



2018 Interconnection Process Enhancements (IPE)

Webconference

November 12, 2018, 2018

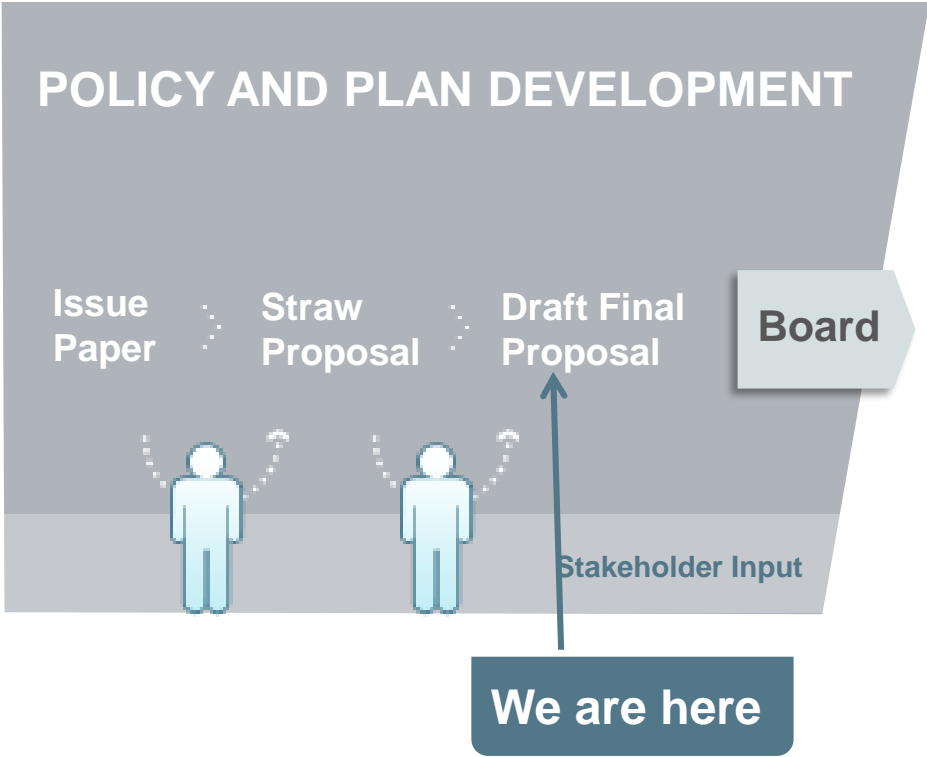
1:00 p.m. – 4:00 p.m. (Pacific Time)

Agenda

Time	Item	Speaker
1:00 - 1:10	Stakeholder Process and Schedule	Kristina Osborne
1:10 - 1:15	Introductions	Linda Wright
1:15 - 1:30	Background and Scope	
1:30 – 3:00	Interconnection Financial Security and Cost Responsibility Topics	Team
3:00 – 3:50	Interconnection Request Acceptance and Validation Criteria	
3:50 - 4:00	Next Steps	Kristina Osborne

STAKEHOLDER PROCESS

CAISO Policy Initiative Stakeholder Process



Background/Scope

2018 IPE goal is to modify and clarify the generator interconnection process to reflect changes in the industry and in customer needs

- IPE was completed in 2014
- 2015 IPE was completed in 2016
- 2017 IPE was completed March 2018
- 2018 IPE
 - Issue paper included 42 potential topics
 - Straw proposal included 25 topics
 - 8 topics were finalized in the straw proposal
 - Revised straw proposal included revisions to 17 topics
 - This addendum further explores Item 7.1 and includes two new topics

Initiative topics and associated presenter

Category	Topic	Presenter
Interconnection Financial Security and Cost Responsibility	Maximum Cost Responsibility for NUs and potential NUs	Jason Foster
NEW - Interconnection Request Acceptance and Validation Criteria	Interconnection Request Acceptance	Matt Chambers
	Validation Criteria	

INTERCONNECTION FINANCIAL SECURITY AND COST RESPONSIBILITY TOPICS

Cost Responsibility for Network Upgrades (7.1)

Proposed Definitions:

- **Assigned Network Upgrade (ANU)**

RNUs and LDNUs for which the Interconnection Customer has a direct cost responsibility. ANUs exclude CANUs until they become ANUs.

- **Conditionally Assigned Network Upgrade (CANU)**

RNUs and LDNUs whose cost responsibility is assigned to an earlier Interconnection Customer, but which may fall to the then current Interconnection Customer.

- **Interconnection Service Network Upgrade (ISNU)** (Plan of Service)

RNUs at the POI to accomplish the physical interconnection of the generator to the CAISO Controlled Grid. ANUs or CANUs can be identified as ISNUs.

- **Precursor Network Upgrade (PNU)**

Network Upgrades required for an Interconnection Customer that consist of (1) Network Upgrades whose cost responsibility is assigned to an earlier Interconnection Customer that has posted its third Interconnection Financial Security (IFS); and (2) Network Upgrades in the approved CAISO Transmission Plan.

