



Mandatory GHG Reporting and Cap-and-Trade Program Workshop

June 24, 2016

Workshop Materials and Submitting Comments

- ▣ This presentation is posted:
<http://www.arb.ca.gov/cc/capandtrade/meetings/meetings.htm>
- ▣ The presentation webcast is available:
<http://www.calepa.ca.gov/broadcast/?BDO=1>
- ▣ During this workshop, e-mail questions to:
coastalm@calepa.ca.gov

Workshop Agenda

- ▣ Introduction
- ▣ Electricity GHG Accounting
 - ▣ ARB GHG accounting background
 - ▣ ARB existing regulatory requirements
 - ▣ CAISO EIM
 - ▣ ARB proposed regulatory changes
- ▣ Post-2020 Allocation to EDUs
 - ▣ Legacy contract allocation
 - ▣ Allocation for Waste-To-Energy and LNG
- ▣ Compliance Obligation Exemptions
- ▣ Qualified Export Adjustment

GHG Accounting Background

- AB 32: “Statewide GHG emissions” means the total annual GHG emissions in the state, including all GHG emissions from the generation of electricity delivered to and consumed in California, accounting for transmission and distribution lines losses, whether that electricity is generated in state or imported.
- Statewide GHG Inventory
- 2020 Statewide Target
- Scope in Cap-and-Trade Program

Emissions Reporting for Electricity Generation

- California power plants must submit emissions and other data to the ARB under MRR
- Report fuel use (by fuel type), emissions, electricity generated, and thermal output (if applicable)
- All power plants must calculate and report CO₂, CH₄, and N₂O
 - Biogenic emissions are separately identified and reported
- Calculate emissions using one of the following:
 - A fuel-based estimation method (Fuel Use x Fuel Characteristic Data x Emission Factor)
 - Continuous Emissions Monitoring System (CEMS) that meets all MRR specifications (for CO₂)
 - A steam-based method may be used for municipal solid waste or solid biomass fuels

Emissions Reporting for Imported Electricity

- Under AB 32, ARB must account for emissions from imported electricity generated out-of-state to serve California load
- Electricity importers must report physical delivery of electricity by generation source
- Imported electricity reported as either specified or unspecified
- Allows ARB to account for emissions profile of imported electricity by fuel type of generation source

Specified vs. Unspecified Imports

- Specified Source Imports
 - Importer must own, operate, or contract for the power
 - Must be directly delivered to California from the source
 - Power must be specified when parties agree to deal
 - Unspecified power cannot be resold as specified power
 - Report the lesser of power generated or scheduled (with certain exceptions)
- Unspecified Imports
 - Generation source not specified when parties agree to deal
 - Power that does not meet specified source requirements
 - Unspecified emission factor captures emissions impact from “marginal” source in western power markets

Treatment of EIM Imports in the Cap-and-Trade Regulation

- Electricity imported through the CAISO EIM currently incurs a compliance obligation, as follows:
- Point of regulation is the EIM Participating Resource Scheduling Coordinator
- Imported electricity is defined to include dispatches designated by the CAISO's optimization model as electricity imported to serve retail customers' load located in the state of California.
- Currently being reported as specified power from participating resources identified by model

Aligning ARB GHG Accounting Policy and EIM

- EIM model optimizes resources based on economic bids, including “greenhouse gas bid adders” submitted by EIM participating resource scheduling coordinators open to serving CA load
- EIM optimization results may not in all cases report full GHG burden experienced by the atmosphere as a consequence of electricity consumed in CA
- ARB and CAISO staff coordinating to ensure ARB GHG accounting policy is accurately implemented to ensure only real GHG emissions changes are quantified and assessed for achieving progress towards the AB 32 goals, including 2020 target, and a compliance obligation in the Cap-and-Trade Program



Energy Imbalance Market GHG Design Discussion

Don Tretheway

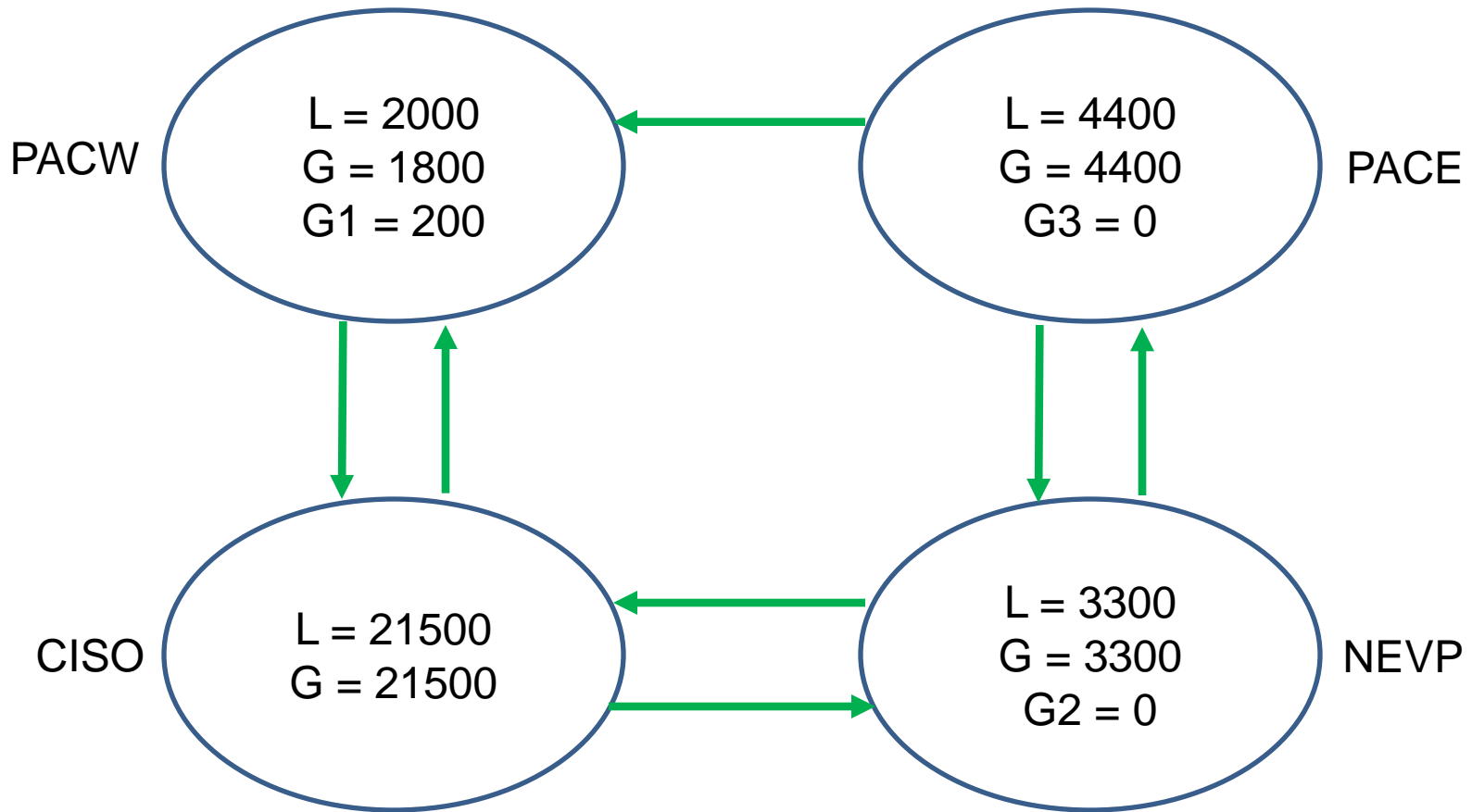
Sr. Advisor, Market Design and Regulatory Policy

