EIM Greenhouse Gas Enhancement Revised Draft Final Proposal
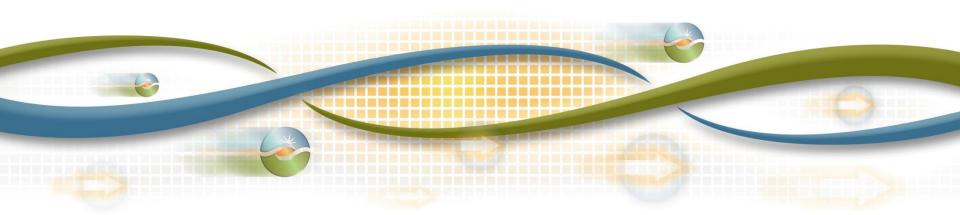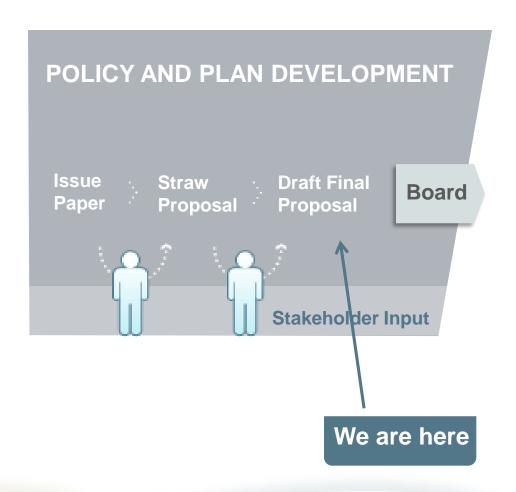
Stakeholder Call

June 22, 2017

Agenda

Time	Topic	Presenter
9:00 – 9:10	Introduction	Kristina Osborne
9:10 – 10:50	Proposed GHG Market Design Changes	Don Tretheway
10:50 – 11:00	Next Steps	Kristina Osborne

California ISO

ISO Policy Initiative Stakeholder Process

POLICY AND PLAN DEVELOPMENT

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

Stakeholder Input

We are here

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Identified changes that can improve solution time of second pass

- ## Draft final proposal
  - Add a resource specific constraint that GHG attribution must be above GHG allocation base determined in the first pass

- ## Revised draft final proposal
  - Limit the GHG bid quantity to the upper economic limit minus the GHG allocation base determined in the first pass
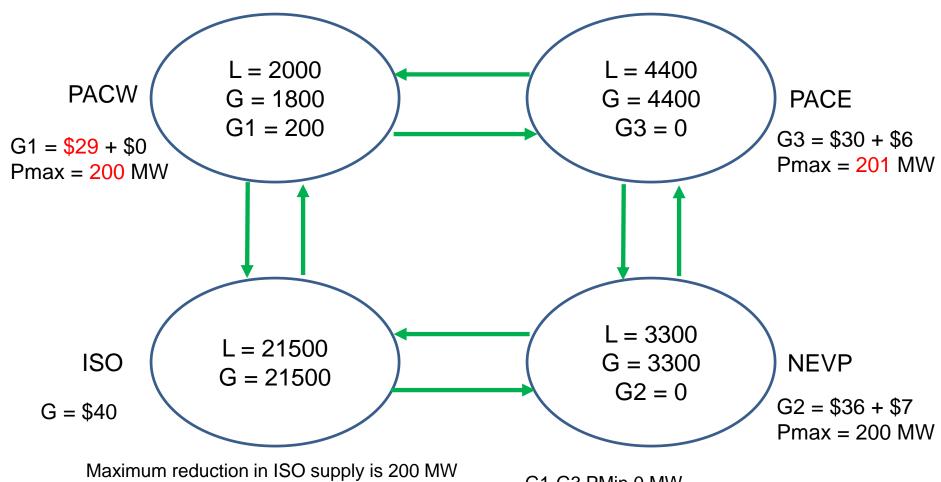
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On an hourly basis, EIM participating resources submit a GHG bid price and quantity

