Imbalance Conformance Enhancements (ICE) Issue Paper/Straw Proposal

Stakeholder Meeting

December 8, 2017

Megan Poage

Sr. Market Design Policy Developer

Agenda

Time	Topic	Presenter
10:00 – 10:05	Welcome and Introductions	Jody Cross
10:00 – 10:10	Purpose, Schedule & EIM Categorization	Megan Poage
10:10 – 10:40	Background	Megan Poage
10:40 – 11:10	Authority to Conform in RT and DA	Megan Poage
11:10 – 11:50	Conformance Limiter Enhancements & Examples	Megan Poage
11:50 – 12:00	Next Steps	Jody Cross

Imbalance Conformance Enhancements

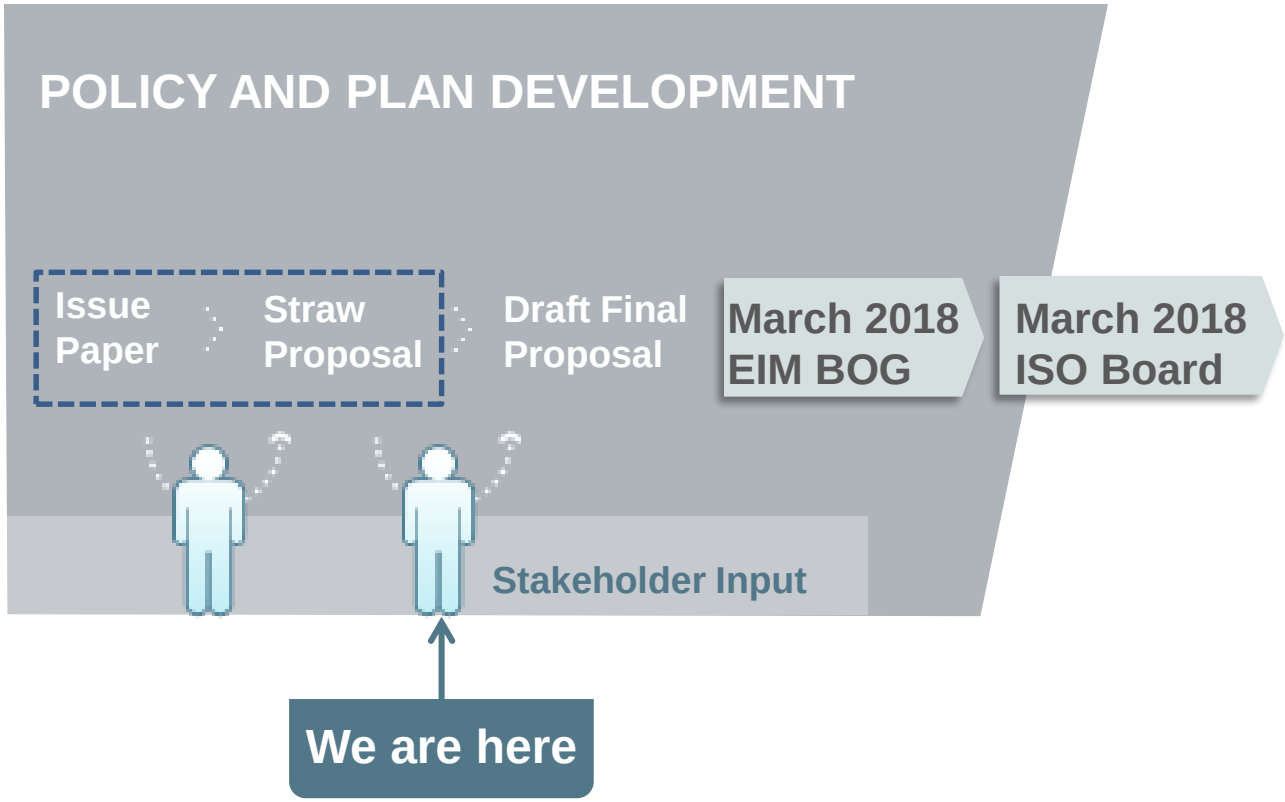
PURPOSE, SCHEDULE & EIM CATEGORIZATION

The purpose of the ICE initiative is to clarify the process of conforming and improve the limiter

