-3) will count towards the full diversity benefit
  - If a BAA has an import transfer capability that is less than its imbalance reserve up diversity benefit, this will reduce the reduction in its BAA requirement
  - If a BAA has export capability less than its imbalance reserve down diversity benefit, there will be a resulting reduction in its BAA requirement

# TRANSFER AND CONGESTION REVENUE DISTRIBUTION

# CAISO proposed principles for congestion revenue distribution

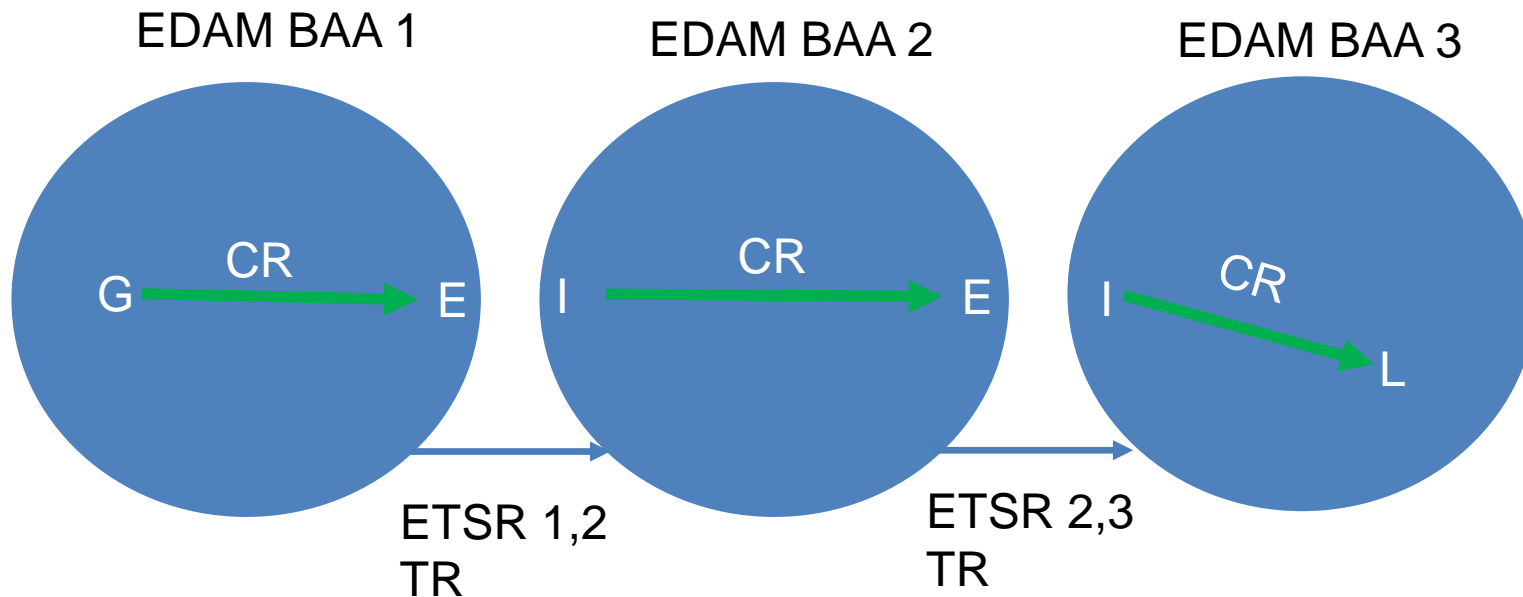
1. Allocate revenues to those long term exports and internal transmission customers who are paying for the long term investment in transmission
2. Distribute revenues equitably to support flexibility of meeting transmission customer needs with EDAM transmission buckets
3. Incent long term forward procurement of transmission for resource sufficiency evaluation
4. Respect long term traditional bilateral scheduling rights
5. Provide accurate accounting of congestion revenues between BAAs in the EDAM