Cost Responsibility for Network Upgrades (7.1) (cont'd)

Proposed Definitions (cont'd):

- **Current Cost Responsibility (CCR)**

The sum of the Interconnection Customer's current allocated costs for ANUs, not to exceed the MCR. This cost is used to calculate the Interconnection Customer's IFS requirement.

- **Maximum Cost Responsibility (MCR)**

The lower sum of an Interconnection Customer's ANU costs from its Phase I or Phase II Interconnection Studies, which may be adjusted if a subsequent reassessment converts CANUs to ANUs.

- **Maximum Cost Exposure (MCE)**

The sum of (1) the Interconnection Customer's MCR and (2) the lower sum of the Interconnection Customer's CANUs from its Phase I or Phase II Interconnection Studies.

Cost Responsibility for Network Upgrades (7.1) (cont'd)

CAISO reconsidered its proposal, definitions, and the framework of cost responsibility:

- Separately define ANU and CANU
- Separately define MCR and MCE
- Eliminates headroom issues with CANUs and ANUs by adjusting the MCR and MCE
- Establishes a fixed-cost concept for CANUs identified in the phase II study for the purpose of adjusting the MCR and MCE
- Shift the PTO cost responsibility for upgrades from the execution of the GIA to the point at which a project provides its third IFS posting

Cost Responsibility for Network Upgrades (7.1) (cont'd)

Proposed Cost Responsibility Framework:

1. Interconnection Customer assigned upgrades:

- a. Assigned Network Upgrades (ANU)
- b. Conditionally Assigned Network Upgrades (CANU)

Note: Either upgrade above could be identified as an Interconnection Service Network Upgrade (ISNU)

2. Cost Allocations for **ANUs**

- a. Cost allocations will follow current tariff provisions in Appendix DD, Sections 8.3 (RNUs including Short Circuit related impacts) and 8.4 (LDNU flow impacts), except
 - ISNUs are allocated 100% of upgrade cost to MCR
 - » For CCR and IFS posting requirements – clusters share cost equally with other projects in same cluster

Cost Responsibility for Network Upgrades (7.1) (cont'd)

3. Cost Allocations for **CANUs**

- a. Phase I – CANUs are allocated 100% of upgrade cost
- b. Phase II - Cost allocations will follow current tariff provisions in Appendix DD, Sections 8.3 and 8.4, and
 - ISNUs are allocated 100% of upgrade cost within MCE
- c. CANUs can:
 - a. be removed from a project's responsibility
 - i. become Precursor Network Upgrade (PNU) when at least one prior cluster project provides its third IFS posting for the network upgrade
 - b. become Assigned Network Upgrades when all prior clusters projects withdraw without providing its third IFS posting
- d. Project's phase II study will establish a fixed-cost for each CANU for sole purpose of adjusting MCR and MCE
 - At the time a CANU converts to an ANU, the MCR will increase by the fixed-cost of that upgrade. MCE remains unchanged.
 - At the time a CANU is removed from a project's responsibility, the MCE will be reduced by the fixed-cost of that upgrade. MCR remains unchanged.

Cost Responsibility for Network Upgrades (7.1) (cont'd)

4. MCR equals lower sum of Assigned Network Upgrades (2 above) from I and II interconnection studies
5. MCE equals sum of the 1) MCR, and 2) the lower sum of CANUs from the phase I and phase II interconnection studies (3 above)
6. IFS only posted for Assigned Network Upgrades
 - a. Not for Conditionally Assigned or Precursor Network Upgrades

Cost Responsibility for Network Upgrades (7.1) (cont'd)

Additional notes:

- After a CANU is converted to an ANU, all ANU cost allocations are recalculated based on the number of remaining projects that have cost responsibility for the ANUs. The sum of a project's revised ANU cost allocations are assigned to the project and any costs that exceed the MCR become the responsibility of the PTO.
- MCR adjustments will continue to be based on existing tariff guidelines in Appendix DD, Section 7.4.

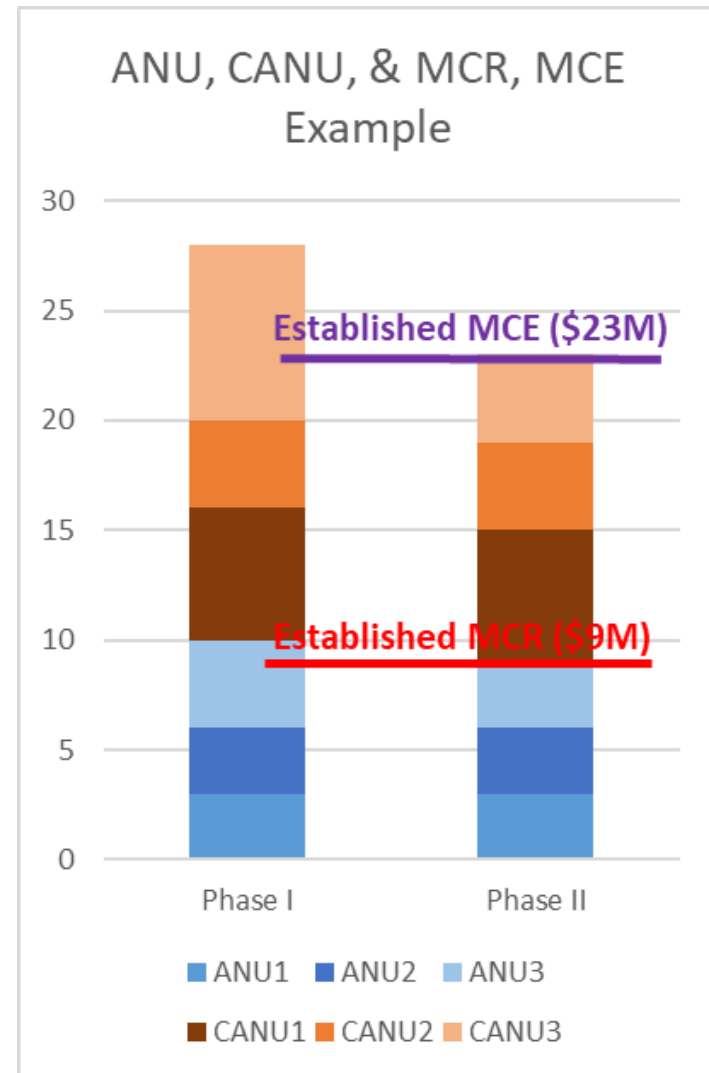
Cost Responsibility for Network Upgrades (7.1) (cont'd)