- Clarify authority in the tariff for ISO and EIM grid operators to conform for imbalance in the:
  - Real-time markets
  - Day ahead markets

- Propose enhancements to the conformance limiter to ensure accurate results

ISO Policy Initiative Stakeholder Process



Plan for stakeholder engagement

Milestone	Date
Post Issue Paper/Straw Proposal	November 29, 2017
Stakeholder Conference Call	December 8, 2017
Stakeholder Written Comments Due	December 20, 2017
Post Draft Final Proposal	January 24, 2018
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EIM Governing Body Meeting	*March 8, 2018*
Board of Governors Meeting	*March 21, 2018*

EIM Categorization

- The EIM Governing Body will have advisory authority for considering and supporting policy changes to market rules resulting from this initiative.

- EIM Governing Body – E2 classification (Advisory Authority)

"To the extent a policy initiative proposes modification of generally applicable rules of the ISO's real-time market or rules that govern all ISO markets, the EIM Governing Body has an advisory and consultative role."

http://www.caiso.com/Documents/GuidanceforHandlingPolicyInitiatives-EIMGoverningBody.pdf

Imbalance Conformance Enhancements

BACKGROUND

Naming convention has evolved to “imbalance conformance”

- Previously the term “load bias” was used
  - Still used as operations jargon
  - Does not accurately describe what occurs

- The term “imbalance conformance” will be used in this initiative

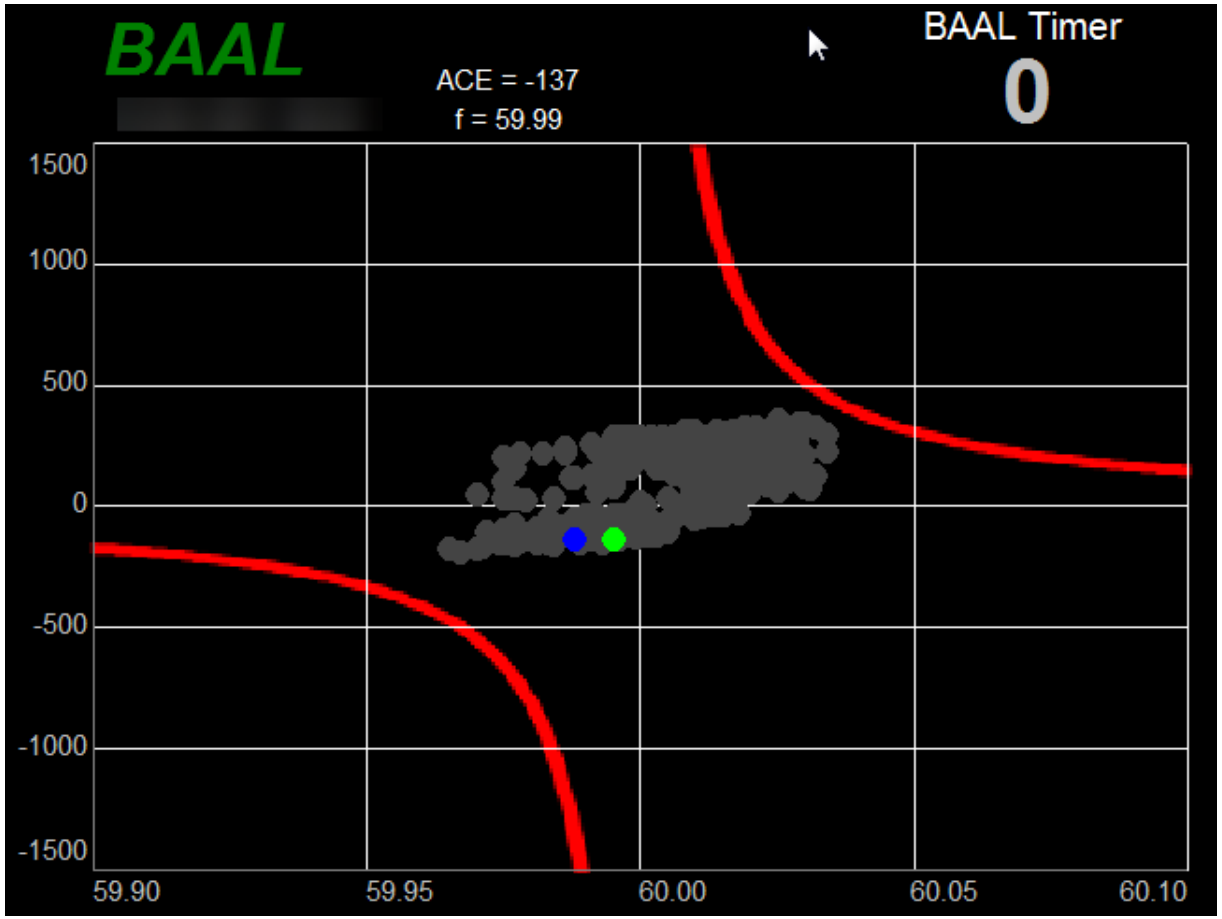
Initiative is the result of a technical bulletin published by the ISO in November 2016

