

WESTERN

EIIM



2022

IMPLEMENTATION WORKSHOP

March 16, 2021

INTRODUCTION AND ROADMAP

Allie Mace, Director of Grid Modernization



SAFETY MOMENT



Stephanie Kwolek (1923 – 2014)

“I don’t think there’s anything like saving someone’s life to bring you satisfaction and happiness.”

- Discovered new polymer 5 times stronger than steel by weight but lighter than fiberglass.
- Kevlar was introduced in 1971.
- Kevlar is used in PPE, including cut-resistant gloves, bullet-proof vests, ropes, and cables.
- Served on the National Research Council and National Academy of Sciences.



AGENDA

| Time | Topic | Presenter |
|---------------------|---|---|
| 9 to 9:05 a.m. | Introduction and Roadmap | Allie Mace |
| 9:10 to 9:50 a.m. | EIM Customer Impact Summary | Roger Bentz Eric King Todd Kochheiser |
| 9:50 to 10:40 a.m. | GHG Accounting | Laura Trolese Alisa Kaseweter |
| 10:40 to 10:50 a.m. | Break | |
| 10:50 to 11:50 a.m. | Phase V Close-out: <ul style="list-style-type: none">• Overview• Closeout Letter• Participation Principles (includes discussion of business case) | Rachel Dibble Steve Gaube |
| 11:50 a.m. to noon | Open Question and Answer Session | |

Five Phases to EIM Decision

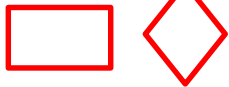




- Exploration** July 2018–June 2019
- Implementation agreement** June–Sept. 2019
- Policy decisions** Oct. 2019–Oct. 2020
- BP-22 & TC-22** Dec. 2020–July 2021
- Close-out** Aug.–Sept. 2021

EIM PARTICIPATION PRINCIPLES

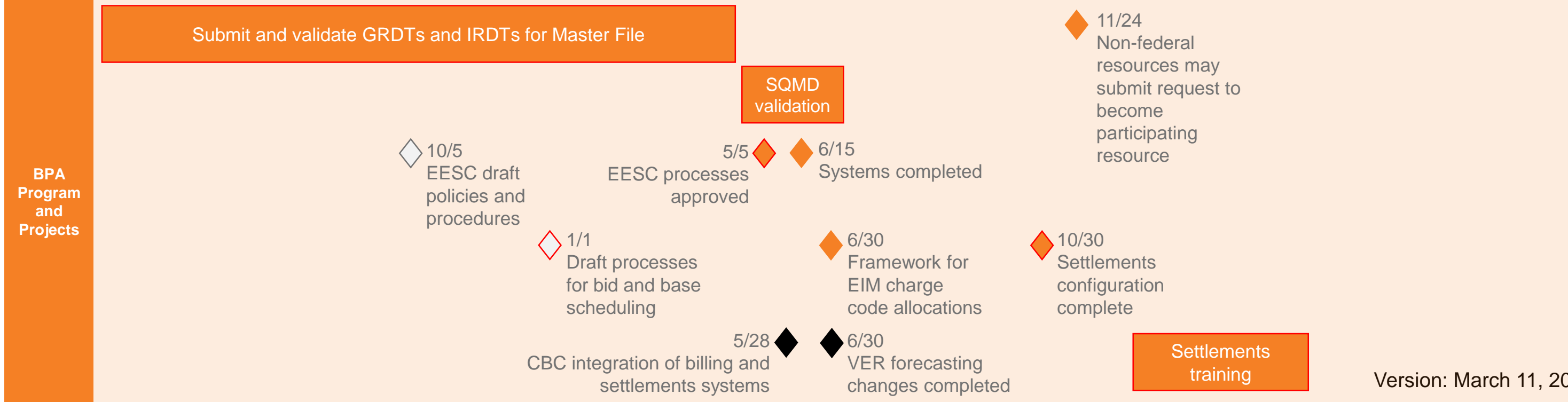
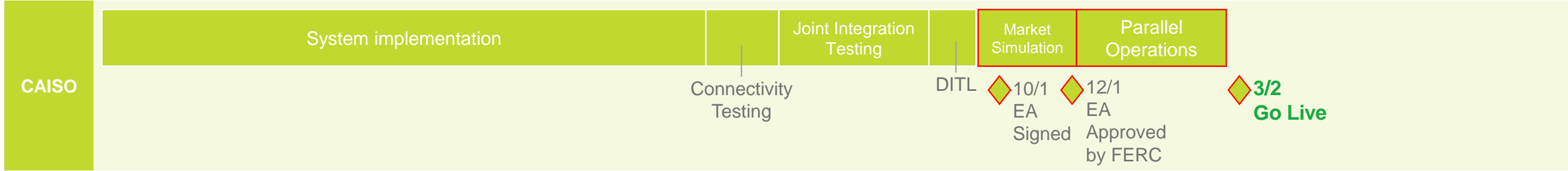
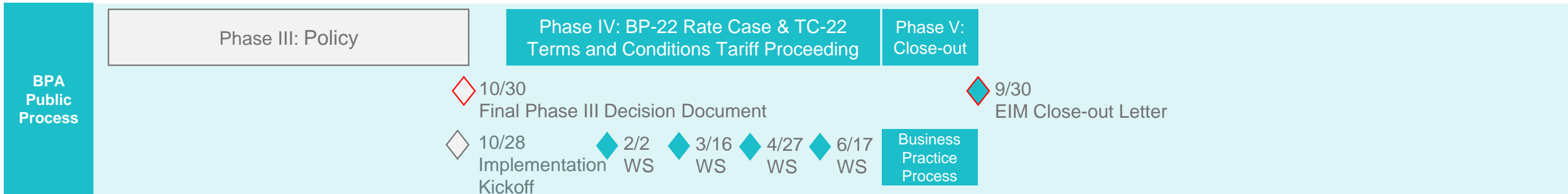
- 1 Bonneville's participation is consistent with its statutory, regulatory and contractual obligations.
- 2 Bonneville will maintain reliable delivery of power and transmission to its customers.
- 3 Bonneville's participation is discretionary and Bonneville retains its ability to effectively exit the market in the event participation is no longer consistent with these principles.
- 4 Bonneville's participation is consistent with a sound business rationale.
- 5 Bonneville's participation is consistent with the objectives of Bonneville's Strategic Plan.
- 6 Bonneville's evaluation of EIM participation includes transparent consideration of the commercial and operational impacts on its products and services.