June 24, 2016

Topic – Accounting for atmospheric effects of least cost dispatch

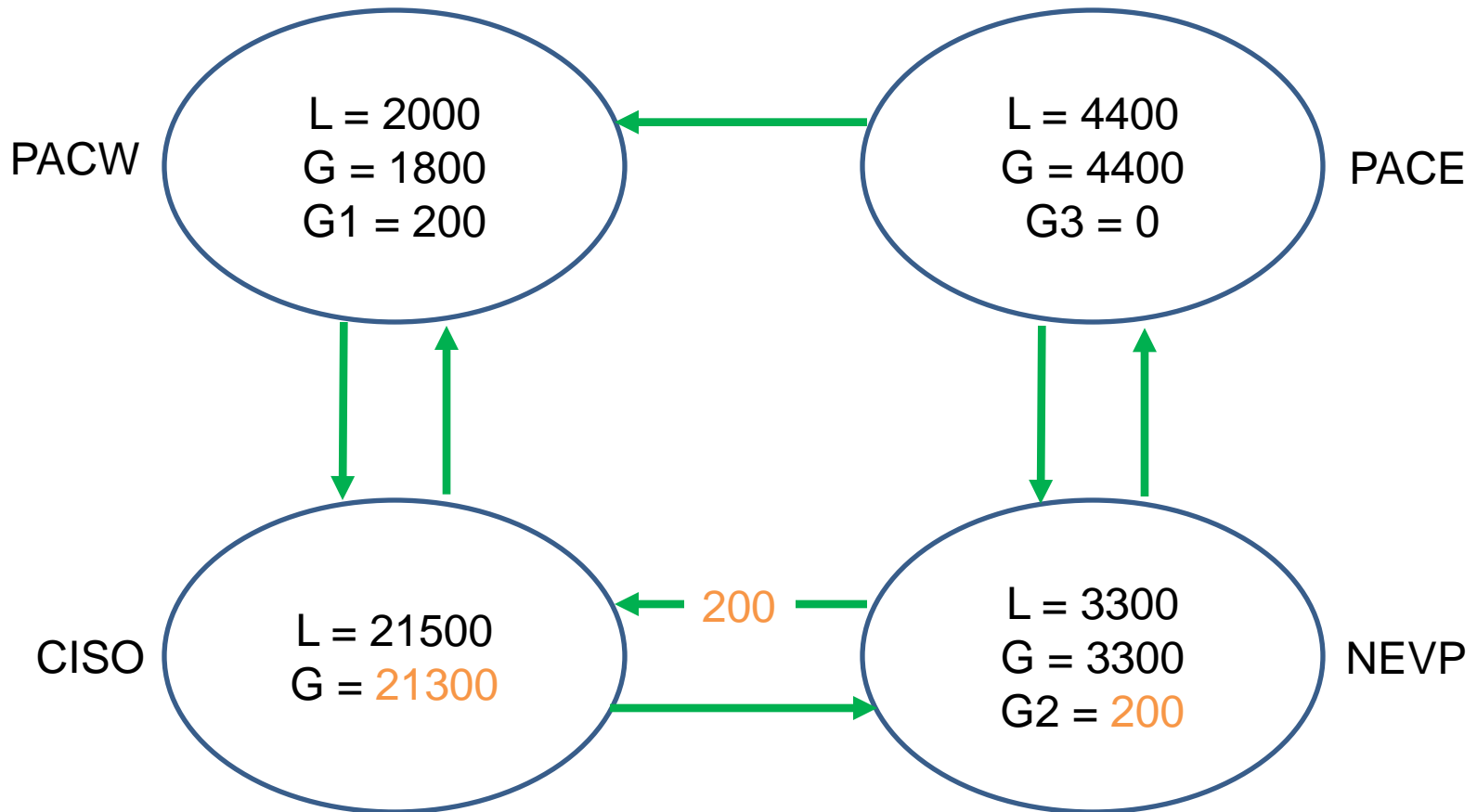
- Least cost dispatch can have effect of sending low emitting resources to CAISO, while not accounting for secondary dispatch of other resource to serve external demand.
- Least cost dispatch can result in avoided curtailment of CAISO renewables by displacing emitting resource to serve external demand.

All EIM balancing authority areas are balanced prior to the start of the EIM operating hour



