Resource Adequacy Enhancements Straw Proposal - Part 1
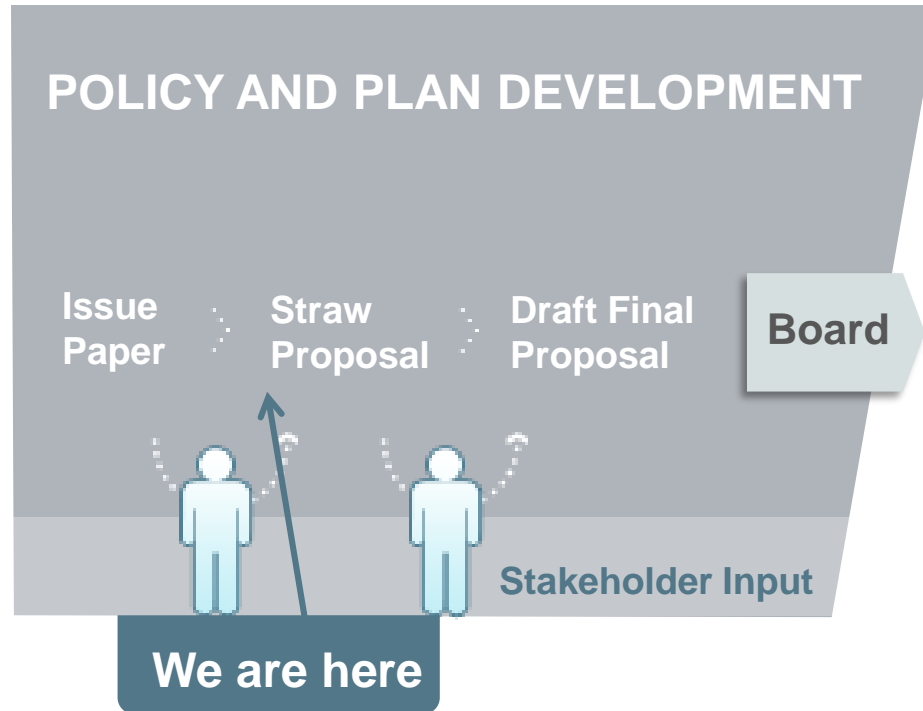
Stakeholder Call

January 23, 2019

Agenda

Time	Topic	Presenter
1:00 – 1:10PM	Welcome and introduction	Jody Cross
1:10 – 1:40PM	Rules for Import RA	Chris Devon
1:40 – 2:30PM	Outages and RAAIM	Karl Meeusen
2:30 – 3:15PM	Meeting local needs with slow demand response	Lauren Carr
3:15 – 3:55PM	Local capacity assessments with availability-limited resources	Lauren Carr
3:55 – 4:00PM	Next steps and conclusion	Jody Cross

Stakeholder Process

POLICY AND PLAN DEVELOPMENT

Issue Paper → **Straw Proposal** → **Draft Final Proposal** → **Board**

We are here

Stakeholder Input

Stakeholder Engagement Plan

Date	Milestone
Dec 20	Straw proposal (part one)
Jan 23	Stakeholder call on straw proposal (part one)
Jan 30	Stakeholder comments on straw proposal (part one) due
Feb 14	Straw proposal (part two)
Feb 21	Stakeholder meeting on straw proposal (part two)
Mar 8	Stakeholder comments on straw proposal (part two) due
Apr 8-9	Working group meeting
Apr 22	Stakeholder comments on working group meeting due
May 20	Revised straw proposal
May 28-29	Stakeholder meeting on revised straw proposal
Jun 10	Stakeholder comments on revised straw proposal due
Jul 8	Second revised straw proposal
Jul 16-17	Stakeholder meeting on second revised straw proposal
Jul 31	Stakeholder comments on second revised straw proposal due
Sep 9	Draft final proposal
Sep 24-25	Stakeholder meeting on draft final proposal
Oct-9	Stakeholder comments on draft final proposal due
Nov 13	**Present proposal to ISO Board**

Rules for Import RA

Chris Devon

Senior Infrastructure and Regulatory Policy Developer

Import RA background

- LSEs are able to meet System RA requirements with a mix of RA resources including imports

    - Import RA resources are not required to be resource specific or to indicate they represent supply from a specific balancing area

- Import RA resources are only required to be shown and make offers at a specific intertie point into the ISO system (with associated Maximum Import Capability)

- Scheduling Coordinators only required to submit energy bids for import RA in day-ahead