MILESTONES KEY

| | | |
|---|--|--|
|  | Critical path activity or milestone | These activities have a marginal room for error and delay and have the highest risk of impacting the go-live date. |
|  | Partial EIM project milestones | These milestones represent a cross-project coordination point that is critical to the EIM program. |
|  | Completed activity or milestone | These activities have been completed. |

| ACRONYMS IN THE ROADMAP | |
|---|-------------------------------------|
| CBC | Customer Billing Center Replacement |
| DITL | Day in The Life (CAISO) |
| EA | EIM Entity Agreement |
| EESC | EIM Entity Scheduling Coordinator |
| GRDT | Generator Resource Data Template |
| IRDT | Intertie Resource Data Template |
| PR | Participating Resource |
| SQMD | Settlement Quality Meter Data |
| VER | Variable Energy Resources |
| WS | Workshop |
| Additional resource: CAISO's Glossary | |

BPA EIM INTEGRATED PROGRAM ROADMAP



EIM CUSTOMER IMPACT SUMMARY

Roger Bentz, *EIM Program Manager*

Eric King, *Electrical Engineer*

Todd Kochheiser, *Electrical Engineer*



EIM CUSTOMER IMPACT SUMMARY POSTED

- The *EIM Customer Impact Summary* documents what is and is not changing for customers. It also provides whether a final decision has been made and where that decision has been or will be made.
- This document will continue to be updated as information is available and decisions are finalized.
- At workshops, specific items from the summary will be discussed with an opportunity for questions.

VER BALANCING SERVICE

Objective: Establish variable energy resource scheduling and balancing service that is simpler, easier to administer and that is consistent with the EIM participation.

Analysis: In order to accommodate EIM with a model that simplifies VERBS, it was determined that the scheduling elections (previously provided for 30/60, 30/15, and Uncommitted scheduling options) should be eliminated and replaced with the use of forecast scheduling only.

Customer Impact

VER customers taking balancing service will receive BPA's VER reliability forecast and are expected to submit schedules that are consistent with the signal or that result in less imbalance for the scheduling period. These changes will apply both in and out of the EIM.

Source

9/29/2020 Phase III workshop, draft tariff

Status of decision

Pending BP-22, TC-22

INTENTIONAL DEVIATION

Objective: Intentional deviation remains an important schedule performance factor and the model needs to be compatible with EIM and the new VER scheduling practices.

Analysis: The previous ID design was created to accommodate scheduling elections and with those elections changing, the ID design needed to change accordingly.

Customer Impact

The new approach is to measure ID based on the hourly forecast and account for schedule changes made after T-57 as well as to exclude market dispatches from the measurement of station control error.

Source

9/29/2020 Phase III workshop, draft Tariff

Status of decision

Pending BP-22

PERSISTENT DEVIATION

Objective: Persistent deviation remains an important schedule performance factor and needs to be adjusted to be compatible with the EIM scheduling timelines.

Analysis: To be compatible with the EIM timelines, the design needs to be changed to accommodate schedule changes made after the EIM T-57 timeline. Analysis and discussion determined that the most suitable approach for PD is to establish its own rate provisions and limit the application of PD to uninstructed imbalance energy.

Customer Impact

The new approach moves PD into its own rate schedule provision consistent with other penalty rates. It limits the application of PD to only the UIE portions of EI and GI.

Source

9/29/2020 Phase III workshop, draft Tariff

Status of decision

Pending BP-22

BASE SCHEDULE TIMELINE – DAY AHEAD

Objective: To be compatible with EIM timelines, initial schedules for generation and load need to be provided ahead of the operating day.

Analysis: CAISO encourages parties to provide schedules as far as seven days ahead, but only requires early schedule data at 10 a.m. of the day prior. Through the Phase III workshops, it was decided in the initial proposal to adopt an approach consistent with the other regional EIM entities to avoid seams issues.

Customer Impact

Transmission customers with resources or load in the BPA BAA are encouraged to submit their initial transmission customer base schedules seven days prior to each operating day (T-7 days). Transmission customers may modify the proposed transmission customer base schedule at any time but shall submit a schedule by 10 a.m. of the day before the operating day.

Source

9/29/2020 Phase III workshop, draft Tariff

Status of decision

Pending TC-22

BASE SCHEDULE TIMELINE – REAL TIME

Objective: To be compatible with EIM, the scheduling submittal timelines for generation and load in the BPA BAA need to be synchronized with the EIM scheduling timelines. The EIM uses these schedules for resource sufficiency assessments, market optimization and settlement calculations.

Analysis: In the Phase III workshops, it was decided in the initial proposal to adopt an approach consistent with the other regional entities to avoid seams issues.

Customer Impact

Transmission customers shall submit forecasts/schedules for each resource and load no later than T-77. Those forecasts/schedules can be modified consistent with NERC scheduling practices (T-20), but the values at T-57 will be financially binding for EIM settlements.

Source

9/29/2020 Phase III workshop, draft Tariff

Status of decision

Pending BP-22, TC-22

BASE SCHEDULE SUBMISSION – FEDERAL GENERATION

Objective: The federal generation base schedules must be provided to the BPA EIM Entity within the market timelines, and may be updated to pass the market resource sufficiency tests. Passing these tests ensures that the BPA BAA can fully participate in the market and minimizes exposure to over/under scheduling penalties.