↔ EIM Transfer Limits

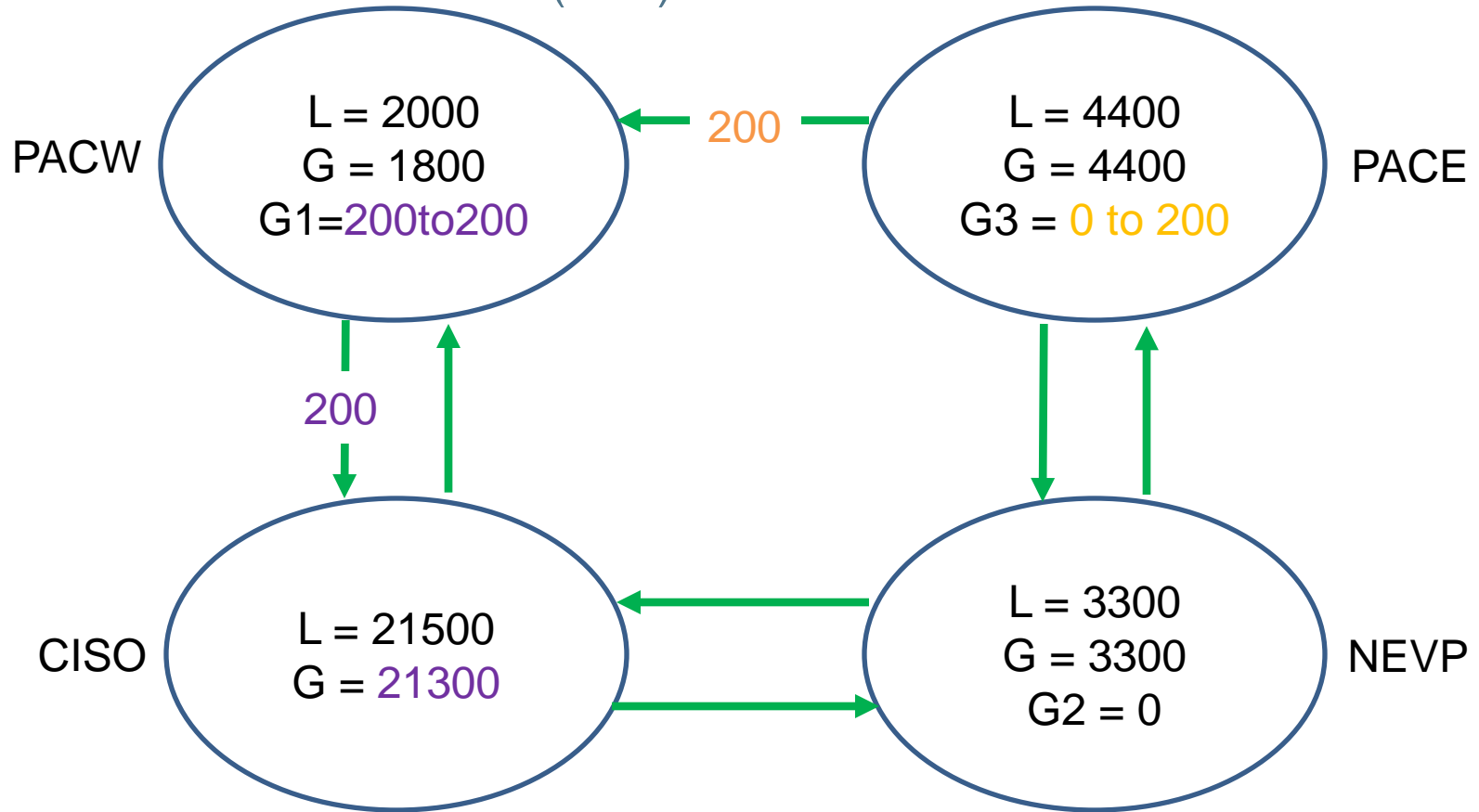
Least cost dispatch to serve load across EIM area. Primary dispatch and GHG awards are aligned



G2 receives 200 MW incremental primary dispatch
G2 receives 200 MW GHG obligation
200 MW transfer from NEVP to CISO

Least cost dispatch to serve load across EIM area.

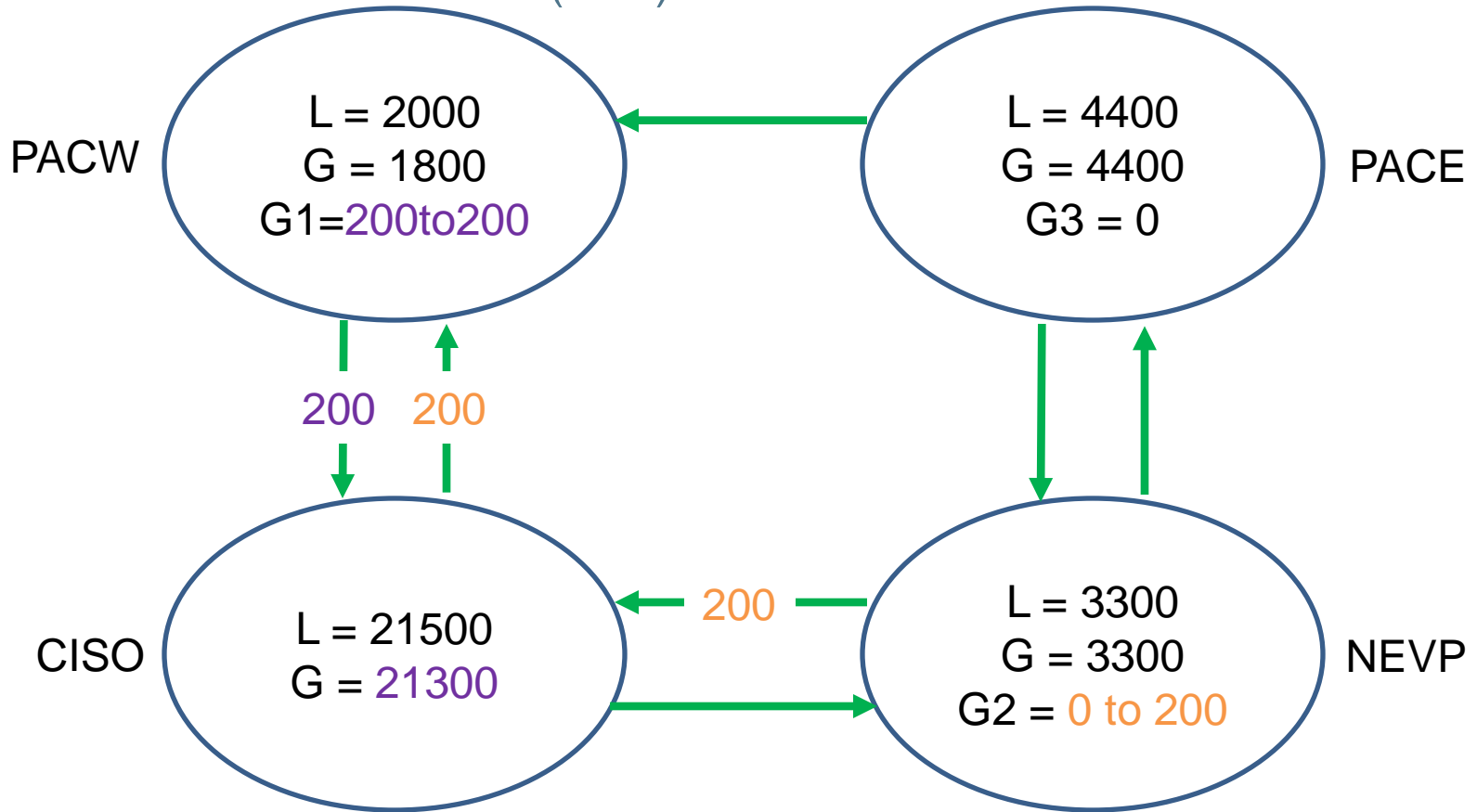
Primary dispatch with “secondary” dispatch because G1 (Hydro) bids lower GHG adder than G3 (Gas) in PACE



G1 receives 200 MW primary dispatch & GHG obligation at resource's emission rate
G3 receives 200 MW incremental secondary dispatch
200 MW transfer from PACW to CISO

Least cost dispatch to serve load across EIM area.