    - Import RA can be bid at any price below offer cap and do not have further obligation to bid in real-time if not scheduled in day-ahead IFM or RUC

ISO believes the current import RA provisions need to be revisited

- Stakeholders have expressed concerns about import RA rules

- Current import provisions impact the integrity of the RA program and can compromise system reliability

- RA rules potentially allow for speculative supply to qualify as RA

- ISO exploring options to ensure more comparable treatment between import RA and internal resources

- Reassess the requirements and rules for specifying the sources behind RA import showings

  - This is important as the ISO considers extending the day-ahead market to EIM entities

  - Need to ensure that resources outside of ISO BA are not double counted in meeting EIM resource sufficiency requirements and RA requirements

- Price caps for import bid submissions are out of scope for this initiative

Modifications to import RA provisions being considered

- Specification of import RA resource sources

- Real time bidding requirement for all MWs of import RA shown – not just MWs awarded in IFM and RUC

- Explore expansion of import RA must offer obligations to 24 by 7 to provide better comparability with internal RA resource provisions

- Require 15 minute bidding/scheduling for import RA

California ISO

Specification of import RA resource source

- Current import RA provisions allow for Non-Resource Specific Resources to qualify to provide System RA

- RA import resources are not required to be resource specific or to provide any greater certainty they represent supply from a specific Balancing Area
  - Only required to be shown as sourced on a specific intertie into the ISO system with associated MIC

- ISO is increasingly concerned about potential for Non-Resource Specific RA import resources to be double counted for reliability
  - May occur if a resource is shown to ISO as import RA while also relied upon by other region or BA to meet capacity or energy needs

California ISO

Specification of import RA resource source

- ISO believes "resource-specific" designations are appropriate as a qualification to provide RA imports

  - With the contemplated extension of the day-ahead market to EIM entities, ISO believes at minimum – RA import resources must be required to specify source Balancing Area

- This option is a more conservative approach and provides greatest certainty that RA imports are not double counted and will be available to ISO when needed

- ISO is open to considering other options regarding specification of import resource sources, but the principle of "source linkage" is essential moving forward

Bidding rules and must offer obligations for import RA

- Currently, RA imports have day-ahead must offer obligations, but only have real-time must offer obligations if they receive a day-ahead award

- ISO is exploring extending the must offer obligations for all RA imports into real-time for all shown RA capacity
  - Not only for resources/MWs scheduled in IFM or RUC

- Intended to provide improved reliability through real-time by requiring full set of import RA bids in real-time

- May also help mitigate potential for RA showings that include speculative supply

Expanding import RA must offer obligations to 24 by 7

- ISO is also considering aligning import RA MOO requirements with internal resources to 24 hours, 7 days a week

- Change would ensure resource availability during all hours of the day to provide reliability for system needs that can occur at any time – not just during peak periods

- Similar to other potential import RA rule modifications, this would also provide more comparable treatment for import RA and internal RA resources

15 minute bidding and scheduling requirements for import RA

- ISO is exploring modifications to the current provisions allowing for hourly block scheduling of import RA

- Requiring all import RA resources to provide 15-minute bids provides greater reliability and better comparability between import RA and internal RA resources

- Help reduce oversupply related issues

- Would not impact non-RA import energy – could still be bid and scheduled in hourly blocks

California ISO

RA Availability Incentive Mechanism Enhancements

Karl Meeusen, Ph.D.

Senior Advisor – Infrastructure and Regulatory Policy

CAISO PUBLIC

The overall objective of this initiative is to ensure the ISO has sufficient capacity – system, local, and flexible – to meet its operational needs

- Straw proposal focuses on RAAIM modifications and application to various outages and resource types

- ISO is exploring moving RAAIM from predetermined hours to event based triggers

- ISO considering a mechanism that accounts for:
  - Availability during these events due to forced outages
  - Resource performance

- ISO is looking to resolve gaps in current planned outage approval process

The overall objective of this initiative is to ensure the ISO has sufficient capacity – system, local, and flexible – to meet its operational needs

- Modifications to RAAIM are critically connected to other elements within the scope

  - Must work in concert with changes to

    - NQC value counting rules,

    - Outage reporting, and

    - MOOs

- The ISO will work with stakeholders to strike the correct balance between them

California ISO

The ISO utilizes two types of outages: Planned and Forced

- Resources taking planned outages work with the ISO to schedule the outage and ensure that sufficient capacity remains available
  - ISO has the authority to deny the outage if a planned outage results in a RA shortage that impairs reliability
  - If the resource SC decides to take a denied planned outage, then the ISO will treat the resource as on forced outage
- Resources on forced outage may be subject to the RAAIM if the resource does not provide substitute capacity
  - Depending on the cause of the outage