Analysis: Federal generator base schedules will be submitted on the same timeline as other resources in the BAA. Those schedules will be provided to the BPA EIM Entity via internal systems being used to manage the hydro generation. After the T-57 submission deadline, and prior to the T-40 deadline (to provide base schedules to the market), the EIM Entity, in coordination with BPA hydro schedulers, may modify those base schedules in order to pass the EIM resource sufficiency tests.

Customer Impact

Federal generator base schedules will be submitted by BPA’s hydro scheduling forming the financial binding basis for IIE and UIE. The EESC may make base schedule changes as appropriate for the purpose of passing the resource sufficiency tests up until T-40, enabling market participation and minimizing over/under scheduling penalties.

Source

7/28/2020 Phase III workshop, draft Tariff

Status of decision

Internal Decision

BASE SCHEDULE SUBMISSION – NON-FEDERAL GENERATION

Objective: The generation base schedules for all generators in the BPA BAA must be provided to the BPA EIM Entity within the market timelines, contributing to the BAA’s ability to pass the resource sufficiency tests and participate in the market while minimizing exposure to over/ under scheduling penalties.

Analysis: E-tags will be the source for non-federal base schedules if present. Absent e-tags, the generator forecasts entered into BPA’s CDE system will be used as the source for non-federal generator base schedules. If the resource does not submit any schedule but generates anyway, the entire metered actual will be settled as UIE and the generator will incur other potential settlement and penalty impacts.

Customer Impact
 If a non-federal generator submits schedules via e-tags, those e-tags will form the basis for that resource's base schedule (forecast). If a resource does not submit schedules via e-tags, the resource forecasts in CDE will be used for that resource's base schedule. These schedules form the basis for EIM settlements and performance penalties.

Source

7/28/2020 Phase III workshop, draft Tariff

Status of decision

Draft Business Practice

TOPICS COVERED IN WORKSHOPS TO DATE

- ✓ Metering Requirements
- ✓ Settlements Processes
- ✓ Settlement Sub-allocation
- ✓ Losses for EIM transfers
- ✓ VER Scheduling
- ✓ Scheduling Timing
- ✓ Intentional Deviation
- ✓ Persistent Deviation
- Participating Resources
- Generators in EIM
- Resource Sufficiency
- EI For Load
- EI For Generation
- Over / Under Scheduling Charges
- Transfer Service Costs

EIM GREENHOUSE GAS ACCOUNTING

Laura Trolese, *Senior Policy Analyst*



CALIFORNIA CAP AND TRADE

- **The California cap-and-trade program for greenhouse gas emissions was implemented in 2013.**
 - A multi-sector, market-based program that covers electricity generated in or imported into California.
 - Sets a cap on GHG emissions that decreases annually to achieve 40% below 1990 levels by 2030.
 - Covered entities must purchase or obtain “allowances” to cover their reported GHG emissions.
- **An emission factor is assigned to a generation source based on its fuel source (MT CO_{2e} MWh)**
 - The emissions factor for an unspecified source is 0.428 MT CO_{2e} MWh, roughly equivalent to natural gas thermal generation.

Asset Controlling Supplier

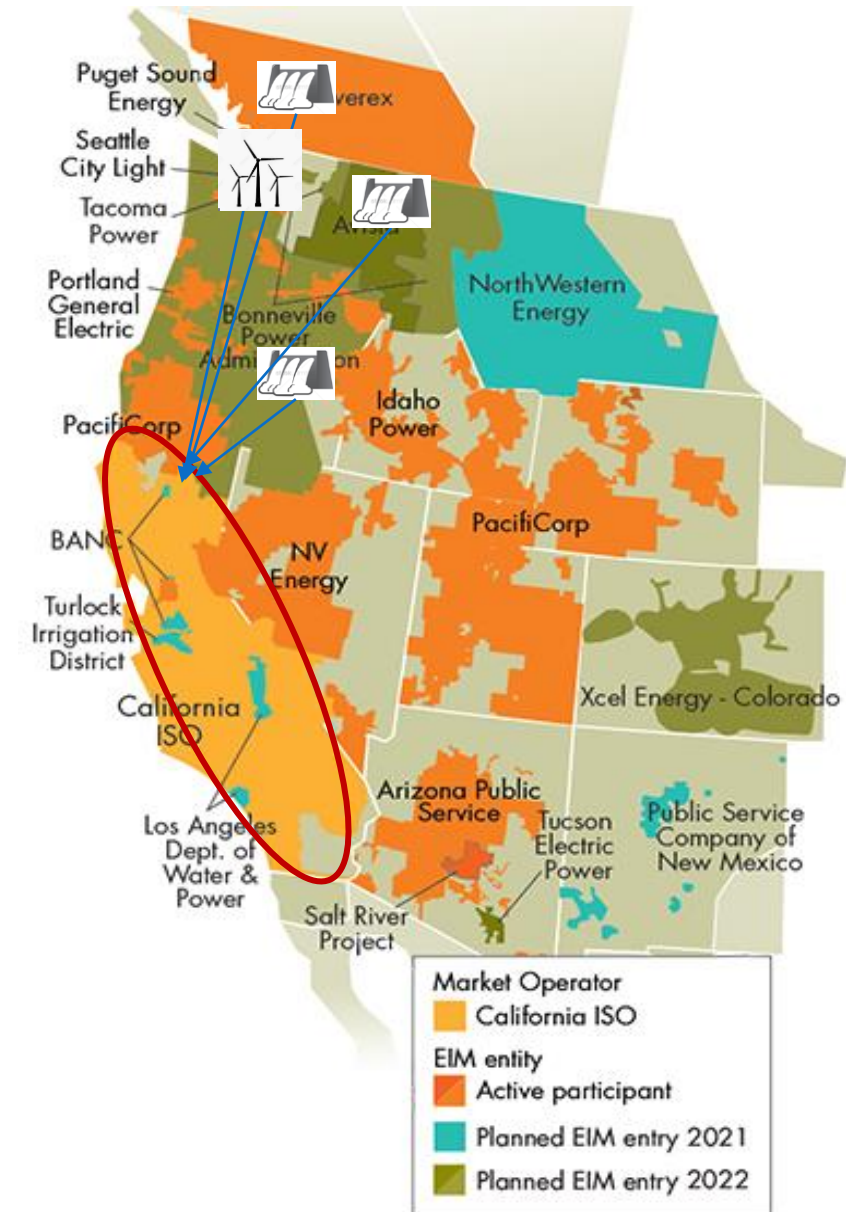
- **Entities outside California can register as Asset Controlling Suppliers (ACS) and voluntarily report GHG emissions annually to California Air Resource Board (CARB).**
 - ACS emission factors are based on the resource mix reports, which have a two-year delay.
 - The emissions factor for an unspecified source is 0.428 MT CO_{2e} MWh, roughly equivalent to natural gas thermal generation.
- **There are two entities currently registered as ACS:**