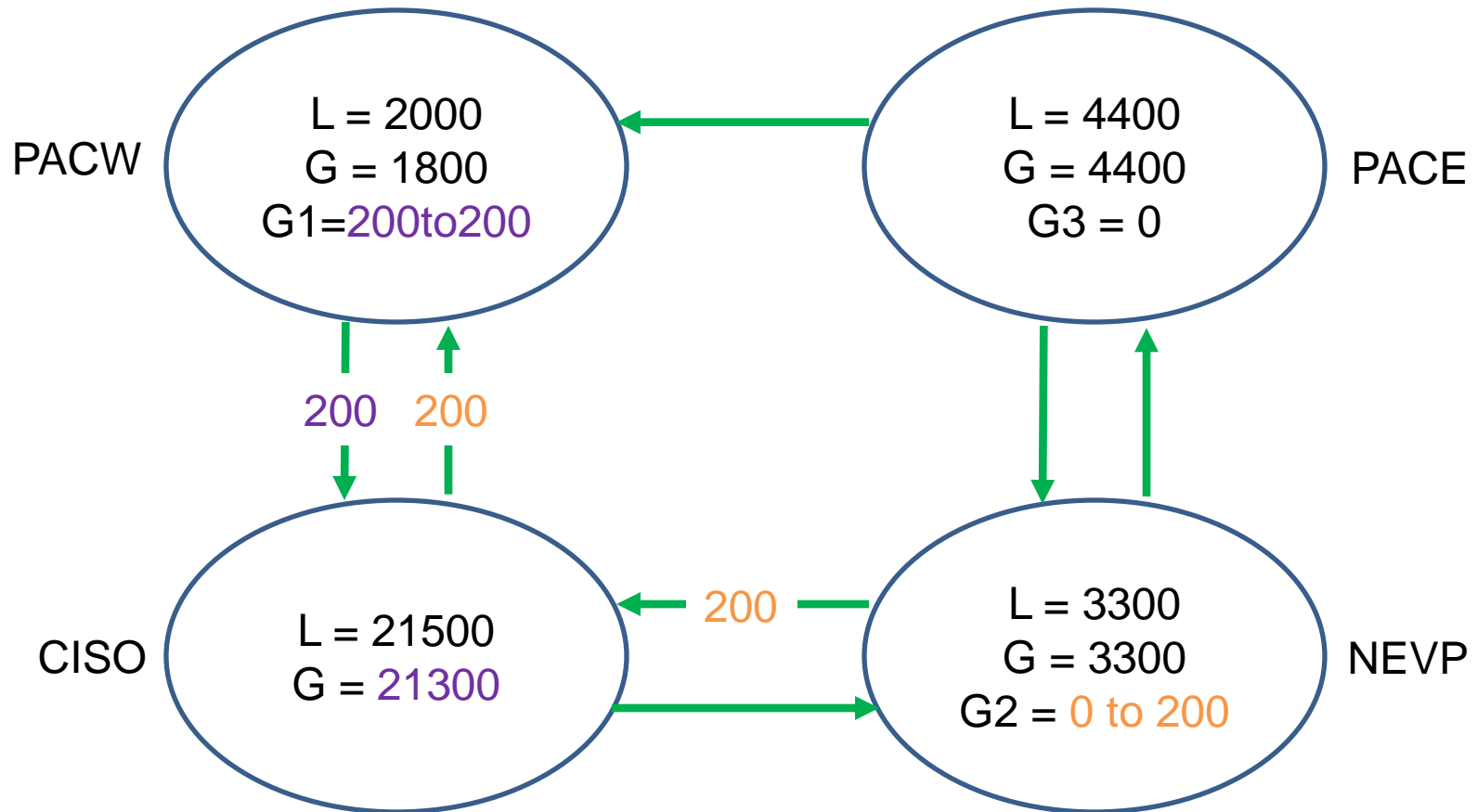
Primary dispatch with “secondary” dispatch because G1 (Hydro) bids lower GHG adder than G2 (Gas) in NEVP



G1 receives 200 MW primary dispatch & GHG obligation at resource's emission rate
G2 receives 200 MW incremental secondary dispatch
200 MW transfer from NEVP to CISO

Least cost dispatch to serve load across EIM area.

Primary dispatch with “secondary” dispatch for GHG because G2 did not submit a GHG bid



G1 receives 200 MW primary dispatch & GHG obligation at resource's emission rate
G2 receives 200 MW incremental secondary dispatch
200 MW transfer from NEVP to CISO

Several options have been considered to enable CARB to account for secondary dispatch (1 of 2)

1. Calculate emissions of secondary dispatch and assign GHG obligation to CAISO load imbalances
2. Require a minimum GHG bid for low emitting resources using the system emission rate
3. Create a hurdle rate using system emission rate for EIM transfers into ISO

Legal/regulatory and market inefficiency impacts of options need evaluation

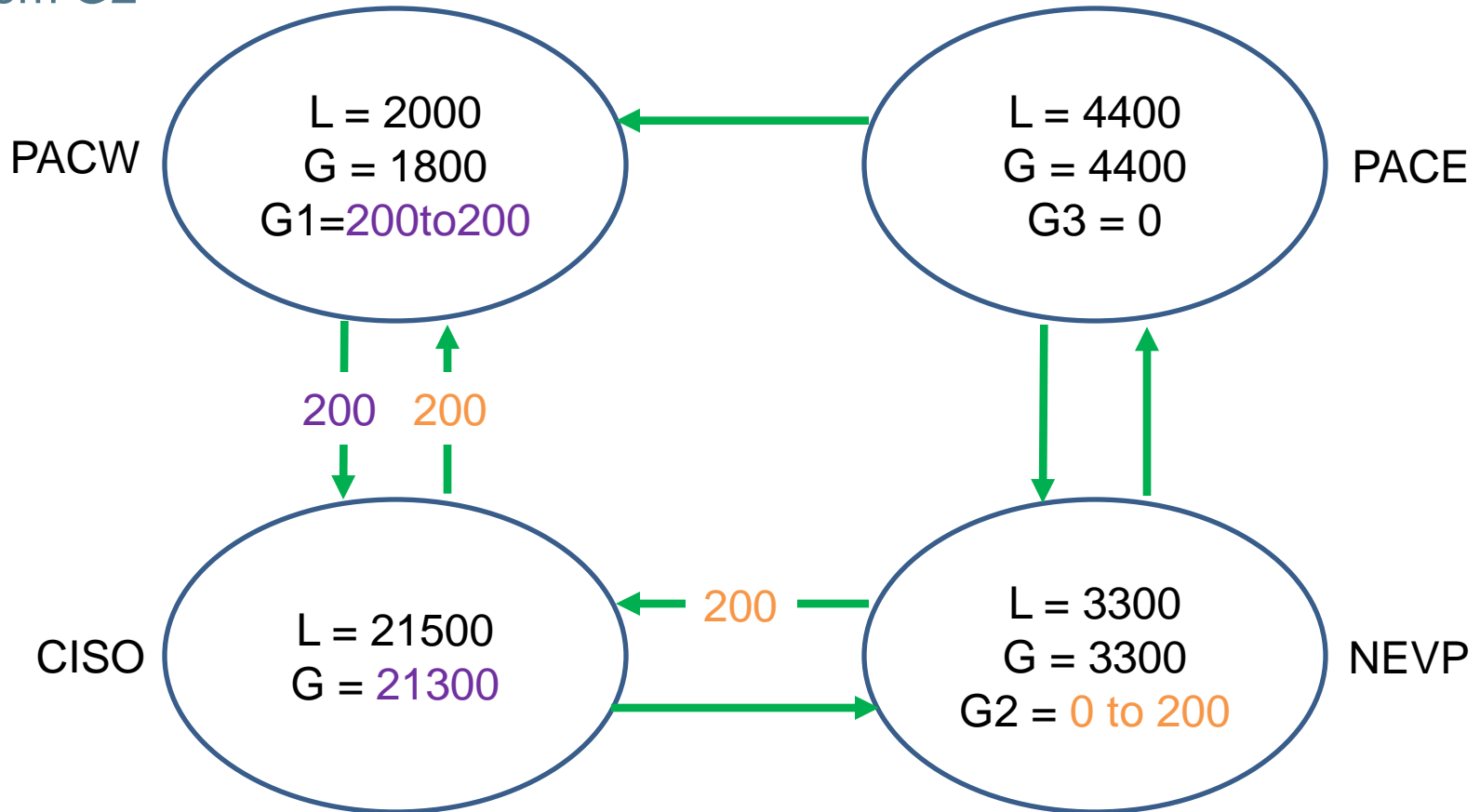
Several options have been considered to enable CARB to account for secondary dispatch (2 of 2)