Example 1)

MCR is established by the lower sum of the ANUs in the I and II study reports.

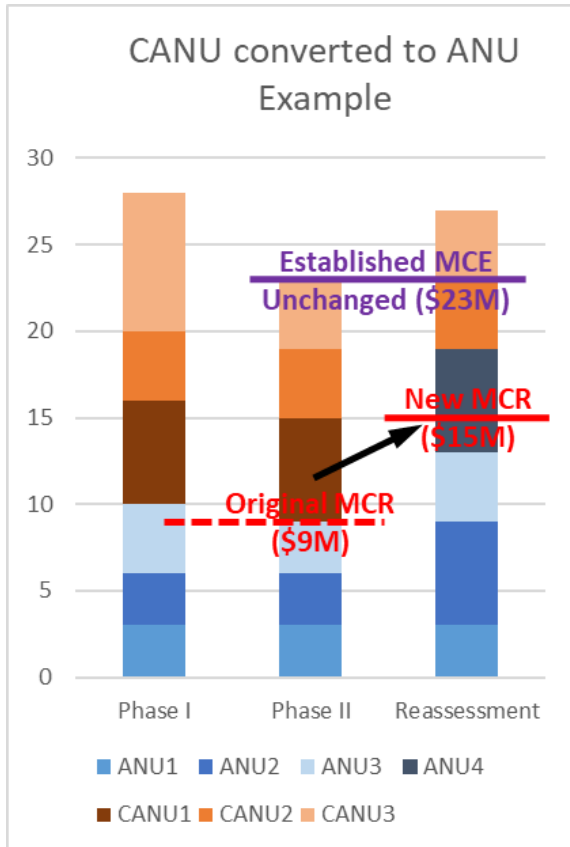
MCE is established by the sum of the MCR and the lower of the 1) sum of the full allocated cost of each CANU identified in the I study report (prior to the phase II study), or 2) sum of the allocated cost of each CANU from the II study report.

	ANU1	ANU2	ANU3	CANU1	CANU2	CANU3
Phase I	3	3	4	6	4	8
Phase II	3	3	3	6	4	4

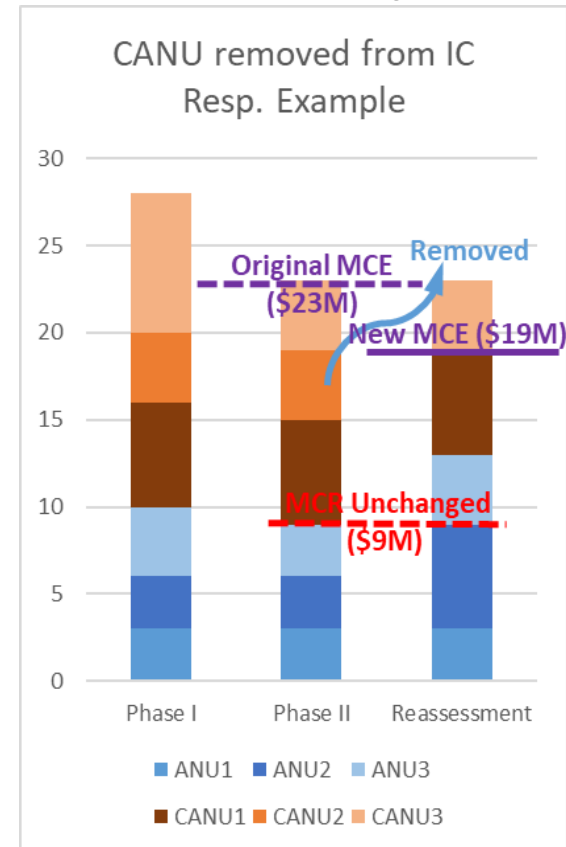


Cost Responsibility for Network Upgrades (7.1) (cont'd)

Example 2a) CANU1 becomes ANU4 (@\$6M). IC's MCR has increased by the fixed-cost of the CANU (\$6M) as identified in the II study. The established MCE remains unchanged.