| Asset Controlling Supplier | CARB-Assigned Emission Factor |
|---|------------------------------------|
| Bonneville Power Administration (BPA) ARB ID #4000 | 0.0211 MT CO _{2e} per MWh |
| Tacoma Power ARB ID #104567 | 0.0337 MT CO _{2e} per MWh |

For transactions of ACS power delivered during calendar year 2021, based on CY2019 reported data

EIM GHG Accounting

- **In organized markets, there is no explicit link between individual resources and loads.**
 - An organized market optimizes generation and load simultaneously for the entire market footprint.
 - The market optimization does not associate any specific generation to serve any specific load.
- **To track the carbon content of imports into the CAISO from the EIM, CAISO “deems” EIM participating resources delivered to California based on the GHG bid adder.**
 - EIM participants must indicate willingness to be “deemed” delivered into California.
 - EIM “deems delivered” resources with lowest GHG bid adder.
 - The quantity a resource is “deemed” delivered to California is limited to the MW value the resource bids above its base schedule



EIM GHG Accounting Algorithm Outcomes

- **CAISO's EIM GHG accounting framework results in secondary leakage**
 - Dispatch is not consistent with GHG accounting
 - “Deemed” deliveries do not capture emissions deliveries of secondary leakage
 - The GHG shadow price does not reflect the GHG costs of resources incrementally dispatched to serve California load
- **Being “deemed delivered” to California may also result in an increased ACS emissions factor**
 - Base schedule “deemed” to serve California is assumed to be backfilled by EIM imports

What's Next?

- CAISO plans to address GHG accounting in Bundle #2 of the EDAM stakeholder process likely to begin Q2/Q3 of 2022
- The EDAM GHG solution should also explore unintended effects of remaining potential secondary dispatch and how to avoid them.
- It is anticipated that the GHG accounting methodology determined for EDAM will also be applied to the EIM

Should BPA allow federal resources to sell directly to California in the EIM?

Laura Trolese, *Senior Policy Analyst*

Alisa Kaseweter, *Climate Change Specialist*



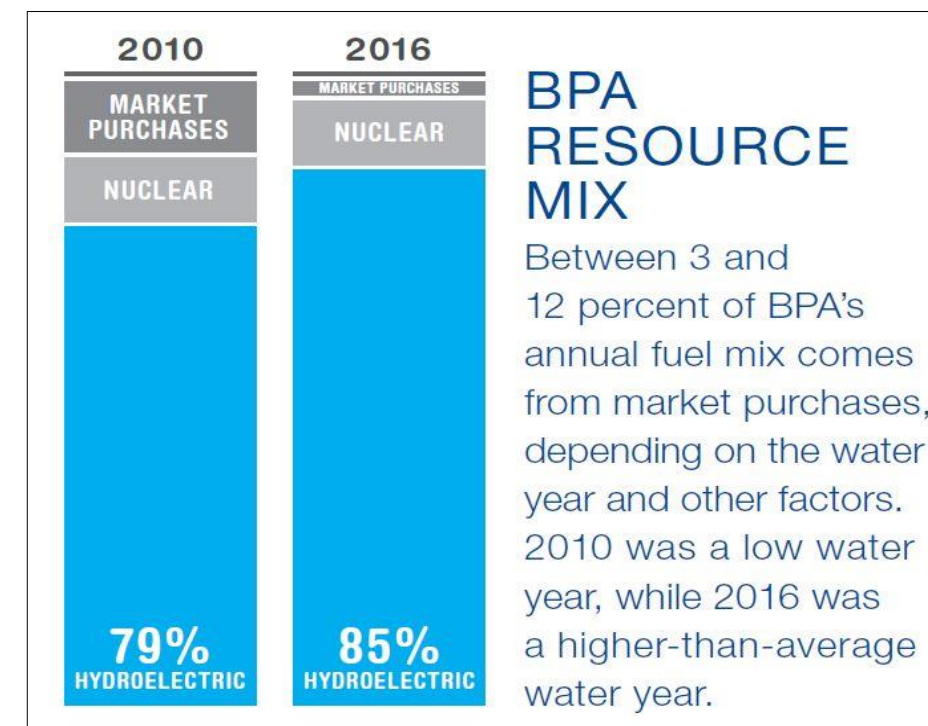
BPA Considerations

- 1. Is there a reasonable business case to support BPA marketing power through the EIM directly into California?**
 - It is within BPA Power Services' discretion to make this determination.
 - The decision to sell directly to California through the EIM can be made on an hourly basis.
- 2. What are the potential impacts to BPA and its customers under other state carbon and greenhouse gas programs?**
 - Whether Washington's Clean Energy Transformation Act (CETA) is delivery-based versus procurement-based will impact how the emissions factor of EIM transactions are considered for CETA compliance.