4. Adjust the caps down or retire GHG allowances by the amount of estimated secondary dispatch effects
5. Ensure dispatch and accounting considers other costs such that lower cost but higher emitting resource gets allocated to support transfer to CA
6. Have CAISO become a regulated party and any obligations based on system or asset controlling supplier rate

Legal/regulatory and market inefficiency impacts of options need evaluation

Option 1

Assume G1 (Hydro) bidding GHG less than G2 (Gas) or no GHG bid from G2



G1 primary dispatch receives 200 MW GHG obligation at resource's emission rate

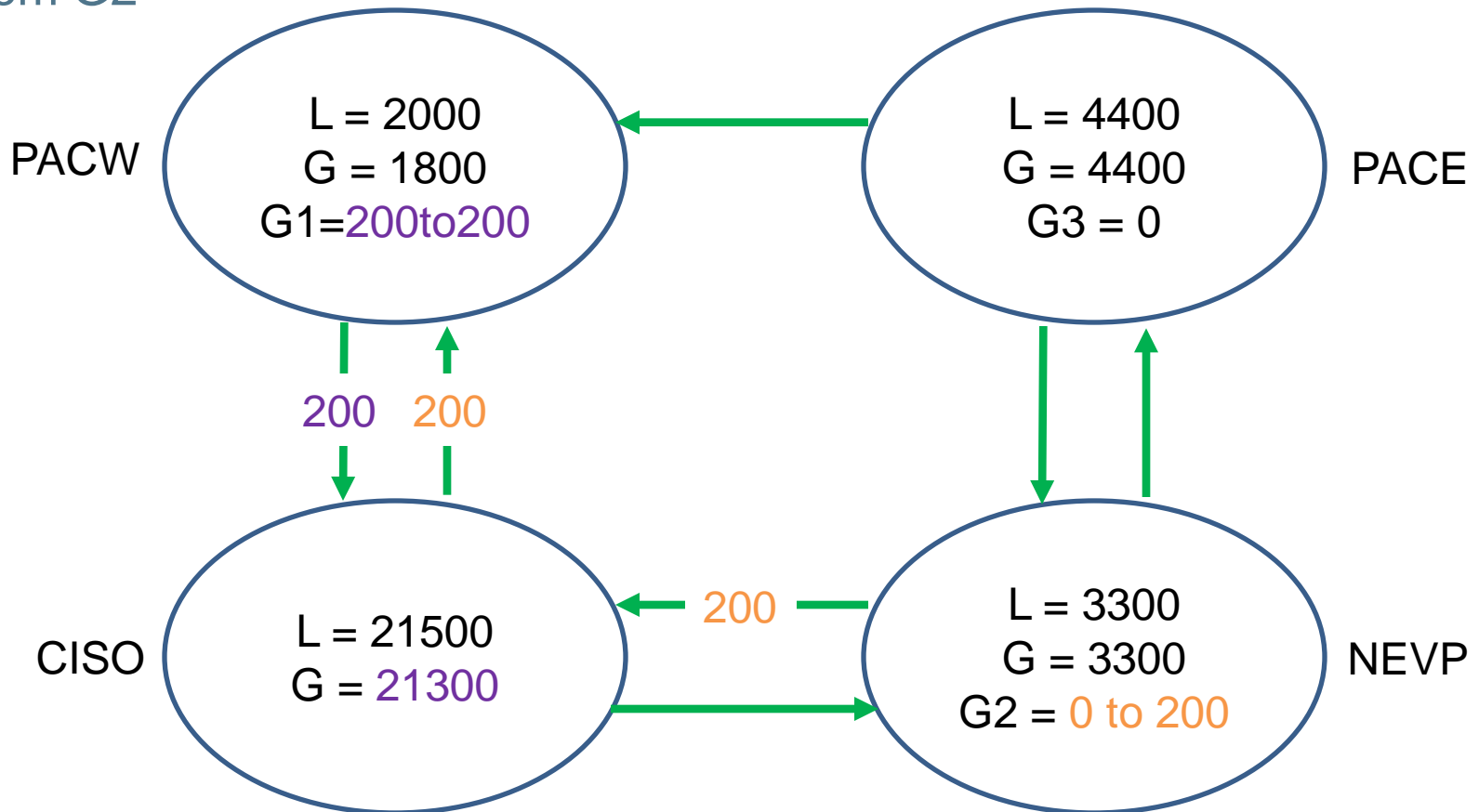
G2 receives 200 MW secondary dispatch

CAISO load receives 200 MW GHG obligation at system emission rate

200 MW transfer from NEVP to CISO

Option 2

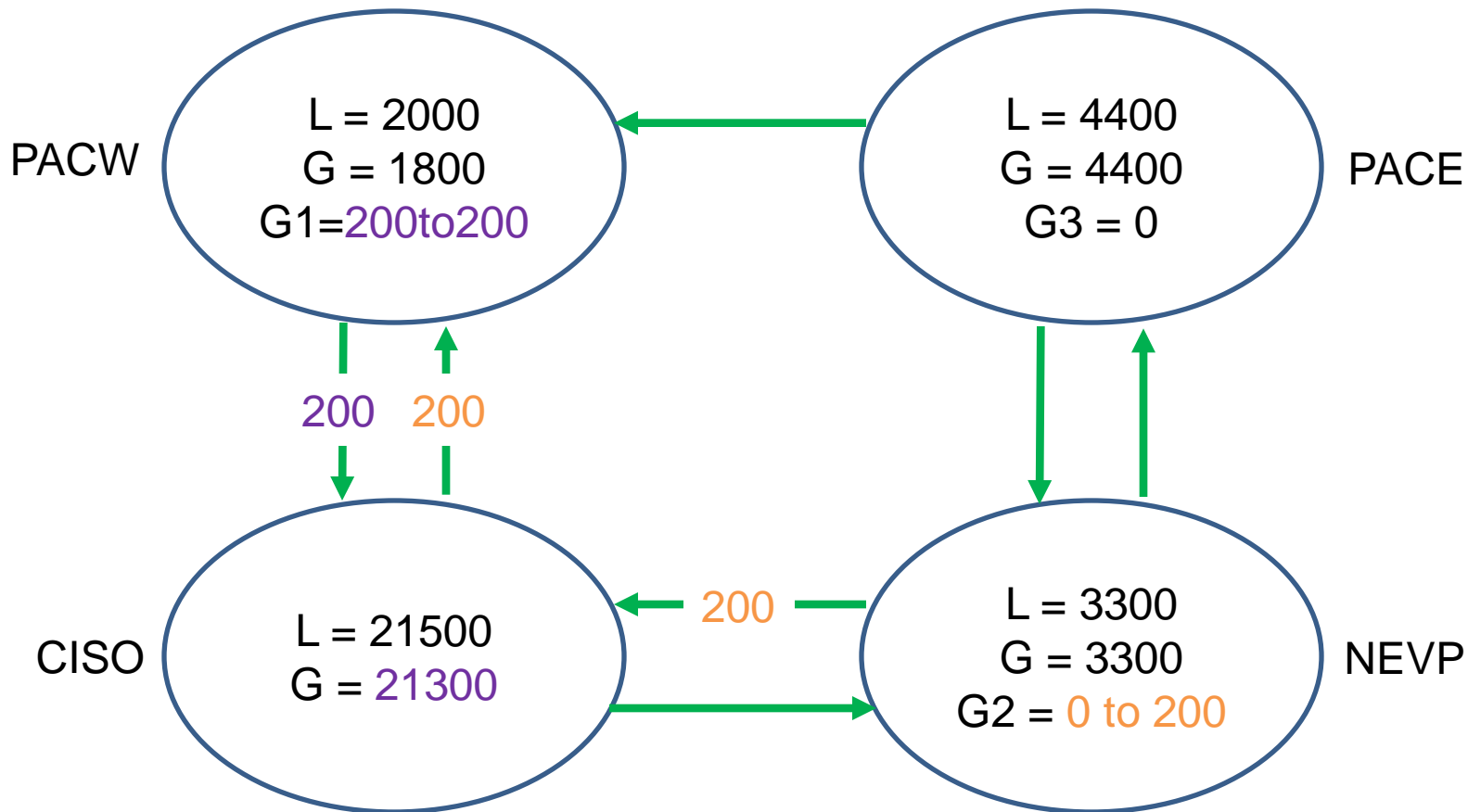
Assume G1 (Hydro) bidding GHG less than G2 (Gas) or no GHG bid from G2



G1 receives 200 MW primary dispatch & GHG obligation **at system emission rate**
G2 receives 200 MW incremental dispatch
200 MW transfer from NEVP to CISO

Option 3a

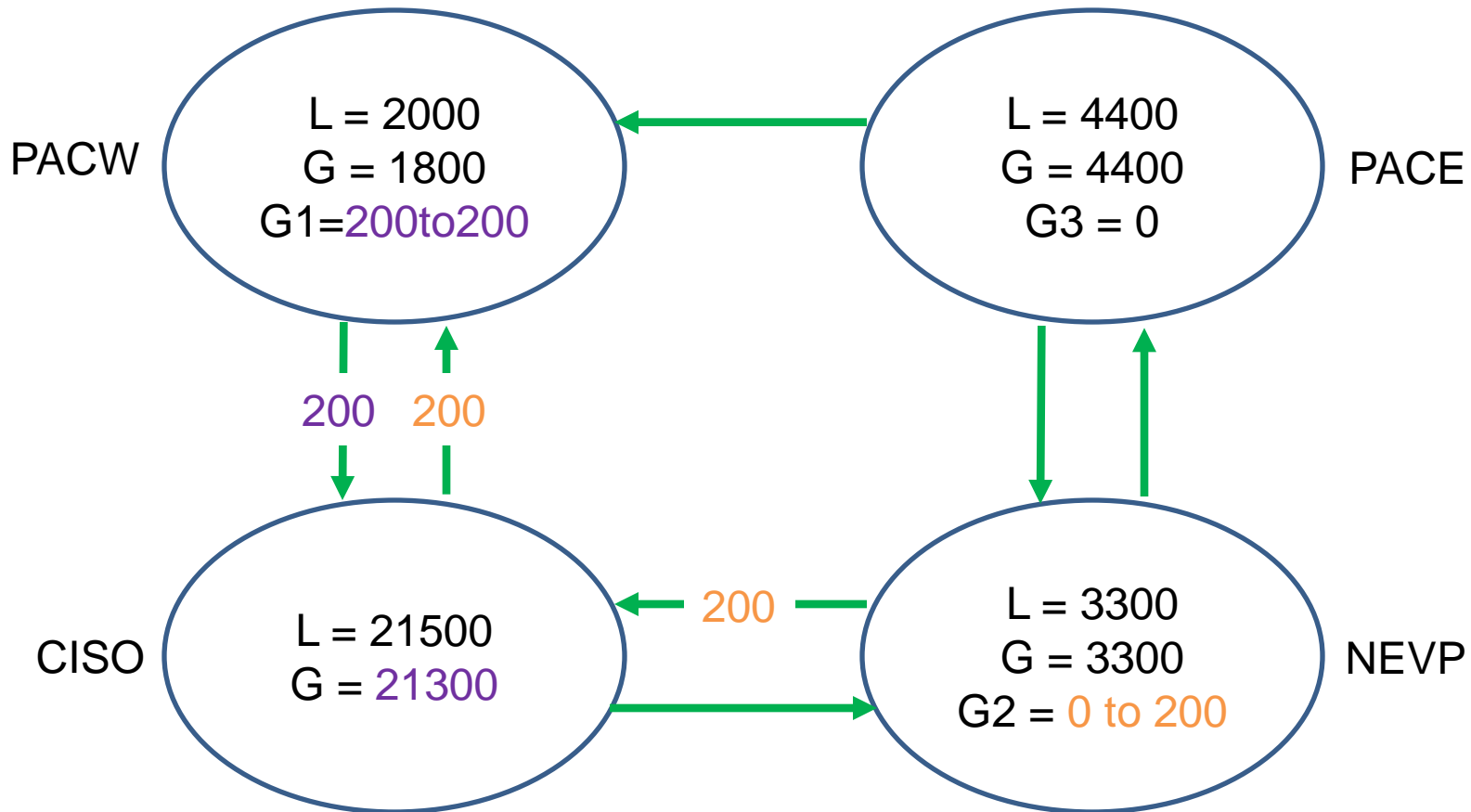
Assume G1 (Hydro) bidding GHG less than G2 (Gas)