- GHG bid price must be at or below the daily calculated maximum cost for the resource

- GHG bid quantity can be between 0 MW and Pmax
  - Bidding 0 MW allows the resource to opt out

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Revised draft final proposal will limit the GHG bid quantity to remaining upward dispatch capability

- Perform the first pass solution which does not allow transfer into the ISO from EIM participating resources

- First pass optimization provides the GHG allocation base for all EIM participating resources

- GHG bid quantity of EIM participating resources limited to upper economic limit minus GHG allocation base

- Perform second pass optimization which is the same as the current optimization

Base assumptions for example to show current attribution not aligned with atmospheric effect

PACW

L = 2000
G = 1800
G1 = 200

G1 = $29 + $0
Pmax = 200 MW

L = 4400
G = 4400
G3 = 0

PACE

G3 = $30 + $6
Pmax = 201 MW

ISO

L = 21500
G = 21500

G = $40

L = 3300
G = 3300
G2 = 0

NEVP

G2 = $36 + $7
Pmax = 200 MW
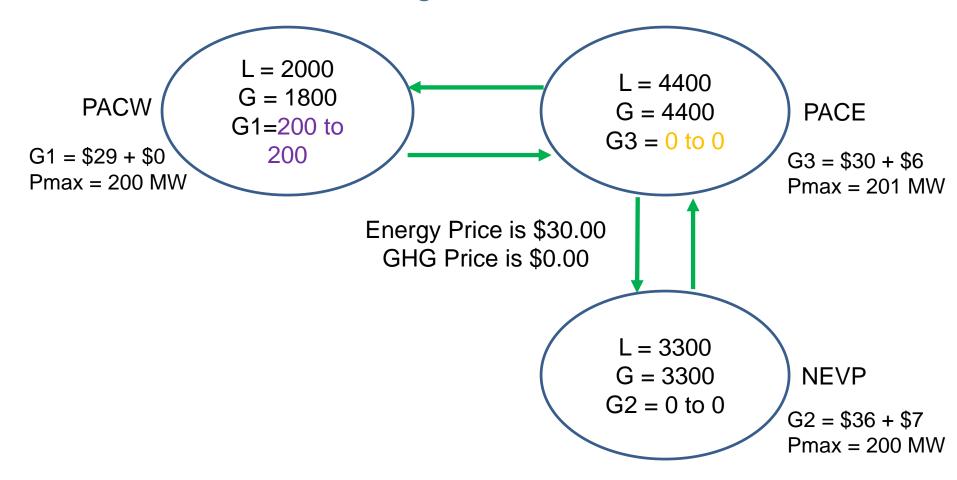
Maximum reduction in ISO supply is 200 MW

EIM Generator = Energy Bid + GHG Bid

G1-G3 PMin 0 MW
GHG MW for all is 200 MW
Transfer limit into ISO is 201 MW

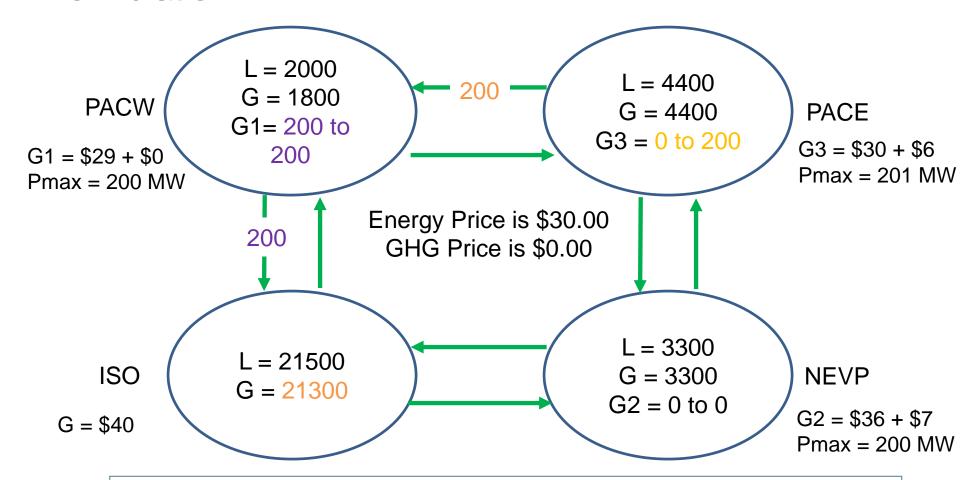# Now let's assume the EIM entities optimized their base schedules before including the ISO