BPA Resource Mix

| Units: | Metric ton CO ₂ e per MWh | MWh | \$ per metric ton CO ₂ e | \$ per MWh |
|--------------------|--------------------------------------|----------------|-------------------------------------|------------|
| Source | Emission Factor | Imported Power | GHG Allowance Price | GHG Cost |
| Unspecified Source | 0.43 | 1 | \$16 | \$6.8 |
| BPA ACS | 0.02 | 1 | \$16 | \$0.3 |
| Difference | 0.41 | | | \$6.5 |

Default emissions factor for market purchases is 0.428 MT CO₂e MWh



Higher market purchases in BPA's resource portfolio will, to a degree, increase BPA's ACS emission factor and the carbon compliance cost for sales into California.

BPA Benefits of Direct Deliveries to California

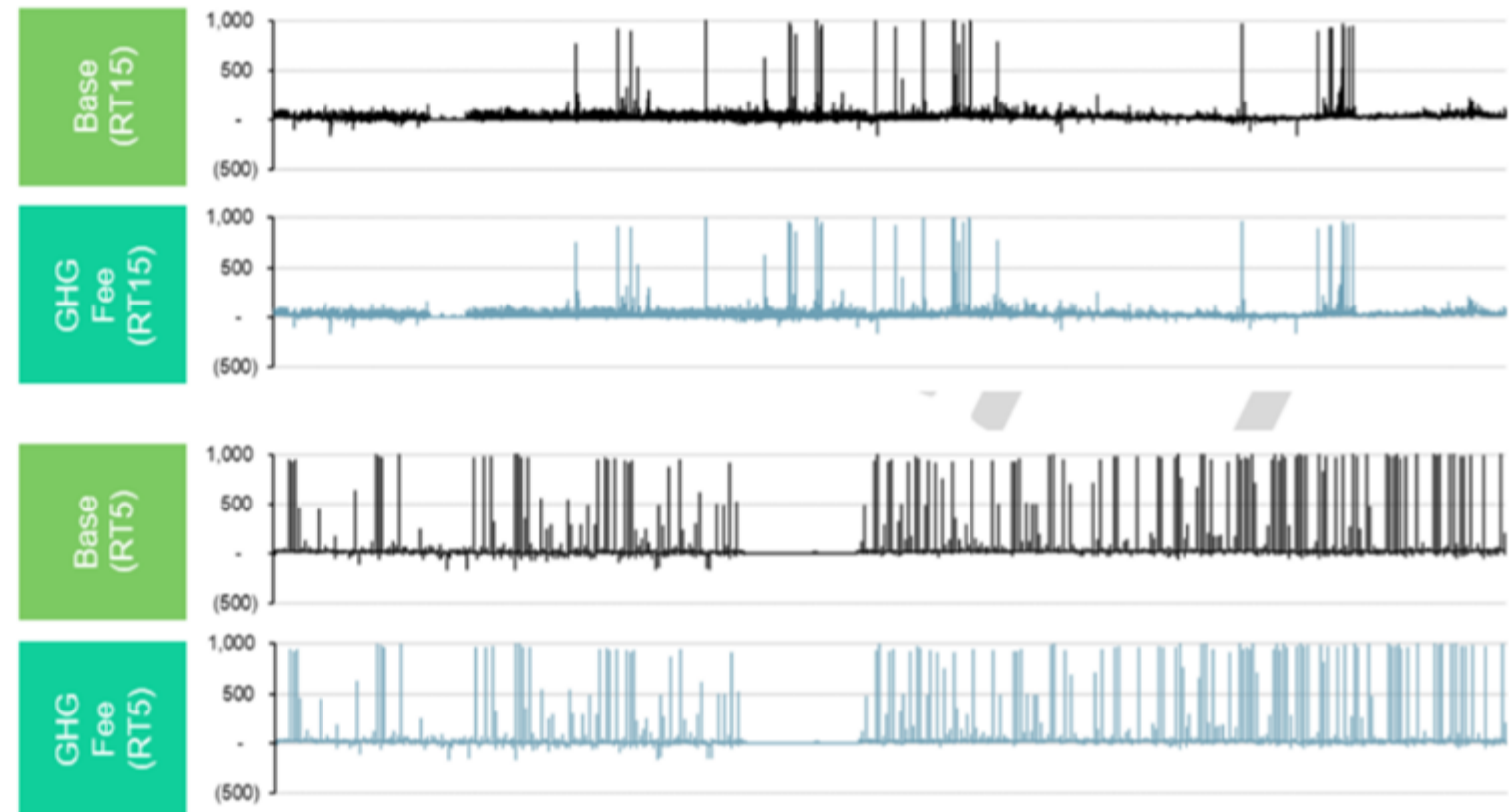
- E3 modeled EIM participation where BPA did not receive higher, CA-delivered prices
- This scenario resulted in average annual revenue \$4.6M less than the base case

EIM Price Scenarios: GHG Compliance

- We model CAISO GHG Compliance as only affecting BPA prices when selling into EIM
 - Marginal GHG component is small relative to energy, congestion

Table 9. Average and Annual Revenue from Dispatch Benefits for Sensitivities

| Sensitivities | Average Revenue (\$ million) | Annual Revenue (\$ million) | | |
|----------------------------------|------------------------------|-----------------------------|------|------|
| | | 2016 | 2017 | 2018 |
| FRST-Only Participation | 24.4 | 32.3 | 25.4 | 15.6 |
| California GHG Compliance | 34.6 | 45.6 | 34.5 | 23.8 |
| Reduced Price Volatility | 35.3 | 44.9 | 36.1 | 24.8 |
| Higher Success Rate | 47.1 | 59.4 | 47.8 | 34.0 |
| NW Midpoint/Base | 39.2 | 49.5 | 39.9 | 28.2 |