California ISO

The ISO is contemplating new provisions for Planned and Forced outages

- Rules should incentivize submission of planned outages over reliance on forced outages

  - The ISO can more effectively manage outages with longer lead time

- Provide resource SCs options for finding alternative resources while ensuring the ISO has sufficient capacity available

California ISO

For planned outages, the ISO is contemplating two bookend solutions

Option 1 – ISO procures capacity for any days on which the resource is on planned outage using the standing CSP bids, or cancel the outage

- Allows resource SC to determine if the outage is cost effective at that time or if they should defer to later date

- Resource would not be subject to additional availability/performance assessment charges

- No impact on the resource's NQC as they make the election more than 8 days prior to the outage

- Market requirements would then be the responsibility of the replacing resource

- Elections made after 8 days prior would be treated as a forced outage

  – ISO is considering if potential NQC reductions should be imposed

California ISO

For planned outages, the ISO is contemplating two bookend solutions

Option 2 – Prohibit resources taking planned outages during a month from providing RA capacity

- ISO would reject any supply plans in excess of the resource's remaining available capacity
  - ISO would note this as a discrepancy and notify impacted SCs
  - Discrepancy can be resolved by resource SC cancelling the outage or by LSE showing alternative capacity
  - If discrepancy is not resolved, ISO will defer to supply plan
- This option may create incentives to not provide planned outages
  - Resources willing to accept a short forced outage to provide RA

The ISO is proposing to continue utilizing an availability incentive mechanism for forced outages

- The ISO is considering new NQC counting rules
  - Net qualifying capacity values could account for the probability of forced outages ahead of time
  - Eliminates the need for complicated replacement capacity rules
- Adjustments to NQC focus on future, not capacity that has already been sold as RA
- Current RAAIM only looks at availability, not performance
  - ISO will look to incorporate a performance aspect into a new availability/performance assessment
  - A revised RAAIM would only apply to forced outages

The ISO is exploring event based triggers for availability and performance assessments

- ISO assesses RAAIM during the AAHs
  - Assessment done regardless of system conditions
- Does not consider compliance with ISO dispatch instructions
- By contrast, ISO-NE has a tool in place called the Forward Capacity Market Pay-For-Performance (PFP)
  - Done only during scarcity events
  - Assessments are based on a resource performance
- ISO-NE does not have CPM or Flexible RA
  - These differences could result in multiple triggers applied to the availability/performance assessment

There are various exemptions from RAAIM

- Section 40.9.2 of the ISO tariff identifies resources that are exempt from various levels of RAAIM penalties
- There are additional specific exemptions based on the nature of the resource outage in the BPM
- Exemptions have two impacts
  1. Adds to the complexity
  2. Degrades the effectiveness of the mechanism itself
- Exemptions should be limited to
  - Outages approved by the ISO or
  - Transmission induced outages, either forced or planned

California ISO

The ISO proposes to eliminate exemptions from an availability/performance assessment and the need for substitute capacity for forced outages

- ISO's ability to achieve these objectives depends on
    1. Specifying availability/performance assessment triggers that are aligned with well-defined operational needs, and
    2. Effectiveness of combined availability and performance incentives from NQC counting rules
- Because ISO is developing event based triggers, it will review all existing RAAIM exemptions
    - Current exemptions may continue if resources are subject to a similar performance obligation tied to ISO operational needs
- ISO remains open to maintaining or making targeted changes to the existing mechanism

Potential Trigger Options

System Based Trigger Options
• Exceptional Dispatch CPM – System
• System peak load and/or net load (Annual / Monthly)
• System emergency
• Insufficient reserves/scarcity condition
• Flex Alert
• Load forecasted to exceed a given percent of forecasted monthly peak (i.e., over 95 percent of forecast monthly peak)
• Restricted Maintenance
Local Based Triggers
• Exceptional Dispatch CPM – Local
• Restricted Maintenance
Flexibility Based Triggers
• Maximum monthly net load ramps
• Monthly Maximum deviation between Day-Ahead and Real-Time forecasts

Any proposed enhancements should simplify availability/performance assessment

- Utilizing all of these elements is complex and unnecessary

- ISO seeks stakeholder feedback regarding

  - Which these potential triggers are needed and

  - Which ones may complicate an availability/performance assessment

California ISO

RAAIM does not consider how well resources perform in response to ISO dispatch instructions