G1 receives 200 MW primary dispatch & GHG obligation at resource's emission rate
G2 receives 200 MW secondary dispatch & GHG obligation at resource's emission rate
200 MW transfer from NEVP to CISO

Option 3b

Assume no GHG bid from G2



G1 receives 200 MW primary dispatch & GHG obligation at resource's emission rate

G2 receives 200 MW secondary dispatch

Uplift cost collected from CAISO load, but no resource to give GHG obligation

200 MW transfer from NEVP to CISO

ARB Proposed Changes to MRR- Option 1

- CAISO provides following information concerning EIM transfers to serve CA load:
 - Total EIM transfers (MWh) to serve California load
 - Calculation of total EIM dispatch emissions associated with EIM transfer serving CA load
 - Options on emission factor (unspecified or system factor) * Total EIM transfers serving California load
 - Entities meeting CA imbalances from EIM transfers and annual quantity MWh
- Remaining emissions not accounted for in EIM “deemed delivered”
 - Remaining emissions = Total EIM dispatch emissions – deemed delivered emissions

ARB Proposed Changes to Cap-and-Trade Regulation – Option 1

- ▣ Entities meeting CA imbalances from EIM transfers assigned compliance obligation
- ▣ Entities meeting CA imbalances from EIM transfers compliance obligation = (Entity EIM meeting CA imbalances from EIM transfers / total CA EIM transfers serving CA imbalances) * Remaining Emissions

Next Steps

- ▣ If adopted, all regulatory amendments would take effect beginning in 2018
- ▣ Early July 2016: release MRR and Cap-and-Trade Regulations for formal comment period
- ▣ September 2016: first of two board hearings on regulations
- ▣ September 2016 - February 2017: continued discussions with stakeholders and CAISO to finalize proposal and/or explore alternatives
- ▣ ARB would work with CAISO on any potential necessary tariff amendments

Allocation to Electrical Distribution Utilities (EDU)

- Current Methodology for 2013-2020 allocation
- Proposal from March 29 workshop
- Changes in expectations for load and resources since EDU allocation was first calculated in 2010
- Updates to the post-2020 EDU allocation proposal

2013-2020 EDU Allocation Methodology

- Based primarily on “cost burden”
 - Estimated emissions from resources to serve load
 - Load amounts and resources reported to CEC on 2009 S-2 forms and data from CEC’s demand forecast were the basis of the original allocation
- Early action credit for RPS-eligible generation from 2007-2011 (<5% of total allocation)
- Energy efficiency recognition for ~1% of total allocation

March 29 Workshop Proposal: Post-2020 EDU Allocation (1 of 2)

- Continue EDU allocation through 2030 based on compliance obligation associated with supplied electricity
 - For EDU sector allocation, subtract out emissions associated with electricity sold to industrial covered entities
 - Current EDU sector allocation = 97.7 million allowances \times c
 - Post-2020 EDU sector allocation =
(97.7 million – industrial sector electricity emissions) \times c
 - For EDU-level allocation, use 2020 allocations with an adjustment for utility-specific industrial emissions as the starting point, but account for planned changes in electricity sources (e.g., planned coal divestiture, availability of nuclear resources)

March 29 Workshop Proposal: Post-2020 EDU Allocation (2 of 2)

- Continue EDU consignment provisions (100% auction consignment for IOUs, optional consignment for POUs)
- Evidence-based allocation for increased electrification
- Staff requested feedback on appropriate data sources and methodologies to use to:
 - Project post-2020 industrial sector purchased electricity emissions
 - Calculate EDU-level allocation
 - Quantify and verify increased load due to electrification

Changes in the Electric Sector Since the 2010 Allocation

- Staff analyzed data from the 2015 S-2s and CEC Demand Forecast
 - CEC Demand Forecast now projects a 0.4% annual decrease in statewide load from 2014-2026 compared to a 1.2% increase projected in 2009 from 2010 to 2020.
 - 17 EDUs accounting for over 75% of retail sales now project 2020 loads 20% to 40% lower than 2009 projections.
- Conclusion: 2015 S-2s provide a more accurate estimate of 2020 load, and 2015 S-2s provide more accurate information on resource types (e.g., 2020 projections reflect retirement of most coal power plants).

Updates to the Post-2020 EDU Allocation Proposal

- Staff are considering two variations of updates to the methodology discussed in the March workshop. Both use 2020 load projections from the 2015 S-2s as the starting point for EDUs that reported under S-2s, and EDU-specific 2020 load information from other EDUs
- Both methodologies include adjustments for industrial covered entities and for retirement of Intermountain Power Plant (IPP)
 - Use MRR data for industrial covered entity electricity purchases and reduce to account for cap decline
 - Use 2015 S-2 data for 2018-2020 for IPP purchases, reduced by cap adjustment factor. Adjust allocation after IPP retirement in 2025 for those EDUs with IPP contracts.
- The two methodologies differ in their assumptions about RPS compliance

Revised EDU Allocation Proposal #1: Updated Load Estimates, Assume 32% RPS in 2020

- Assume that all EDUs meet the same 2020 32% RPS requirement used in the original allocation
- After subtracting zero-emission (including RPS) and coal power from load, assume residual load is met by natural gas power
 - Calif. marginal NG emission factor = $0.4354 \text{ MTCO}_2\text{e/MWh}$
- Allocation continues to decline each year each year by cap adjustment factor

Revised EDU Allocation Proposal #2: Updated Load Estimates, Assume 28% RPS in 2020

- Assume that all EDUs meet a reduced RPS requirement in 2020
 - Instead of 32%, assume 28% RPS
 - Accounts for 15% maximum Category 2 RECs
- After subtracting zero-emission (including RPS) and coal power from load, assume residual is natural gas power
 - Calif. marginal NG emission factor = 0.4354 MTCO₂e/MWh
- Allocation continues to decline each year by cap adjustment factor

Legacy Contract Allowance Allocation under Current Regulation

- Legacy contract generators with industrial counterparties can apply for legacy contract assistance for the duration of the contract
 - Allocation amount calculated using previous year's data, and is trued up to account for changes in energy output
 - Allocation amount is subtracted from industrial counterparties that are covered entities in the Cap-and-Trade Program
- For legacy contract generators without industrial counterparties, legacy contract assistance is not provided after 2017
 - Allocation amount calculated using historical data
- For all legacy contract generators, application deadline is September 2

Proposed Amendments to Legacy Contract Allowance Allocation

- No calculation change for legacy contract generators with industrial counterparties, but application date would move from September 1 to June 1
- Legacy contract generators with *EDU* counterparties would be treated like those with *industrial* counterparties
 - Can apply for assistance through the length of the contract
 - Amount calculated based on previous year's data (includes true-up starting in 2020 for 2018 emissions)
 - Allowances allocated to these generators are subtracted from their EDU counterparties
- Proposed application date for legacy contract generators with EDU counterparties: October 15, 2017 for vintage 2018 allocation, June 1 in subsequent years.