E3 Analysis: Key Assumptions

1. All BPA resources that were bid into the EIM were dispatched in the EIM.
2. BPA sales into the EIM were offset by an equal amount of purchases from the EIM.

| | BPA EIM Participation without direct sales to CA | BPA EIM Participation with direct sales to CA |
|------------------|--|---|
| Purchases | ~3,000,000 MWh per year | ~3,500,000 MWh per year |
| Sales | ~3,000,000 MWh per year | ~3,500,000 MWh per year |

Carbon Compliance Cost: Without EIM Sales to California

Scenario #1

| | Emissions Factor |
|---|---------------------------------|
| 1. Original emissions factor | 0.0122 MT CO _{2e} /MWh |
| 2. New emissions factor (BPA joins EIM: no direct sales to CA in EIM) | 0.0261 MT CO _{2e} /MWh |
| 3. New emissions factor (BPA joins EIM: direct sales to CA in EIM) | 0.0284 MT CO _{2e} /MWh |
| 4. Change in emissions factor (2-1) | 0.0139 MT CO _{2e} /MWh |
| 5. Change in emissions factor (3-2) | 0.0023 MT CO _{2e} /MWh |
| 6. Change in emissions factor (3-1) | 0.0162 MT CO _{2e} /MWh |

- *BPA extra-regional sales to CA (outside the EIM) are ~ 4,000,000 MWh per year.*

$$\sim 4,000,000 \text{ MWh} * 0.0139 \text{ MT CO}_{2e}/\text{MWh} * \$17/\text{MT CO}_{2e} = \underline{\underline{\sim \$0.95 \text{ million per year}}}$$

Carbon Compliance Cost: EIM Sales to California

Scenario #2

| | Emissions Factor |
|---|---------------------------------|
| 1. Original emissions factor | 0.0122 MT CO _{2e} /MWh |
| 2. New emissions factor (BPA joins EIM: no direct sales to CA in EIM) | 0.0261 MT CO _{2e} /MWh |
| 3. New emissions factor (BPA joins EIM: direct sales to CA in EIM) | 0.0284 MT CO _{2e} /MWh |
| 4. Change in emissions factor (2-1) | 0.0139 MT CO _{2e} /MWh |
| 5. Change in emissions factor (3-2) | 0.0023 MT CO _{2e} /MWh |
| 6. Change in emissions factor (3-1) | 0.0162 MT CO _{2e} /MWh |

- *BPA extra-regional sales to CA (outside the EIM) are ~ 4,000,000 MWh per year.*
 $\sim 4,000,000 \text{ MWh} * 0.0162 \text{ MT CO}_{2e}/\text{MWh} * \$17/\text{MT CO}_{2e} = \underline{\underline{\sim \$1.1 \text{ million per year}}}$
- *BPA direct sales to CA in the EIM can be up to ~3,500,000 MWh per year, however the carbon compliance cost for these sales are compensated for through the GHG bid adder.*

Costs vs. Benefits of Direct Sales to California

| | Emissions Factor (MT CO _{2e} /MWh) | Carbon compliance cost for extra-regional sales to CA (~\$ million/yr) | Gross Benefits (~\$ million/yr) |
|---|--|--|------------------------------------|
| Pre-EIM | 0.0122 CO _{2e} /MWh | \$0.8 | |
| BPA joins EIM: no direct sales to CA | 0.0261 CO _{2e} /MWh | \$1.8 | \$29 |
| BPA joins EIM: with direct sales to CA | 0.0284 CO _{2e} /MWh | <u>\$2.0</u> | <u>\$33.6</u> |

- The benefits of selling directly into California in the EIM appear to far outweigh the costs.
- Bonneville can decide to stop selling directly to California in the EIM at any time.

EIM Transactions and Implications for Compliance with State GHG Emission Reduction Policies

Alisa Kaseweter, *Climate Change Specialist*



Overview

- State policy determines how purchases in the EIM will be treated for purposes of compliance with state programs. This is an evolving area and thus difficult to quantify.
- BPA recognizes that the flaws in the CAISO's EIM algorithm (resulting in a situation where federal resources are “deemed” delivered to California) may have implications for customers' compliance with other state GHG emission reduction and clean energy policies, e.g. CETA.

Washington Clean Energy Transformation Act

- BPA's customers *may* need to mitigate for EIM purchases.
 - Unresolved issue revolving around state rulemaking decisions on whether CETA is a delivery or procurement standard and how utilities will demonstrate compliance based on BPA's single system mix.
- Customers will not need to mitigate for unspecified power/natural gas under CETA until 2030, providing time for further development of this issue.