- Simply assesses whether or not an RA resource

  – Economic bids or self-schedules

  – Day-ahead and real-time markets

  – During the AAHs

  – Consistent with the MOO for the given resource and RA capacity type

The ISO is contemplating an assessment based on two measures: availability and performance

- Resource 1: Bids 100 MW into the day-ahead and real-time market and responds perfectly to ISO dispatch instructions

- Resource 2: Bids 100 MW into the day-ahead and real-time market and fails to respond to ISO dispatch instructions

- RAAIM incentive for both resources is the same

- Availability/performance assessment should include resource performance in addition to fulfilling the MOO

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The ISO is contemplating an assessment based on two measures: availability and performance

- Availability assessment would be a measure of the resource's obligation relative to the bid capacity

    - Designed to ensure the resource is made available consistent with its MOO

- The performance aspect would be a comparison between dispatch instruction and metered output

- Assess overall performance based on the greater of the resource's obligation or bid, minus the resource's metered output

    - Ensures both the bidding and performance obligations are reflected in the assessment

The ISO is contemplating an assessment based on two measures: availability and performance

- Example:
  - a 150 MW resource
  - Shown as for 100 MW of RA capacity,
  - Submits economic bids for 90 MW,
  - Receives a 75 MW dispatch instruction,
  - Actual dispatch of 60 MW

- All of these aspects are important, and should be a part of a new availability/performance assessment

- ISO seeks stakeholder feedback on how it might incorporate these aspects into an assessment

RAAIM is developed as a self-funding mechanism

- Charges for under-performance are used to fund over-performance

- Assessment is limited to a resource's shown RA value
  - ISO contemplating allowing resources to be eligible for this incentive if they provide capacity above its shown RA value and accurately respond to ISO dispatch instructions
    - Will look at resources availability on a single day
  - Create additional incentive for resources to make capacity above its RA value available to the ISO.

- The ISO is seeking stakeholder feedback on how to do this

For purposes of any availability/performance assessment, ISO is considering assessing only real-time bidding and performance

- ISO continues to believe compliance with day-ahead bidding obligations remains important

- Assessments of both day-ahead and real-time bidding obligations have created numerous complexities in the RAAIM calculation

- ISO seeks stakeholder input on the moving to a real-time assessment only

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RAAIM assesses all capacity types – system, local, and flexible – at the same monthly capacity price

- ISO will also explore the option of seeking different pricing structures for each capacity type
  - There could be three separate capacity values, one for each type of capacity
  - Aligns with considering various event based triggers for an availability/performance assessment
  - Could result in more accurate valuation for each capacity attribute
  - Allows the ISO to receive the benefit of system capacity availability even if the resource self-schedules
- ISO seeks stakeholder input about how best to determine what the correct price for each attribute

Performance relative to a resource's RA value should be considered the minimum standard

- NQC counting rules that consider forced outages should ensure resources are available as much as possible

- May be appropriate to allocate any penalties to

  - Resources that bid above their RA value and perform well when dispatched, and
  - Load

- No longer an incentive for performance above a given minimum performance threshold less than shown RA

- The ISO seeks stakeholder feedback on these performance and availability assessment concepts