Allowance Allocation for WTE and LNG

- Staff proposes to extend allocation to waste-to-energy facilities through the second compliance period to incentivize waste diversion
- Staff proposes to allocate allowances to liquefied natural gas suppliers for the second compliance period to address the potential for emissions leakage
 - Leakage is possible due to a mismatch in the point of regulation between MRR and the Cap-and-Trade Regulation
 - Staff proposes to fix the point of regulation so that there's no potential for leakage starting in 2018

Remove Certain Compliance Obligation Exemptions

- Staff proposes to remove the following source categories from the list of emissions without a compliance obligation:
 - Natural gas hydrogen fuel cells
 - Continuous-bleed pneumatic devices starting in 2019 (exemption for intermittent-bleed pneumatic devices will continue)
- The GHG emissions from these sources have the same climate change impacts as emissions from other sources; deleting these exemptions ensures that facilities are treated equally under the Program.

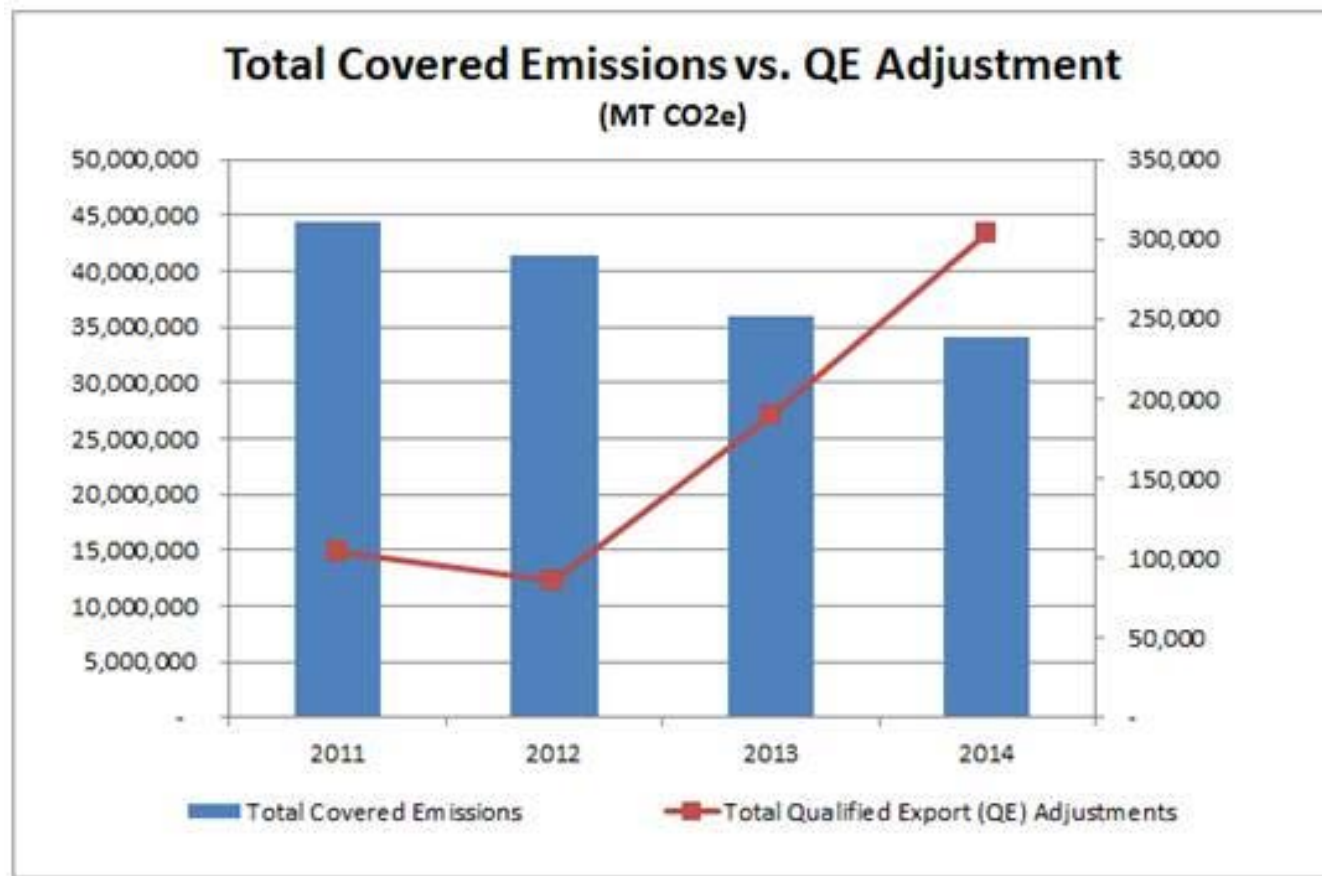
Source	Emissions in First Compliance Period (MTCO ₂ e)
Natural gas hydrogen fuel cells	8,000
Low-bleed pneumatic devices	185,000

Overview of Qualified Export (QE) Adjustment

- The QE adjustment may be applied for a MWh of electricity that is exported out of CA in the same hour as a MWh of electricity imported into CA by the same EPE
 - Applied as an adjustment to the compliance obligation
- Intent was to recognize simultaneous exchange power agreements
- In 2010, staff agreed to include the QE adjustment but determined to monitor and analyze the effects of the QE adjustment on the power market to monitor gaming and leakage

Trends in the QE Adjustment Claims

- Total Covered Emissions have trended down, while the QE Adjustment has increased over time



Evaluation of the QE Adjustment

- QE adjustment claims not explicitly tied to simultaneous exchanges, with broader than expected use
 - EPEs not currently required to provide evidence that a simultaneous exchange agreement is in place or whether the combined import and export is a reasonable representation of a wheel
- Scheduling practice changes designed to maximize the QE adjustment do not result in actual emissions reductions
- Current staff thinking is to remove QE Adjustment to ensure compliance obligation accurately represents imported electricity emissions

Additional Information

- ▣ Mandatory Greenhouse Gas Reporting Program:
<http://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-rep.htm>
- ▣ Cap-and-Trade Program:
<http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm>
- ▣ Email questions and comments to:
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