PHASE V CLOSE-OUT

Rachel Dibble, *Director of Market Initiatives*

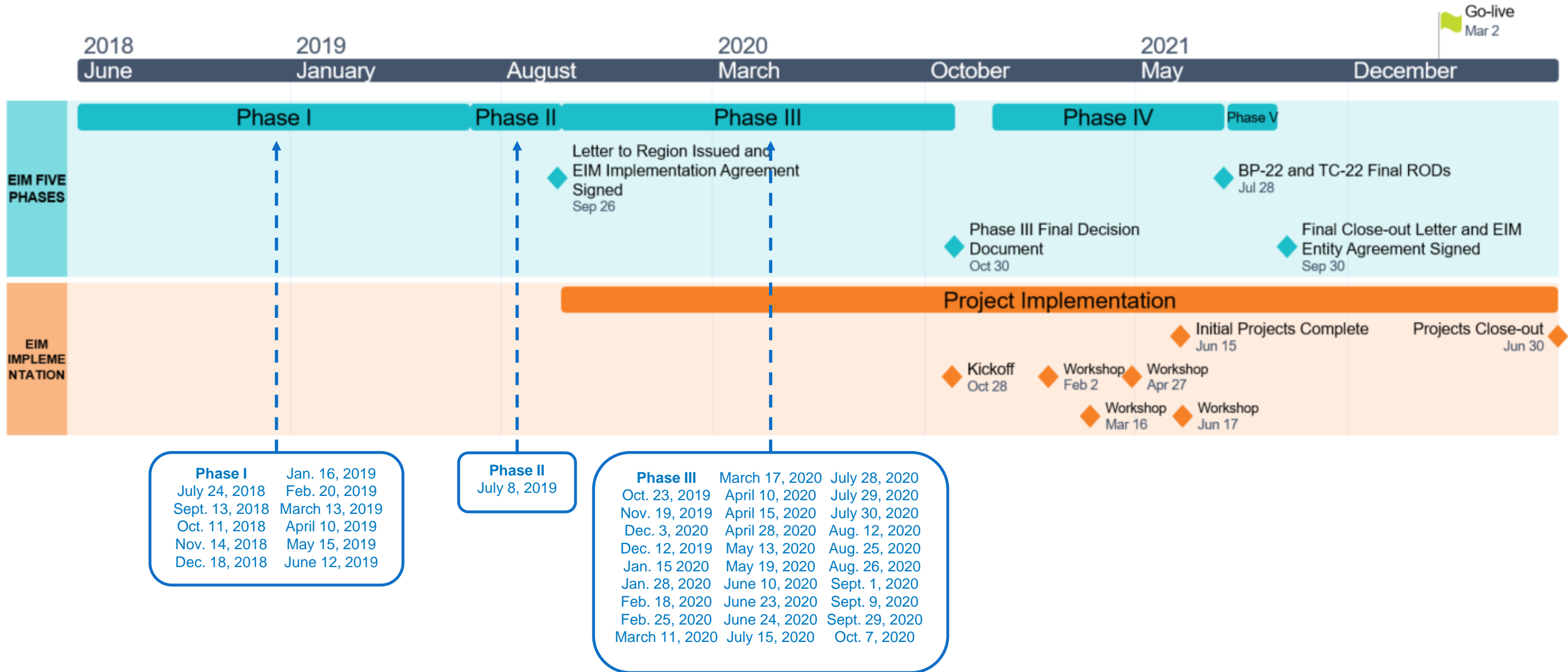
Steve Gaube, *Bulk Marketing Analyst*



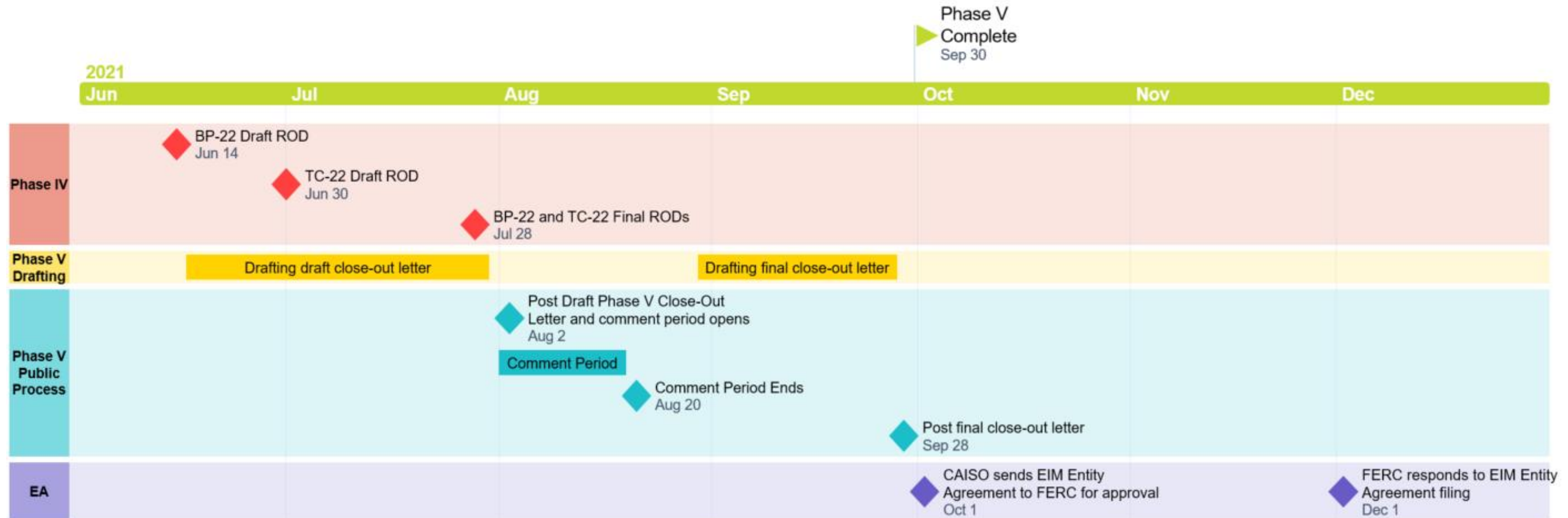
PHASE V OVERVIEW

- In the EIM Policy Record of Decision, BPA adopted a five phase decision process for determine whether or not to join the EIM.
 - *After the conclusion of the TC-22 and BP-22 proceedings, Bonneville will make a final decision whether to join the EIM. If Bonneville decides to join the EIM, Bonneville will write a letter stating that proposed decision and setting out how that decision is consistent with Bonneville's principles for joining the EIM that were established in Phase II. Stakeholders will have an opportunity to comment on this proposed decision. Bonneville will publish a final Close-Out Letter addressing the comments and setting out its decision on joining the EIM.*

FIVE-PHASE DECISION PROCESS



PHASE V TIMELINE



Note: Comment period starts Aug. 2 and closes Aug. 20 for a total of 19 days. BPA will not be able to extend the comment period or allow for late comments.