Example 2b) CANU2 is removed from project's cost responsibility (@\$4M). IC's MCE has decreased by the fixed-cost of the CANU (\$4M) as identified in the II study. The MCR remains unchanged.



	ANU1	ANU2	ANU3	ANU4	CANU1	CANU2	CANU3
Phase I	3	3	4	---	6	4	8
Phase II	3	3	3	---	6	4	4
Reassessment	3	6	4	6	---	4	4

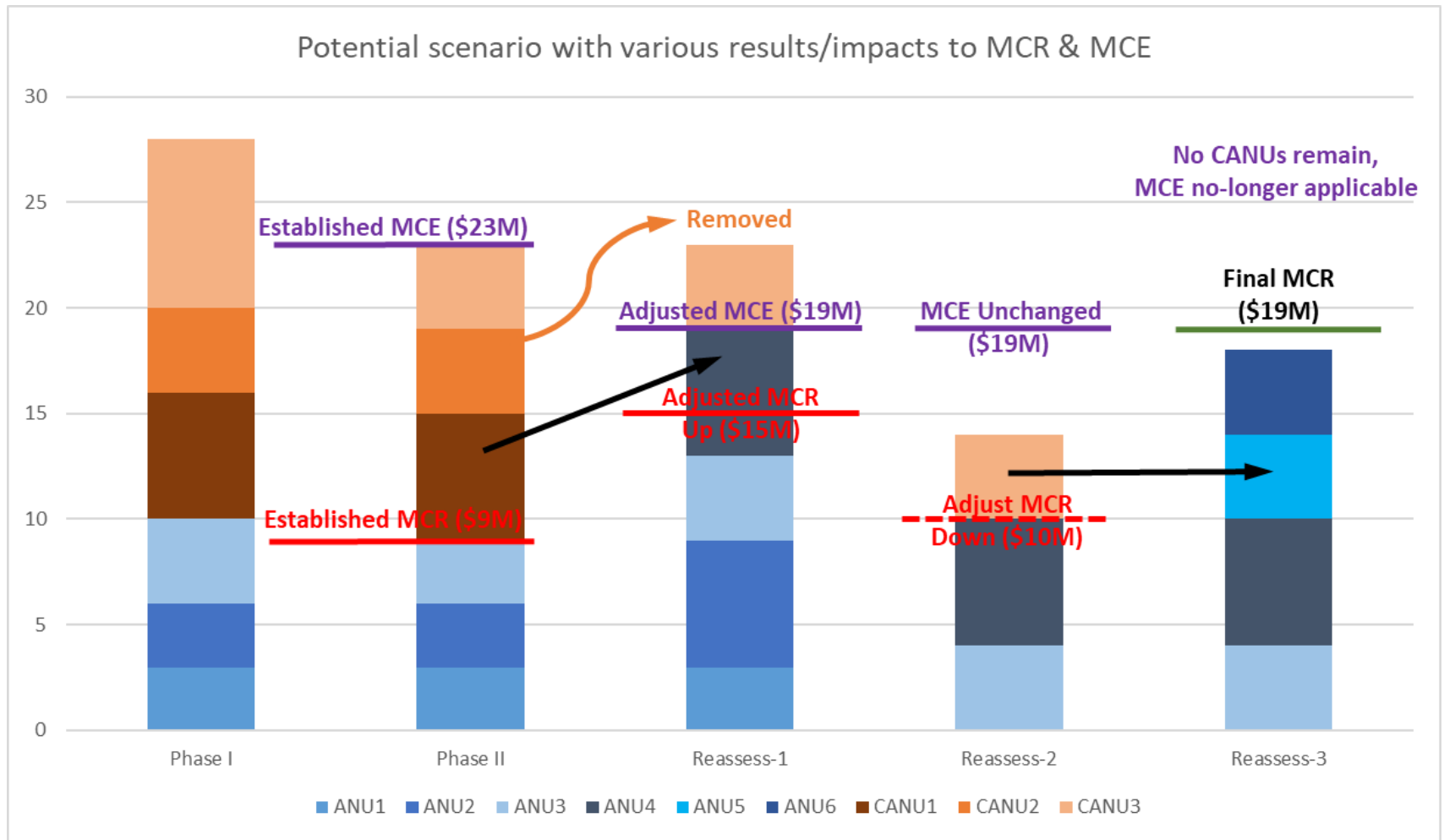
	ANU1	ANU2	ANU3	CANU1	CANU2	CANU3
Phase I	3	3	4	6	4	8
Phase II	3	3	3	6	4	4
Reassessment	3	6	4	6	---	4

Cost Responsibility for Network Upgrades (7.1) (cont'd)