# Two concepts for distributing day-ahead market over collections

- Transfer revenue (*New*)
  - Price differential between the power balance constraint of BAAs
- Congestion revenue
  - Internal BAA transmission constraints



# Load in BAA3 has contracted with generation in BAA1



- TR = Transfer Revenue
- CR = Congestion Revenue

G = Generator  
E = Export  
I = Import  
L = Load Aggregation Point

# Distribution of transfer revenues

- Transmission provider bucket 3 receives 100% to ensure full compensation at the usage fee or marginal value
- Additional transfer revenue in excess of bucket 3 is proposed to be split 50%/50% between EDAM BAAs
  - Similar to EIM today
- Need to determine if transmission customer is settled directly with the CAISO or through the EDAM BAA OATT

# Distribution of congestion revenue

- Each BAA will have its own congestion revenue balancing account
- EDAM BAA may elect to utilize the CAISO's monthly CRR allocation process
  - EDAM BAA may use and sub-allocate, or
  - EDAM BAA enables its LSEs to become CRR holders
- If EDAM BAA does not use CRR process, they will need to develop their own distribution under their OATT
- Need to ensure similar treatment for out-of-balancing authority area LSEs

# Treatment of congestion revenue from intertie scheduling constraints

- Some argue that this revenue should be shared similar to transfer revenue because EDAM transfers lead to the ITC binding
- This is complicated by imports from non-EDAM BAAs also leading to the ITC binding
- Seek stakeholder feedback if ITC should be shared similar to transfer revenue

# Transfer revenue and ITC congestion revenue examples

<http://www.caiso.com/InitiativeDocuments/Examples-TransferRevenue-ITCCongestionRevenue.xlsx>

# EDAM BAA allocation of congestion and transfer revenue under OATT

- **Straight forward allocation**
  - Transfer revenue to the transmission customer who provided ETSR
  - Congestion revenue to non-participating LSEs that self-schedule their source and sink
- **Difficult to determine allocation**
  - Participating LSE is using the market to serve their load versus their specific generation
  - Unable to map directly the source/sink pair to provide correct congestion hedge

## Other options for distribution driven by

1. When/how revenues are split between BAAs
2. If the transmission customer has a direct settlement with the CAISO or its BAA

# Approaches to ITC congestion revenue and transfer revenue

- ITC congestion revenue 100% import direction, transfer revenue 100% export direction
- ITC congestion revenue 100% import direction, transfer revenue 50%/50%
- ITC congestion revenue 50%/50%, transfer revenue 100% export direction
- ITC congestion revenue 50%/50%, transfer revenue 50%/50%

Seek stakeholder comments on appropriate approach



# Approaches for settling with transmission customer

Transmission Customer in EDMA	Transfer Revenue w/ CAISO	Transfer Revenue w/ EESC	Congestion Revenue w/CAISO	Congestion Revenue w/ EESC
Participating	X		X	
Participating		X	X	
Participating	X			X
Participating		X		X
Non-Participating		X		X
Non-Participating	X			X
Non-Participating		X	X	
Non-Participating	X		X	

Seek stakeholder comments on the relationship between the CAISO and participating and non-participating transmission customers

# NEXT STEPS

# Next steps

Date:	Activity:
July 20, 2020	Straw proposal posted (bundle 1)
July 27-29, 2020	Stakeholder calls
September 10, 2020	Comments due
Mid- to late October*	Revised straw proposal posted (bundle 1)
Late October*	Stakeholder calls
Early December*	Comments due

\*Tentative until confirmed in a market notice

## **Important – Please review new process for submitting comments**

- Please submit comments using the new commenting tool that will be launching on August 10.
- Training and registration for the new commenting tool will take place on August 3. Check website calendar for participation details.
- A link to submit comments will be available on the EDAM initiative webpage by end of day Aug 10.
- For your convenience, a Word version of the comments template is available on the initiative webpage with the same questions that will be in the commenting tool template.