CLOSE-OUT LETTER

Phase I – IV

Review of the process and policy decisions made in Phase I (Exploration), Phase II (Implementation Agreement), Phase III (Policy Decisions) and Phase IV (BP-22 and TC-22).

Participation Principles

Assess whether or not BPA's six participation principles are met given the various decisions made in Phases I – IV.

Assess Changes

Determine if there have been any significant changes to underlying facts or the way the EIM operates, and whether any such changes jeopardize meeting the participation principles.

Decision

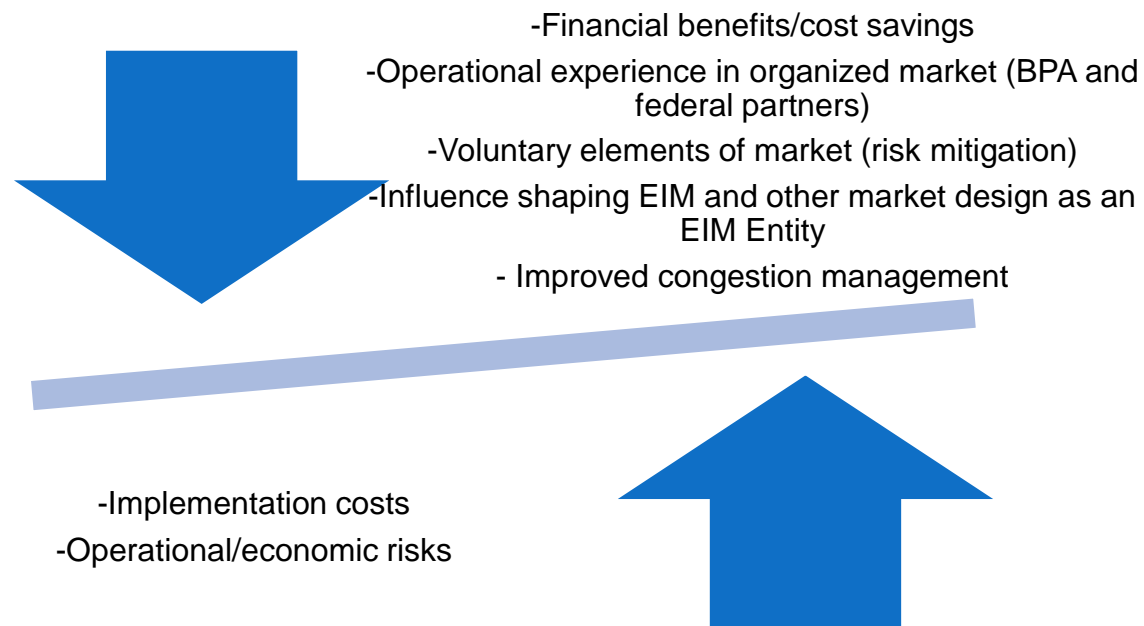
Proposed decision on whether or not BPA will join the EIM.

DECISION EVALUATION

Phase V Decision

Validate decisions made in September 2019 ROD by confirming EIM participation meets 6 principles

Weigh pros and cons based on current information



Future Decisions

Public Processes

- BPA’s potential participation in a future day ahead market
- BPA’s potential participation in RTO/ISO (either existing or future developments)
- BPA’s potential participation in NWPP Resource Adequacy program

BPA Evaluations (factoring in customer input)

- Level of support for EIM operational changes
- Level of support for CAISO governance changes

BPA Decisions

- Short term marketing decisions on EIM and bilateral market participation.

EIM PARTICIPATION PRINCIPLES

- 1 Bonneville's participation is consistent with its statutory, regulatory and contractual obligations.
- 2 Bonneville will maintain reliable delivery of power and transmission to its customers.
- 3 Bonneville's participation is discretionary and Bonneville retains its ability to effectively exit the market in the event participation is no longer consistent with these principles.
- 4 Bonneville's participation is consistent with a sound business rationale.
- 5 Bonneville's participation is consistent with the objectives of Bonneville's Strategic Plan.
- 6 Bonneville's evaluation of EIM participation includes transparent consideration of the commercial and operational impacts on its products and services.

BUSINESS CASE

- BPA's EIM business case was intended to inform whether EIM benefits justified EIM-related costs.
- BPA committed to updating its business case should we observe meaningful changes to market fundamentals or business case assumptions.
 - Evaluation and timing to be determined.
- The “bar” for revising the business case is whether changes are reasonably expected to change the business decision to join EIM resulting from the FY 2019 business case.

BUSINESS CASE - EVALUATION

- BPA will evaluate four areas for material changes:
 - FCRPS Capability
 - Compare recent spin capability (2019-present) to observations from the study period (2016-18) to ensure consistency.
 - EIM Market Price Volatility
 - Compare EIM price volatility to the study period (standard deviation changes) to ensure consistency.
 - Ongoing Costs
 - Compare BP-22 ongoing EIM cost estimates with business case assumptions to ensure consistency.
 - Market Fundamentals
 - Are the EIM rules for participation fundamentally the same or different; have any recent initiatives changed the value proposition for joining EIM.

BUSINESS CASE – TIMING

- Evaluation to take place in July 2021.
 - Allows for 2.5 years of additional data.
 - A summary of the evaluation will be included in the draft close-out letter for customer review and comment.

QUESTIONS?



COMMENTS

Please send your feedback to techforum@bpa.gov by Tuesday March 30. Specifically share with us:

- Feedback on today's topics including topics you would like to see next from the customer impact summary.
- Any additional topics you would like see covered at future workshops.

Thank you for participating in today's workshop. For more information, visit www.bpa.gov/goto/eim.