Example 3) A more complex scenario with various results/impacts to MCR and MCE

- I. The MCR is established at \$9M and MCE is established at \$23M
 - II. In Reassessment 1,
 - I. CANU2 is removed from the project's responsibility, MCE reduced by Phase II fixed-cost of \$4M to \$19M
 - II. CANU1 is converted to ANU4, MCR increases by that Phase II fixed-cost of \$6M
 - III. ANU2 and ANU3 cost allocations have increased a total of \$4M (ANU2+\$3M and ANU3+\$1M)
 - III. In Reassessment 2,
 - I. ANU1 and ANU2 are removed from the project's cost responsibility.
 - II. MCR reduced by \$5M to \$10M, (based on Section 7.4)
 - III. MCE remains unchanged at \$19M
 - IV. In Reassessment 3,
 - I. CANU3 is converted to an ANU5 based on Phase II fixed-cost of \$4M
 - II. ANU6 added to project's cost responsibility at \$4M (due to system changes)
 - III. Result of the two items above:
 - I. The project's MCR increased by 1) Reassessment 1 Adjusted MCR (\$15M), plus 2) the fixed-cost CANU3/ANU5 conversion (\$4M), to \$19M**
- **The MCR increases back to the maximum allowed as established in from the phase I and phase II studies plus the cost of the CANUs converted to ANUs. Eligibility for downward adjustments to the MCR will follow Appendix DD, Section 7.4, which, in this reassessment 3 example, does not meet the criteria for a decrease.
- V. Lastly, all CANUs have been removed or converted to ANUs and the MCE is no longer applicable

Cost Responsibility for Network Upgrades (7.1) (cont'd)



	ANU1	ANU2	ANU3	ANU4	ANU5	ANU6	CANU1	CANU2	CANU3
Phase I	3	3	4	---	---	---	6	4	8
Phase II	3	3	3	---	---	---	6	4	4
Reassess-1	3	6	4	6	---	---	---	---	4
Reassess-2	0	0	4	6	---	---	---	---	4
Reassess-3	0	0	4	6	4	4	---	---	---

INTERCONNECTION REQUEST ACCEPTANCE AND VALIDATION CRITERIA TOPICS

Interconnection Request Acceptance (11.1)

- CAISO proposes to specify minimum requirements for an Interconnection Request (IR) application to be deemed complete
- If an IR application is not deemed complete by the close of the cluster application window, it will not move on to the validation process
- CAISO will respond to IR submissions within (5) business days with a determination of IR deemed complete, or IR deemed incomplete and identify deficiencies in IR application
 - Final submissions and attempts to cure must be submitted by April 15th
 - If CAISO exceeds the 5 business day response timeline, IC will be provided a day-for-day extension to the April 15th deadline

Interconnection Request Acceptance (11.1) (cont'd)

- Study Deposit
- Evidence of Site Exclusivity or Deposit In Lieu of Site Exclusivity
- Completed Appendix 1 (Interconnection Request)
- Completed Attachment A to Appendix 1 (Generator Technical Data - Excel)
 - Technical Validation Tab: Must contain no errors and all warnings must be explained
 - IR Validation and Comments Tab: Column A must be filled in with “Yes” or “N/A” on all items
- Site Drawing
- Single Line Diagram
- Reactive Power Curve
- Load Flow Model (*.epc)
- Dynamic Model (*.dyd)
- Plot showing flat run from the PSLF (screenshot okay)
- Plot showing requested MW at POI from the PSLF (screenshot okay)

Interconnection Request Acceptance (11.1) (cont'd)

Complete
Interconnection Request
Application
Package

Appendix 1
Interconnection
Request
(Word)

Attachment A to
Appendix 1
Generator
Facility Data

Site Drawing

Single Line
Diagram

Reactive
Power Curve

Power Flow
Model (*.epc)

Dynamic Model
(*.dyd)

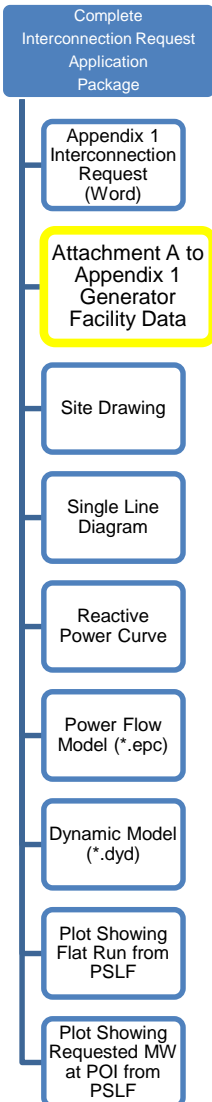
Plot Showing
Flat Run from
PSLF

Plot Showing
Requested MW
at POI from
PSLF

Technical Validation Tab: Displaying Errors

Sample - Solar ES Hybrid Project					
Generator Data Validation Check Button					
Data Error/Warning					
Type	Data Section	Data Item	Error/Warning Description	Entered Value	Suggested Changes
Error	VIII. Transformer Data	VIII.5 Cooling Type (OA,OA/FA, etc.)	data missing		Please enter a value for each type of transformers used
Error	VIII. Transformer Data	VIII.6 Temperature Rise Rating	data missing		Please enter a value for each type of transformers used
Error	VIII. Transformer Data	VIII.7 Rated Voltage	data missing		Please enter a value for each type of transformers used
Error	VIII. Transformer Data	VIII.8 BIL	data missing		Please enter a value for each type of transformers used

Interconnection Request Acceptance (11.1) (cont'd)



IR Validation and Comments Tab:
Column A must be filled in with “Yes” or “N/A” on all items