- Technical bulletin, presentation, and stakeholder written comments can be referenced at:

  https://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=e1c05272-e1bd-498f-b6a0-c8a4bcca83a9

- Imbalance conforming was a topic presented to the MSC and MPPF
  - General consensus to complete a review of the conformance limiter

BAAL-001-2 requires BAs to maintain ACE and frequency



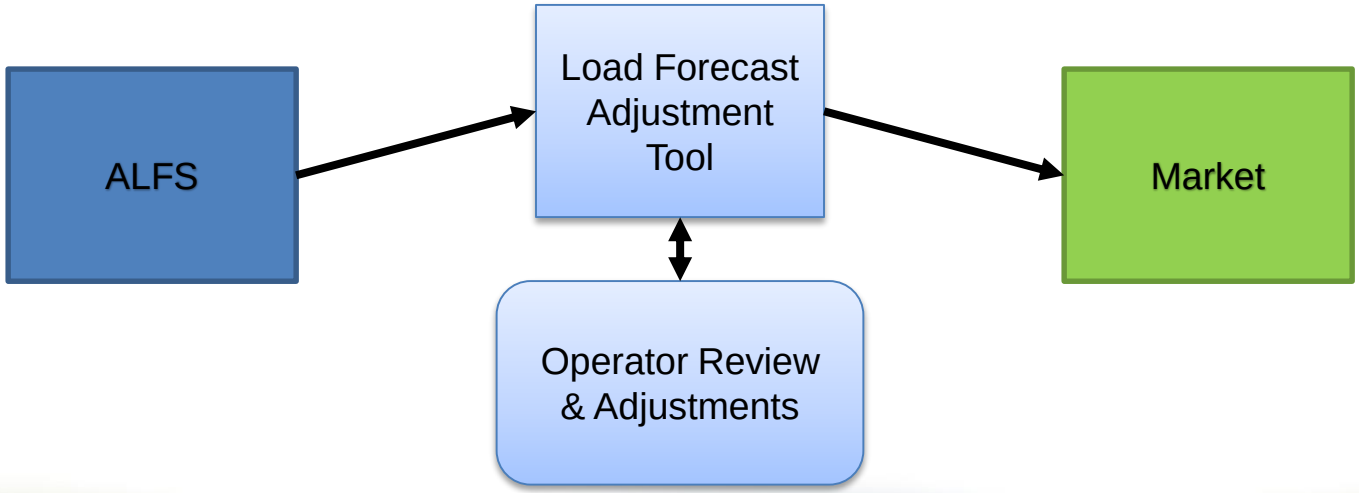
When market cannot maintain perfect balance, grid operator must make manual corrections

- Market outcome is a direct result of the market inputs
  - Forecast
  - Generator dispatches
  - Intertie schedules
  - Outages

- When deviations occur, operators will conform to ensure bulk electric grid is stable and standards requirements are met

Conformance must occur quickly and easily, therefore the load forecast tool is used

- Operator would be unable to make multiple adjustments simultaneously
- Load forecast is the tool used to allow an aggregate value to be input into the market based on current system conditions



Imbalance Conformance Enhancements

AUTHORITY TO CONFORM IN REAL-TIME AND DAY AHEAD

Tariff authority to conform for imbalance in the **real time market** can be clarified

- Tariff gives the ISO discretion to create a load forecast it deems appropriate to maintain grid reliability
- Clarify reasons for conforming for imbalance in the tariff
- Existing procedures and the reasons for conforming will not be changed with this initiative