PACW

L = 2000
G = 1800
G1=200 to 200

G1 = $29 + $0
Pmax = 200 MW

PACE

L = 4400
G = 4400
G3 = 0 to 0

G3 = $30 + $6
Pmax = 201 MW

Energy Price is $30.00
GHG Price is $0.00

NEVP

L = 3300
G = 3300
G2 = 0 to 0

G2 = $36 + $7
Pmax = 200 MW

There is no re-dispatch because the base schedules are optimal.

What is the result using the current market formulation?

PACW

L = 2000
G = 1800
G1= 200 to 200

G1 = $29 + $0
Pmax = 200 MW

PACE

L = 4400
G = 4400
G3 = 0 to 200

G3 = $30 + $6
Pmax = 201 MW

← 200

200

→

Energy Price is $30.00
GHG Price is $0.00

200

ISO

L = 21500
G = 21300

G = $40

NEVP

L = 3300
G = 3300
G2 = 0 to 0

G2 = $36 + $7
Pmax = 200 MW

The current EIM design would not reflect the $6.00 GHG cost of G3 which is the resource whose output increased to serve ISO load.

What would the market result be if we limited G1's GHG bid quantity to the upper economic limit minus first pass solution?

PACW

G1 = $29 + $0
Pmax = 200 MW
GHG Bid = 0 MW

L = 2000
G = 1800
G1= 200 to 200

200

L = 4400
G = 4400
G3 = 0 to 200

PACE

G3 = $30 + $6
Pmax = 201 MW
GHG Bid = 201 MW

200

Energy Price is $36.00
GHG Price is $6.00

ISO

G = $40

L = 21500
G = 21300

L = 3300
G = 3300
G2 = 0 to 0

NEVP

G2 = $36 + $7
Pmax = 200 MW
GHG Bid = 200 MW

G3 correctly attributed as serving ISO load since G1 GHG bid doesn't allow attribution

LMP inside ISO is $36. LMP outside ISO is $30.

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Two pass solution also enables the ISO to calculate residual secondary dispatch, if any remains

- No two pass solution can eliminate all secondary dispatch
  - Solution must balance objective of minimizing secondary dispatch with optimization solution performance, price / dispatch consistency

- ISO will provide data to CARB on the emissions of any residual secondary dispatch
  - CARB can use their backstop or other approach if needed

- ISO investigating potential for enhancements based on Q4'17 demonstration how well two pass solution balances objectives

ISO is planning to implement only necessary changes in the real-time market to support EIM at this time

- Currently developing software enhancements to perform two pass solution

- Will brief EIM Governing Body and ISO Board of Governors in July

- Prepare report end of year evaluating the accuracy of the two pass solution

- Seek EIM Governing Body and ISO Board of Governors approval in Q1'18

- Activate two pass solution <u>no later</u> than January 1, 2019

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Next Steps

Item	Date
Stakeholder Conference Call	June 22, 2017
Stakeholder Comments Due	July 6, 2017
EIM Governing Body Briefing	July 13, 2017
Board of Governors Briefing	July 26-27, 2017
Report on GHG Attribution Accuracy	Q4 2017
EIM Governing Body Decision	Q1 2018
Board of Governors Decision	Q1 2018
Implementation	Fall 2018

Please submit comments on the *revised* draft final proposal to InitiativeComments@caiso.com.