Meeting local resource adequacy needs with slow demand response

Lauren Carr
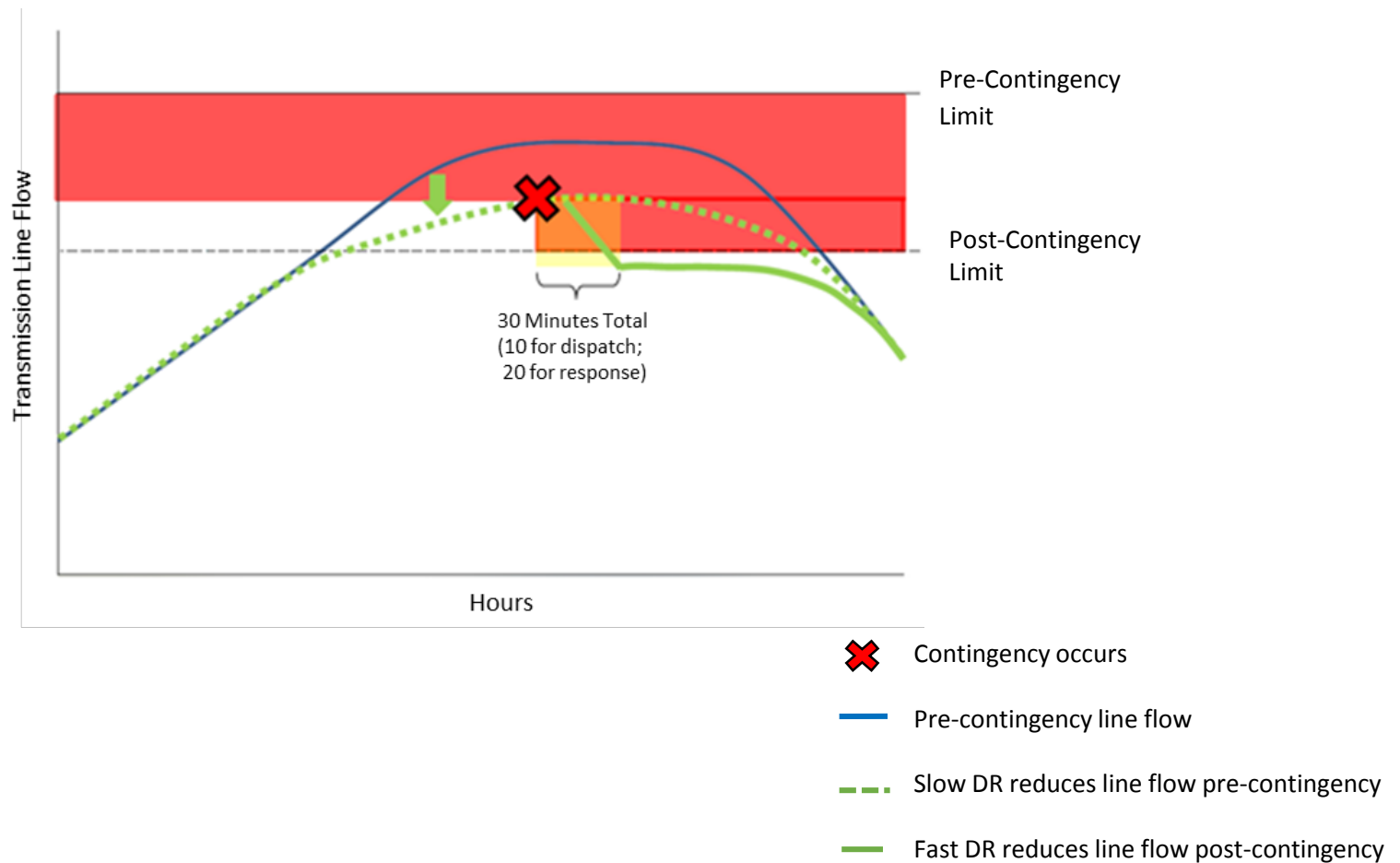
Infrastructure and Regulatory Policy Developer

Background

- Per NERC standards and ISO tariff section 40.3.1.1(1), the ISO must secure the system within 30 minutes of a contingency

- This allows roughly 10 minutes for ISO operators to assess system conditions and 20 minutes for resource dispatch and response

- This required response time impacts DR resources because many cannot respond with 20 minute notification

Slow DR is not capable of responding to ISO dispatch instructions within 20 minutes

- Slow demand response resources may still help mitigate local area reliability issues

- ISO planning studies indicate current levels of slow DR generally have sufficient availability to count for local RA

  - Excludes limited run-time duration

- Dispatching slow DR resources before a contingency occurs as a preventive measure can allow them to qualify for local RA

- Pre-contingency dispatch may result in DR resources being called upon more frequently

A combination of fast and slow resources can work together, provided the slow responding resources are dispatched appropriately

Transmission Line Flow

Pre-Contingency Limit

Post-Contingency Limit

30 Minutes Total
(10 for dispatch;
20 for response)

Hours

Contingency occurs

Pre-contingency line flow

Slow DR reduces line flow pre-contingency

Fast DR reduces line flow post-contingency

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Bidding options in EDSER 3 provide notification time slow DR requires and CME can pre-contingency dispatch

- ESDER 3 bidding options provide notification time slow DR requires:
  - Hourly block: 52.5 minute notification time

  - 15-minute block: 22.5 minute notification time

- In local areas where CME is enforced, it will pre-contingency dispatch slow DR for energy when economic over reserving corrective capacity on another resource

- ISO solution leverages the ESDER 3 bidding options, and incorporates CME functionality when available

Qualifiers for local RA eligibility

1. Resource must be able to respond to dispatches within real-time market time horizons

   – Will require transition to real-time dispatch notification in order to qualify for local RA