The factors for which ISO and EIM balancing authority areas may conform for imbalance in the **real time markets** include but are not limited to:

- Inaccurate load forecast
- ACE adjustments
- VER deviations
- Generator outages
- Generator testing
- Reliability curtailments
- Weather inflections
- Pumping schedule changes
- Averages that do not reflect dramatic load increase/decrease

Tariff authority to conform for imbalance in the **day ahead market** can be clarified

- The residual unit commitment (RUC) process ensures enough capacity is online for the following trade date to meet the CAISO forecast of CAISO demand (CFDF)
- If the operator does not believe RUC will procure enough capacity, RUC net short can be used to bring additional generators online
- ISO has the authority to set the CFCD as it deems appropriate. Tariff can be clarified to provide additional details.

The factors for which the ISO conforms for imbalance in the **day ahead market** includes but is not limited to:

- Load forecast uncertainty
- Dramatic weather
- Generator outages
- Fire danger
- Reliability concerns
- Reliability Coordinator (RC) next-day analysis

Imbalance Conformance Enhancements

CONFORMANCE LIMITER

BACKGROUND, ENHANCEMENTS, AND EXAMPLES

Conformance limiter prevents prices spikes resulting from artificial infeasibilities

- Operator conformance requirements are rough, conservative adjustments
- If operator conformance requirement exceeds ramping capability for corresponding interval, market result will be infeasible
- Infeasible market result causes power balance constraint to relax and will set $1000 prices
- If scarcity condition does not actually exist, price spike is not an accurate representation of current system conditions

Example of artificial scarcity condition

- Operator inputs 300 MW requirement into the real time dispatch (RTD) due to VER deviations
- Ramping capacity is only 250 MW for corresponding 5-minute interval
- In reality, physical system only needs 200 MW
  - Operator has over estimated system needs
- Limiter will trigger and will procure 250 MW of available ramping capacity

The current logic for the imbalance limiter is minimal:

- Only uses data from the current binding interval
- Conformance and infeasibility must be in same direction (both positive, or both negative)
- Magnitude of the conformance must be greater than the infeasibility

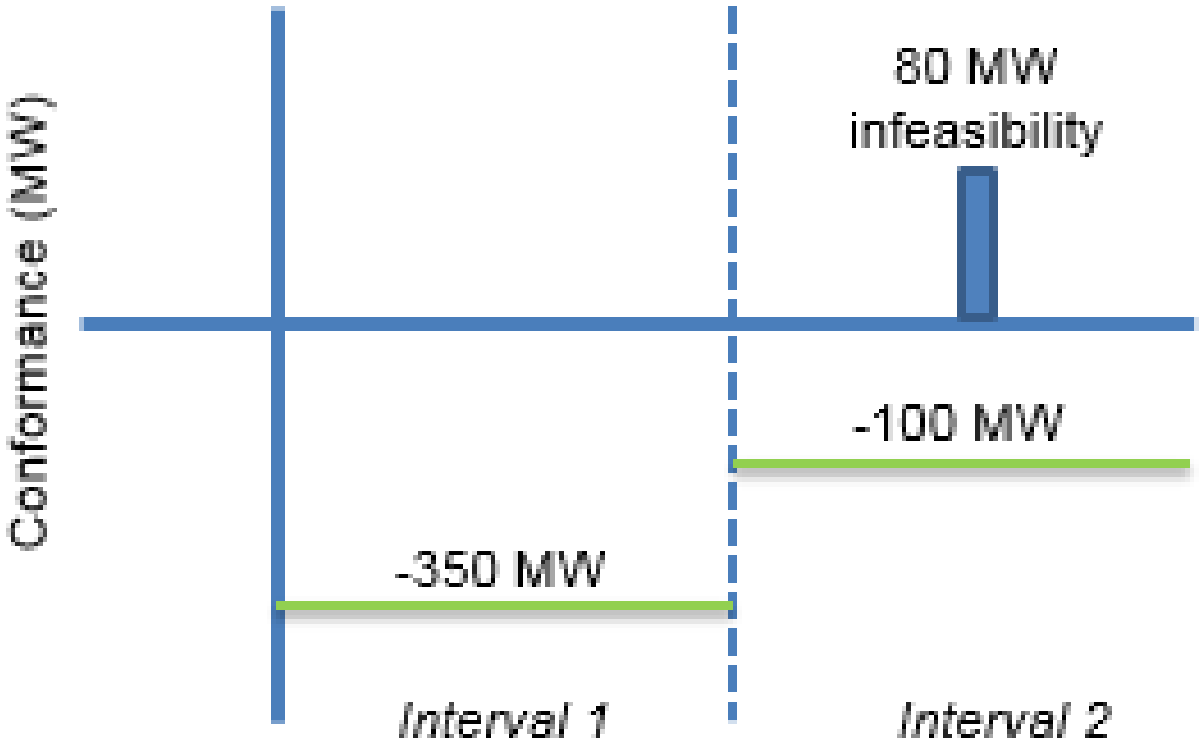
Undersupply (positive infeasibility) Logic:

$$Ci = (PBCinf - Confi)$$

If $C_i < 0$, limiter is triggered.

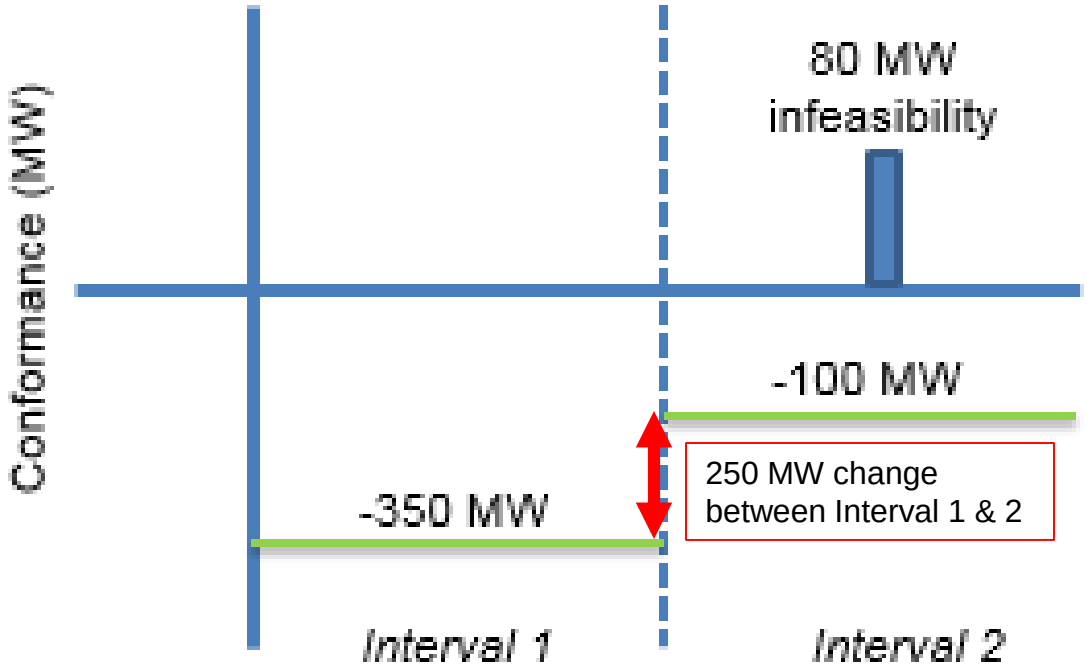
If $C_i > 0$, limiter is not triggered.

Example of current functionality (1 of 2):



- Based on current logic, the limiter does <u>not</u> apply.

Example of current functionality (2 of 2):



- Conformance requirement change between intervals is +250 MW which is greater than the 80 MW infeasibility.

The limiter should apply.

Proposed logic will ensure the limiter triggers (or does not trigger) more accurately:

- Limiter will recognize conformance changes between intervals
- Is not limited to data from only the current interval
- Conformance and infeasibility do not have to be in the same direction
- Limiter will keep a record of data from previous intervals