Sample - Solar ES Hybrid Project		
Customer Confirmation & Validation Checklist		
<p>The following section is intended for:</p> <p>1) the Interconnection Customer to review and ensure all items are included and tasks are complete prior to submitting this form for IR validation.</p> <p>2) the CAISO and PTO to review the data and attachments for completeness and sufficient to consider the IR valid.</p>		
Customer Confirmation	Objective is All Answers = Yes or N/A	CAISO & PTO Review
Supporting Document Submittal Confirmation (see Instructions & I. Project Configuration Tabs for further details)		
Yes	Project One-line Drawing	Choose
Yes	Site Drawing showing POI AND Site Map with aerial imagery	Choose
N/A	.kmz File (Google Earth)	Choose
Yes	Manufacturer supporting data sheets provided for the generators/inverters	Choose
Yes	Manufacturer supporting data provided for SCD characteristics	Choose
Yes	Section II. Generator reactive capability curves	Choose
Yes	Section III. (A.) Plot of generator terminal voltage versus field current	Choose
Yes	Section III. (B.) Copy of the block diagram of the excitation system from its instruction manual	Choose
Yes	Section III. (C.) Copy of a block diagram of the PSS from the PSS Instruction Manual and the correspondence between dial settings and the time constants or PSS gain	Choose
Yes	Section X A Tower Configuration Diagram	Choose
Yes	Power Flow Model in .epc format	Choose
Yes	Dynamic Model in .dtd format	Choose
Instructions	I. Project Configuration	II. Technical Validation
III. Power Flow Model	IV. Dynamic Model	V. IR Validation & Comments
Version Control		

Interconnection Request Acceptance (11.1) (cont'd)

Complete
Interconnection Request
Application
Package

Appendix 1
Interconnection
Request (Word)

Attachment A to
Appendix 1
Generator Facility
Data (Excel)

Site Drawing

Single Line
Diagram

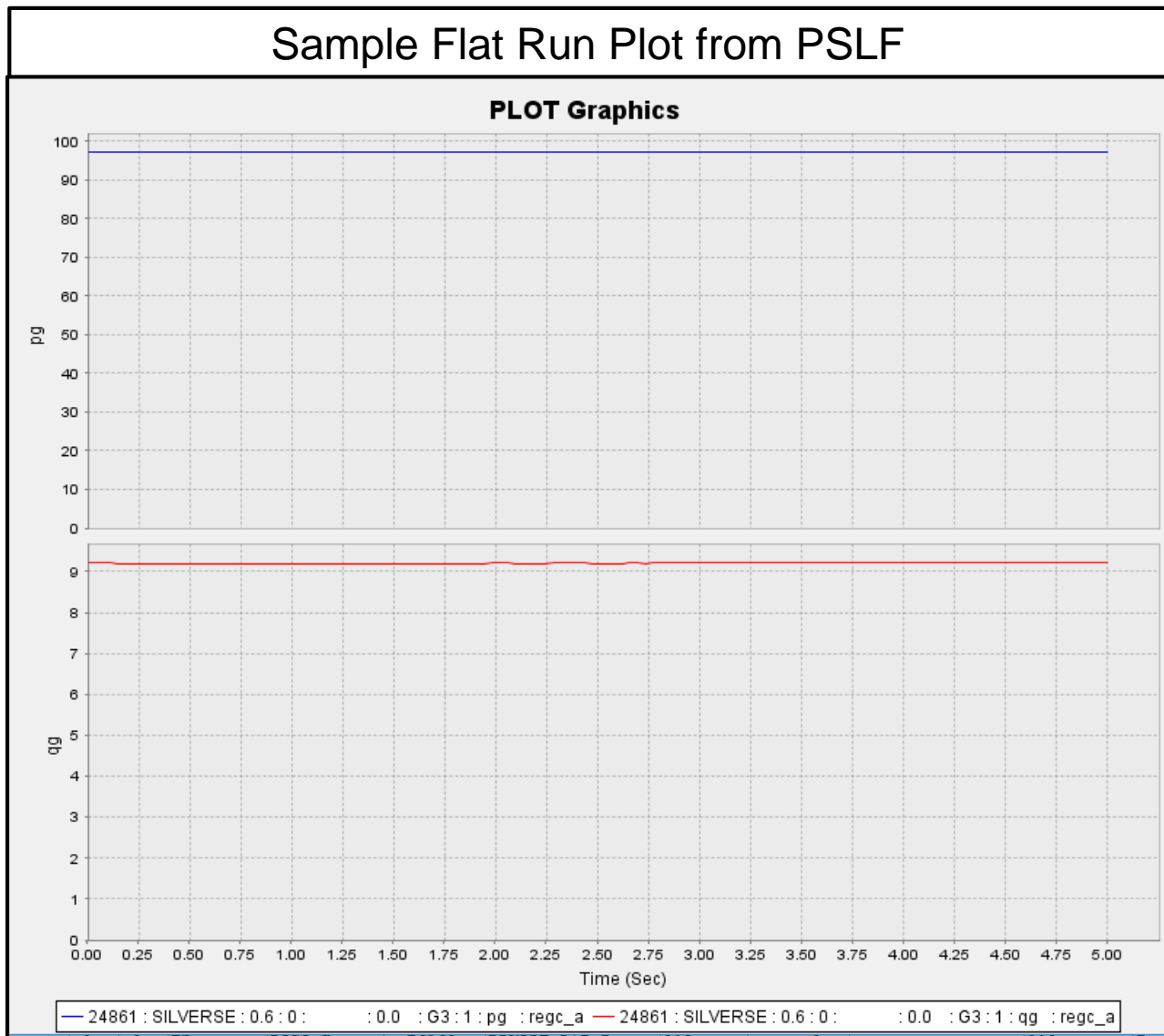
Reactive Power
Curve

Power Flow
Model (*.epc)