   – Slow DR resources can use block bidding options proposed in ESDER 3 to receive extended notice of a dispatch in real-time

2. Only slow PDR will qualify for local RA, slow RDRR will not qualify for local RA

   – Slow RDRR cannot be dispatched on a pre-contingency basis

   – Only dispatched once the ISO calls warning or emergency

* Eligibility for local RA is subject to availability requirements determined by the CAISO and CPUC

California ISO

ISO is reconsidering solution included in straw proposal part 1

- Original solution results in unit dispatch that can cause inappropriate price impacts and inefficient outcomes

- Inputs required for potential day ahead notification timeline are imprecise and use assumptions about operating conditions

  - Requires information too far in advance for conditions that may not materialize (assumes certain generator commitments, load profiles, import levels, etc.)

- Solution must leverage real time market timelines and information to ensure more efficient and effective use and dispatch of local RA eligible PDR

Solution intended to consider local capacity area load, import capability, and generation capacity to determine when to dispatch slow DR

- Slow DR MW requirement = Load – Import Capability – Generation Capacity

  - Load: day-ahead forecast of local capacity area load

  - Import capability: import capability into local capacity area

  - Generation capacity: MWs bid into day-ahead market from generation within the local capacity area

- When slow DR MW requirement > 0, slow DR would be dispatched pre-contingency

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Solution may leverage similar formulation but utilize real-time market timelines

- Real-time market will reflect value and most effectively dispatch these availability limited resources

- Will utilize most up to date grid conditions and will avoid unintended pricing impacts

Local capacity assessments with availability-limited resources

Lauren Carr

Infrastructure and Regulatory Policy Developer

Review of issue

- Current RA program does not fully consider resources' availability limitations

- Availability-limited resources have energy limitations that could affect their ability to respond to contingency events in local areas

- RA requirements are based on meeting peak capacity needs in MWs rather than energy needs (MWhs) in all hours of the day

Review of issue (cont.)

Hourly load shape demonstrating four hour minimum availability threshold
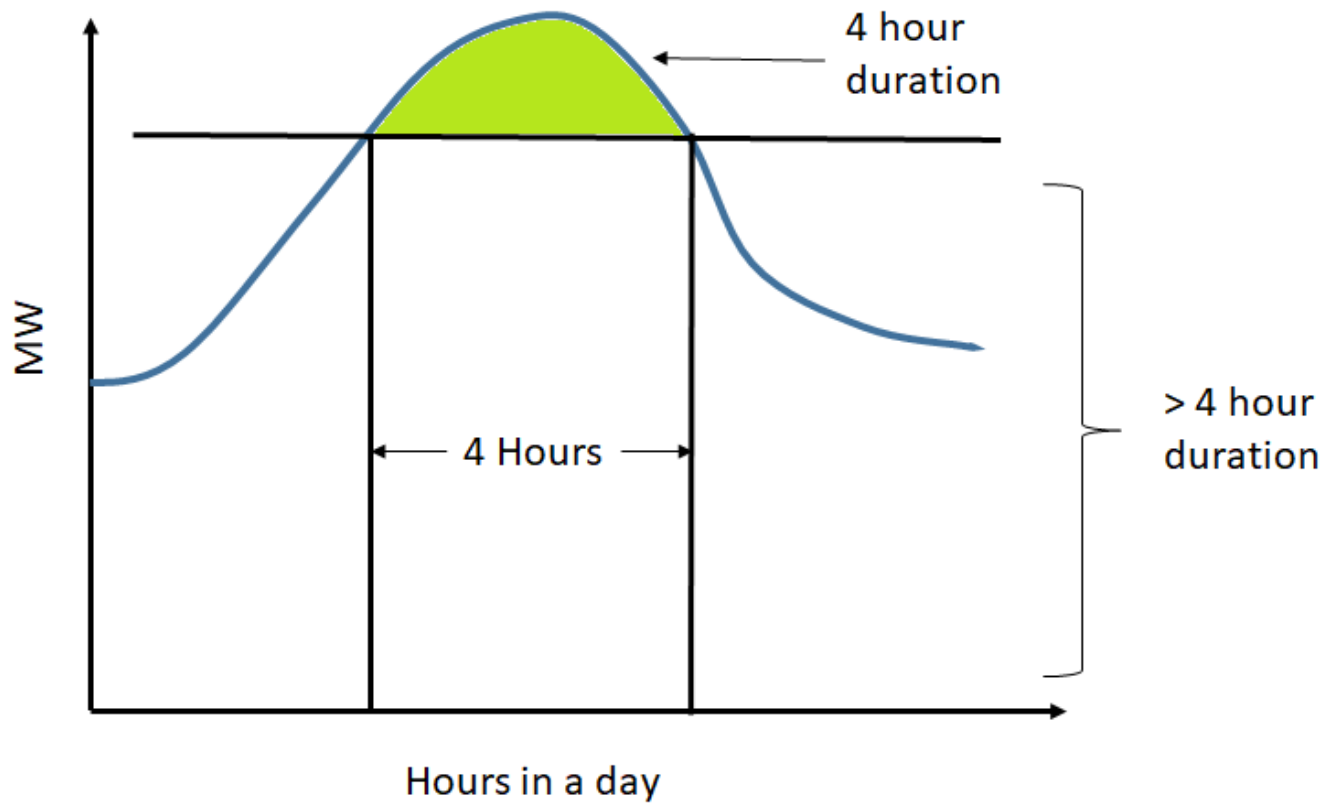
Summary of straw proposal elements