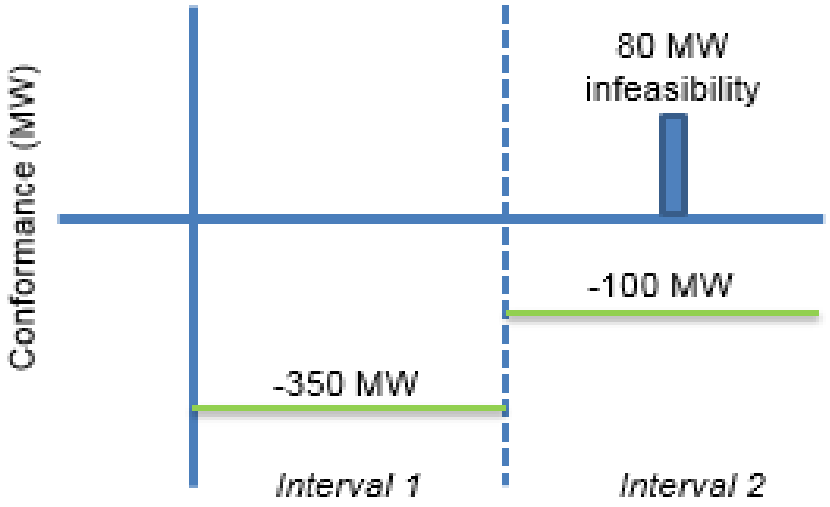
Limiter will trigger for under supply when Ci is less than 0:

$$C_i = (PBC\_inf_i - PBC\_inf_{i-1}) - (Conf_i - Conf_{i-1}) + \max(0, C_{i-1})$$

If $C_i < 0$, limiter is triggered.

If $C_i > 0$, limiter is not triggered.

Example of proposed functionality:

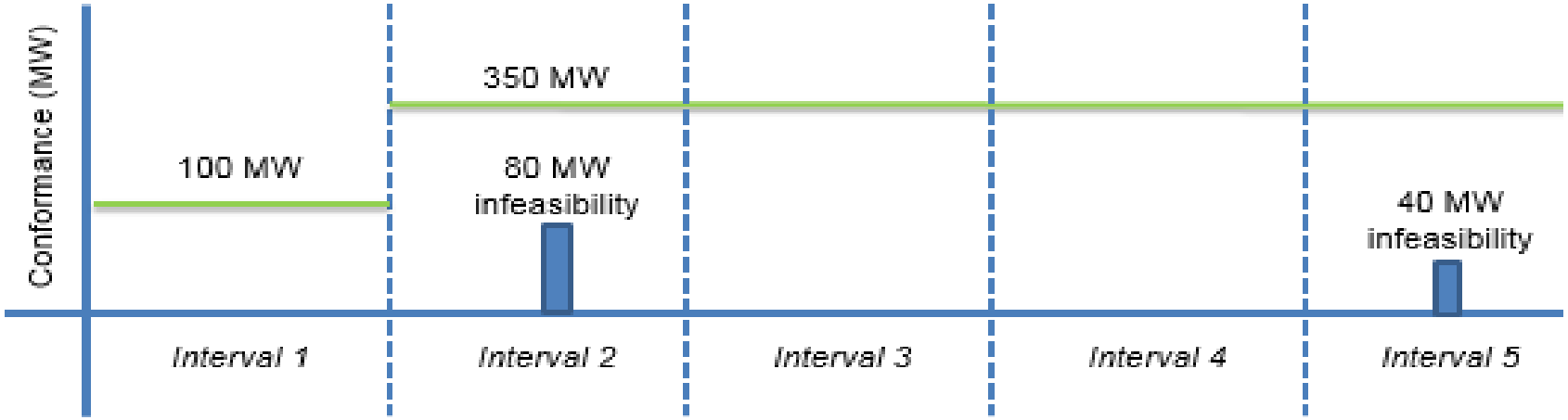


$$C_i = (PBC\_inf_i - PBC\_inf_{i-1}) - (Conf_i - Conf_{i-1}) + \max(0, C_{i-1})$$

$$C_1 = (80 - 0) - (-100 - -350) + \max(0,0) = -170$$

$C_1 = -170 < 0$? Yes, therefore the limiter applies.