Dynamic Model
(*.dyd)

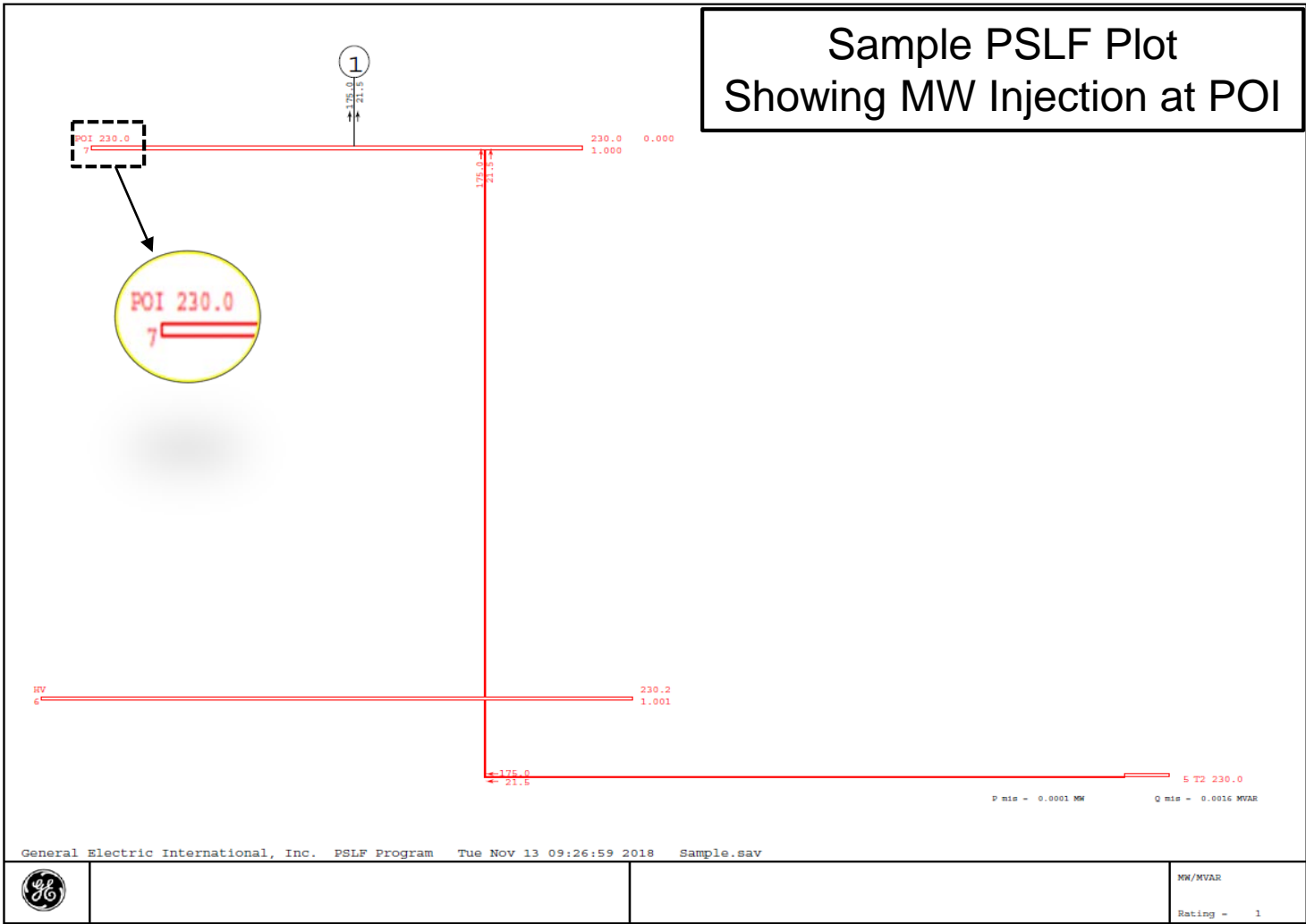
Plot Showing
Flat Run from
PSLF

Plot showing
Requested MW at
POI from PSLF



Interconnection Request Acceptance (11.1) (cont'd)

- Complete Interconnection Request Application Package
- Appendix 1 Interconnection Request (Word)
- Attachment A to Appendix 1 Generator Facility Data (Excel)
- Site Drawing
- Single Line Diagram
- Reactive Power Curve
- Power Flow Model (*.epc)
- Dynamic Model (*.dyd)
- Plot Showing Flat Run from PSLF
- Plot showing Requested MW at POI from PSLF