- Propose definition for availability limited resources

- Outline enhancements to local capacity technical study to inform stakeholders of availability needs within local capacity areas

  - To be incorporated under existing transmission planning stakeholder process and tariff authority

California ISO

Proposed Availability Limited Resource Definition

- Resources with significant dispatch limitations such as limited duration hours (e.g., per year, season, month, or day) or event calls (e.g., per year, season, month or consecutive days) that would limit the resources' ability to respond to a contingency event within a local capacity area

- Definition limited to resources that count towards meeting local area or sub-area resource adequacy needs

# The ISO performs transmission planning studies annually to determine local area RA procurement needs

- Local capacity technical (LCT) studies determine the minimum amount of capacity needed in each local area to ensure reliable grid operations

- Study criteria, methodology, assumptions, and results are reviewed in stakeholder process

- LCT studies look out one and five years forward every year, and ten years forward every other year

- Current study determines capacity amount in MWs, based on 1-in-10 peak load forecast

The ISO plans to maintain the existing LCT study process with certain additions that inform availability needs in local areas

- The ISO will incorporate hourly load and available resource data into the LCT study process to inform of availability needs in local areas
- After LSEs procure local RA, the ISO will model load and resource dispatch for each hour in the power flow model to confirm dispatch meets local capacity needs

- The ISO will use the existing process to allow LSEs to procure any deficiencies

Steps for providing hourly load and available resource data

1. Determine hourly net load shape in local area

MW / Hours in a day
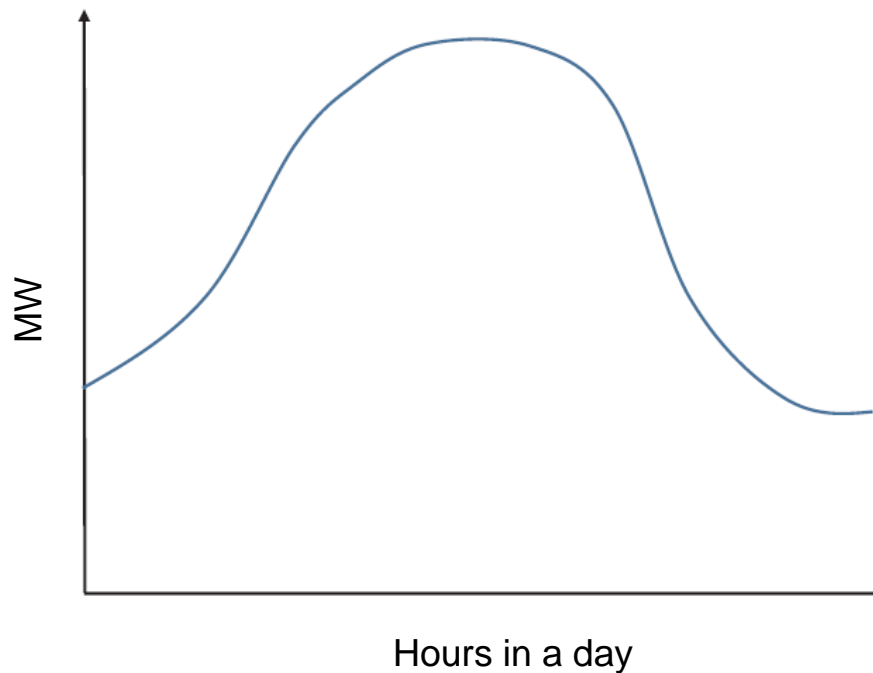
Steps for providing hourly load and available resource data (cont.)