Example of proposed functionality, multiple intervals:



$$C_i = (PBC\_inf_i - PBC\_inf_{i-1}) - (Conf_i - Conf_{i-1}) + \max(0, C_{i-1})$$

$C_1 = (80 - 0) - (350 - 100) + \max(0,0) = -170$

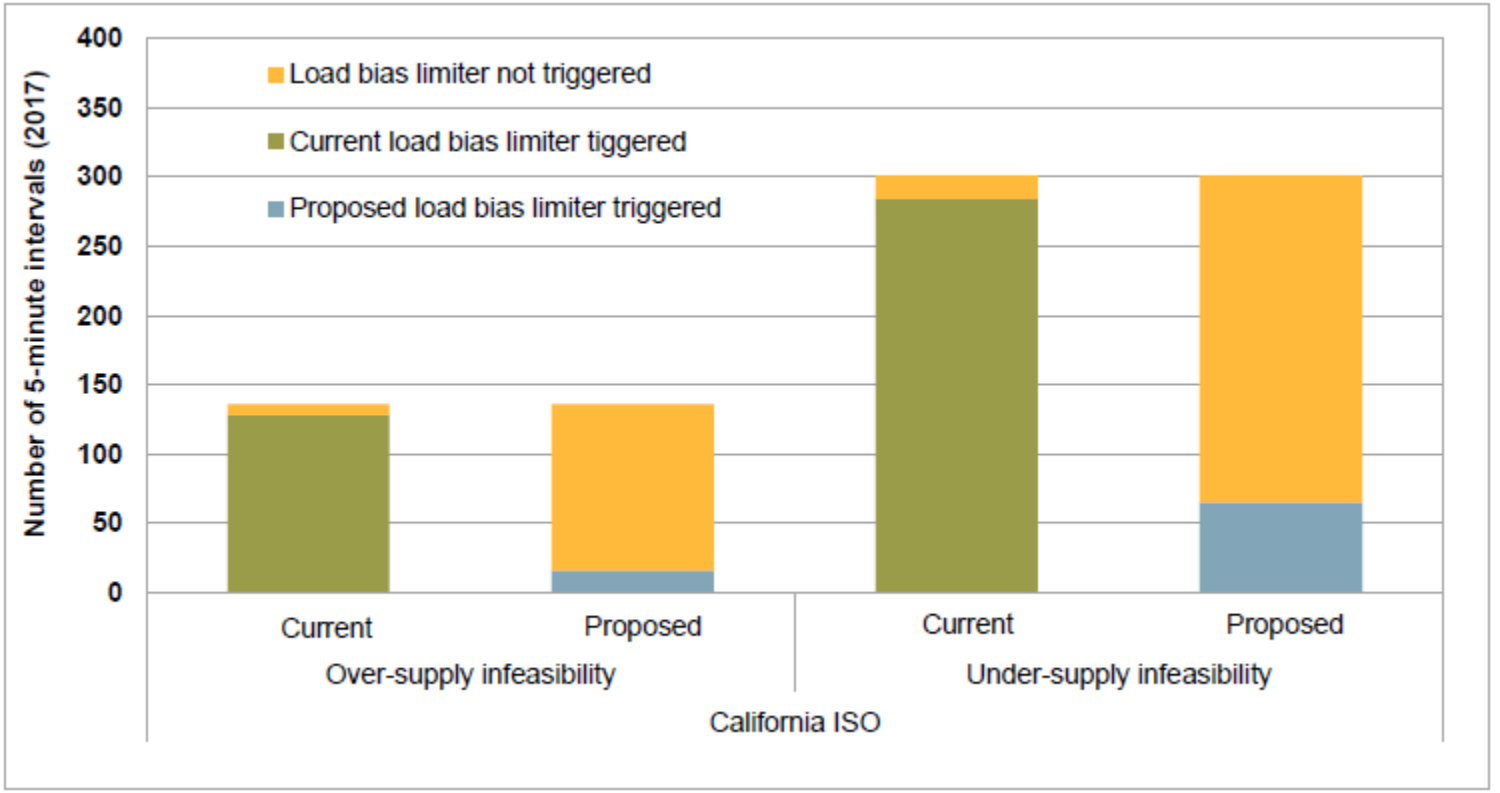
$C_1 = -170 < 0$? Yes, therefore the limiter applies.

$C_4 = (40 - 0) - (350 - 350) + \max(0,0) = 40$

$C_4 = 40 < 0$? No, therefore the limiter does not apply.