Interconnection Request Validation Criteria (11.2)

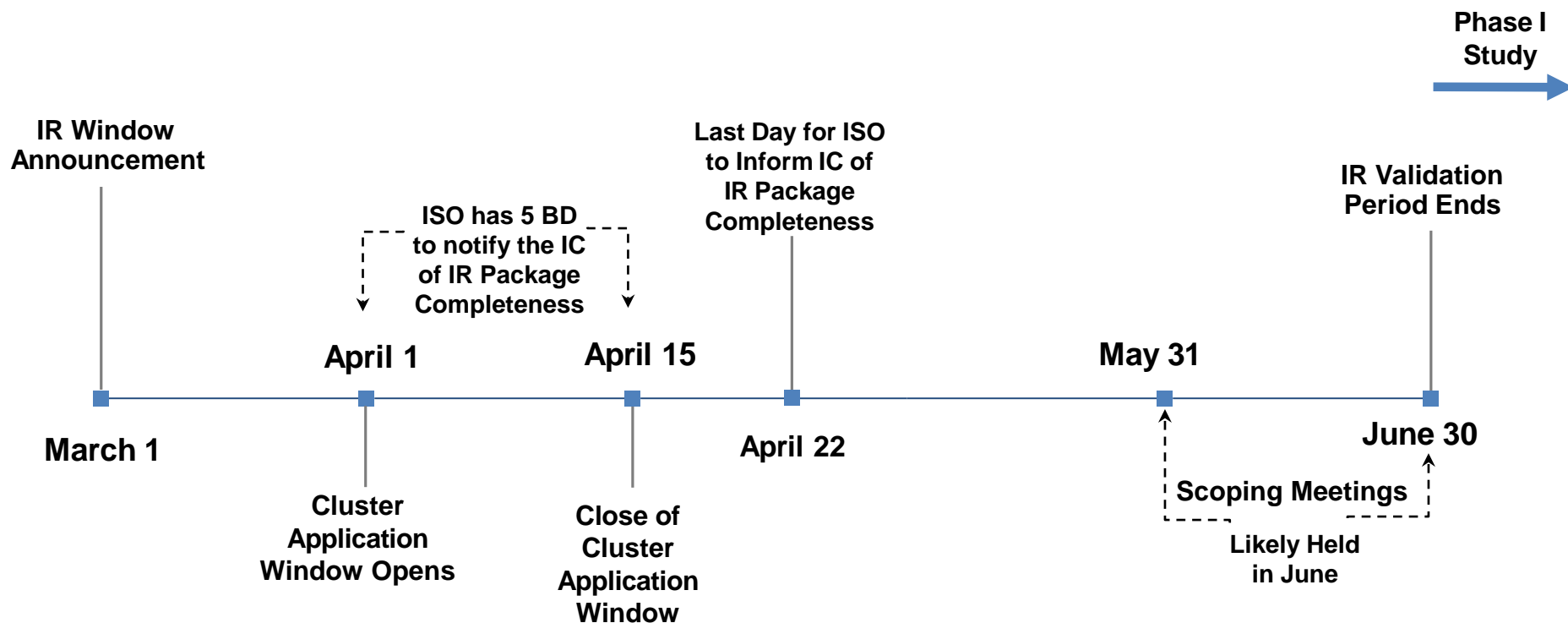
- CAISO has determined that the Interconnection Request (IR) validation process and timelines need adjustment to better align with the validation process
- Clusters 10 and 11, CAISO and the PTOs witnessed the following trends:
 - Increased volume of IRs
 - Increased complexity in proposed generating facility arrangements
 - Increased number of IRs missing application components or including inconsistent data
- CAISO proposes to modify the interconnection request validation process utilizing the following process

Interconnection Request Validation Criteria (11.2)_(cont'd)

- IRs are submitted during Cluster Application Window (April 1 - April 15)
- Within five (5) business days of receiving IR, the CAISO will acknowledge receiving the IR and will deem the IR package:
 - Complete; OR
 - Incomplete and will detail the components of IR package that were missing or incomplete
- IR applications not deemed complete by April 15th will not be accepted
- Within ten (10) business days of deeming an IR application complete, the CAISO and PTO will validate the data in the IR and will deem the IR:
 - Valid and ready to enter the phase I study process; OR
 - Invalid and detail the deficiencies that need correction to deem the IR valid
 - CAISO and PTO will review each subsequent receipt of information within five (5) business days up to May 31st
- IRs must be deemed valid and all scoping meetings completed no later than June 30th
- Interconnection requests that have not been deemed valid by the required date will be withdrawn from the cluster


Interconnection Request Validation Criteria (11.2)_(cont'd)

IR Validation Period: 2018 Example



NEXT STEPS

Next Steps



Milestone	Date
Post Addendum to Draft Final Proposal	November 13, 2018
Stakeholder call	November 20, 2018
Stakeholder comments due	December 3, 2018
February Board of Governors	February 6-7, 2019

Written stakeholder comments on the revised straw proposal are due by COB December 3rd to InitiativeComments@caiso.com

Materials related to the 2018 IPE initiative are available on the ISO website at:

<http://www.caiso.com/planning/Pages/GeneratorInterconnection/Default.aspx>