2. Determine voltage stability/thermal area load limit to derive load that must be served by local capacity resources

MW

Voltage stability or thermal limit

Hours in a day

California ISO
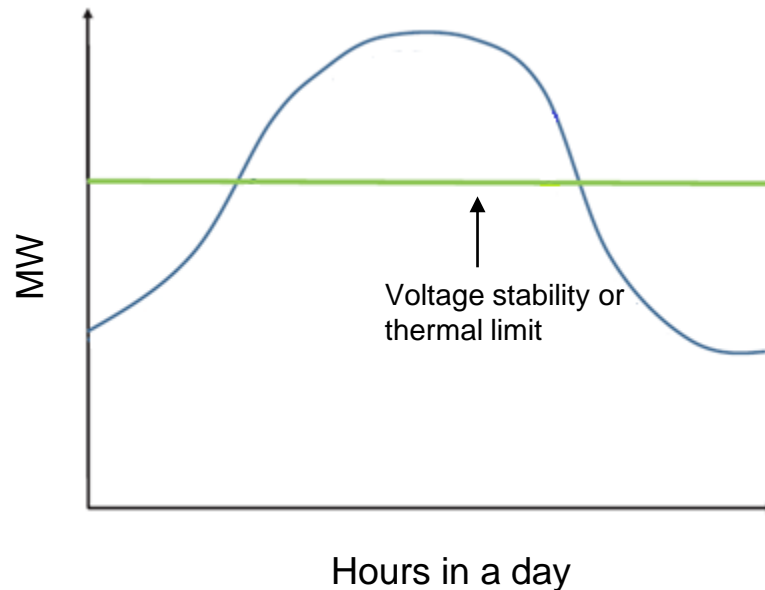
Steps for providing hourly load and available resource data (cont.)

3.   Determine available MWs of capacity from resources in local area using generation expected to be online during study period
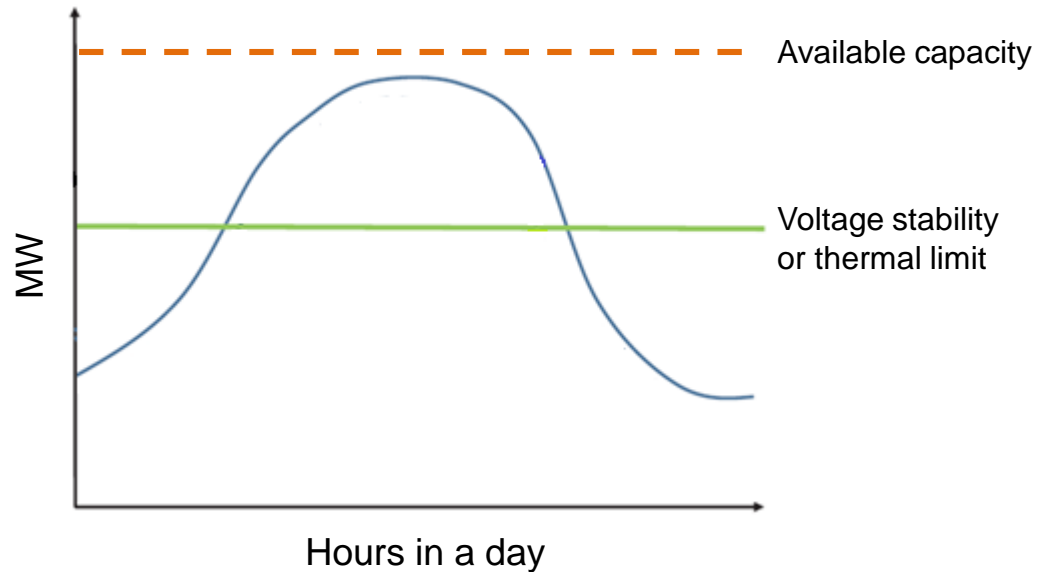
Additional data will help guide resource procurement decisions

- Informs quantity of capacity in MWs and energy in MWhs needed in local capacity area

- Informs longer term procurement and investment decisions by providing greater transparency into duration needs multiple years out

Next steps

- Stakeholder written comments due January 30, 2018

  - Submit to initiativecomments@caiso.com

  - Comments template available at http://www.caiso.com/informed/Pages/StakeholderProcesses/ResourceAdequacyEnhancements.aspx

- Straw proposal part 2 will be posted February 14, 2019