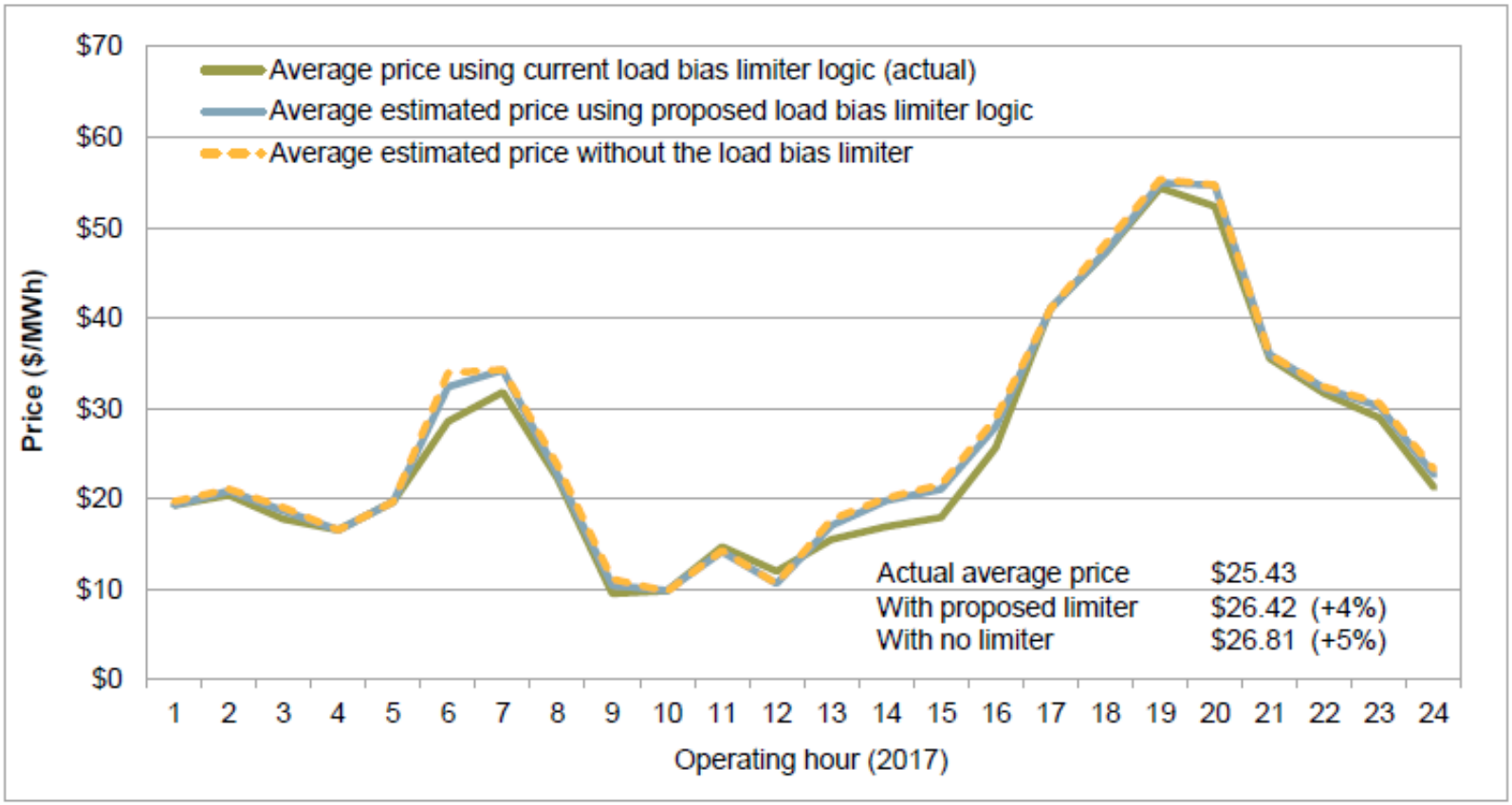
Impact of enhanced logic based on 2017 RTD market

- Number of infeasibilities resolved by the limiter is reduced



Source: Market Performance and Planning Forum, July 2017

Impact of enhanced logic based on 2017 RTD market (PG&E LAP)



Source: Market Performance and Planning Forum, July 2017

QUESTIONS?

Imbalance Conformance Enhancements

NEXT STEPS

ISO requests written comments be submitted by December 20, 2017

- Stakeholders should submit written comments by December 20 to InitiativeComments@caiso.com.

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