



# Opportunities for Adding Storage at Existing or New Generation Sites

Neil Millar, Executive Director, Infrastructure Development

Joanne Bradley, Lead Queue Management Specialist, Infrastructure Contracts & Management

# Agenda

Topic	Presenter
Welcome and introduction	Isabella Nicosia, Neil Millar
Modification process	Joanne Bradley
ISO study process	Joanne Bradley
Hybrid resources initiative update	Joanne Bradley
Next steps	Isabella Nicosia

# Introduction

- New projects, or additions that increase the output from a site, must apply through the ISO interconnection process
- Adding resources such as storage that do not exceed output from a site may qualify as additions that are not material modifications, and can proceed outside of the ISO interconnection process – for projects that are in the queue or online
- Options are available at present regarding managing deliverability, that change if and when the ISO's proposed deliverability methodology goes into effect (currently estimated to go into effect January 2020)

# Energy storage modifications

- Projects may request to add energy storage to their Interconnection Request or operating Generating Facility
  - Energy storage addition does not alter the approved Net-to-Grid MW capacity
  - If an energy storage modification request cannot be approved as requested, the CAISO will work with the Interconnection Customer to identify how much energy storage might be acceptable
- If an existing Generating Facility that has added energy storage is retiring, an assessment will determine if the energy storage can continue to operate after the retirement

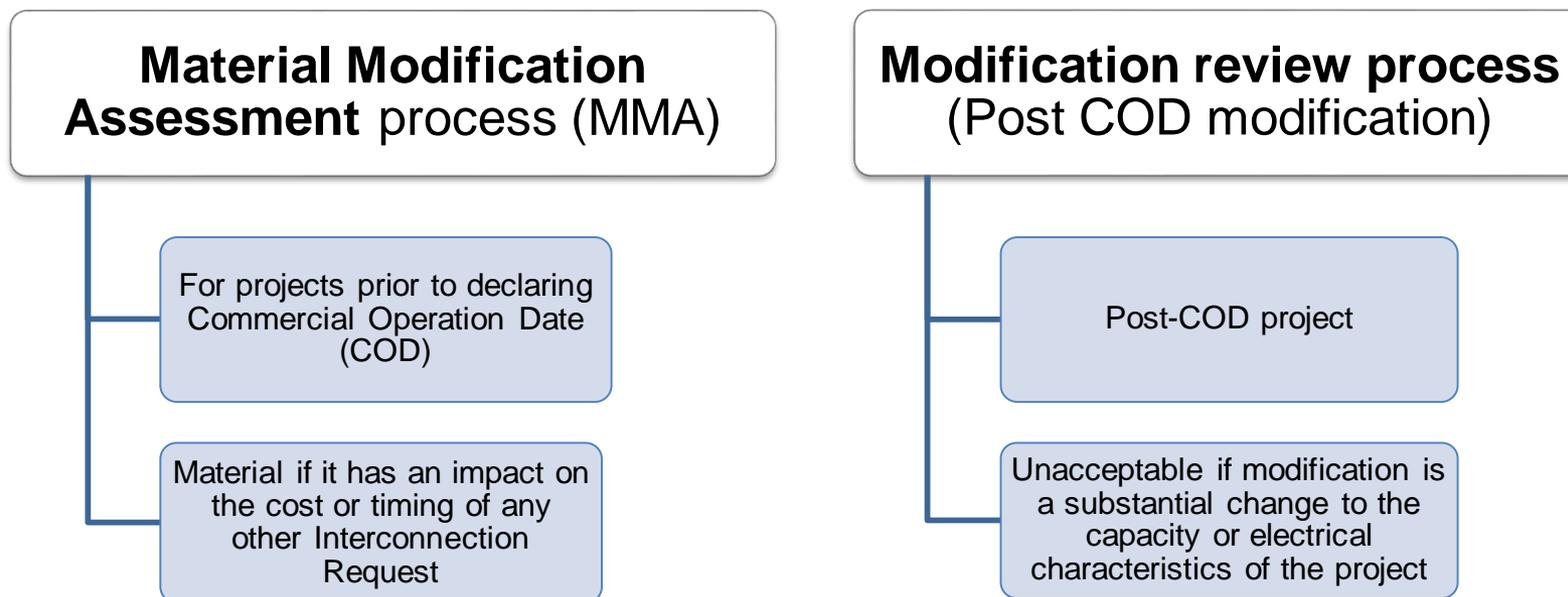


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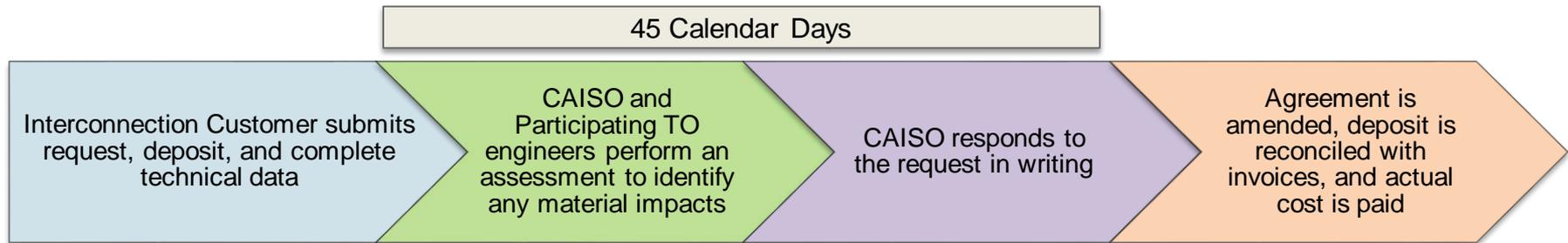
# Modification Process

# Modification review process for projects that are online or in the interconnection queue

- Two very similar processes for modification requests



# Modification review process (continued)



- Submit request and technical data for either request to: [QueueManagement@caiso.com](mailto:QueueManagement@caiso.com)
- The deposit amount is \$10,000
  - Interconnection Customer will be charged actual costs incurred by the CAISO and Participating TO, and remaining deposit, if any, is returned
- 45 day timeline does not start until technical data set is complete and free of deficiencies

## Technical data requirements (data set) include:

- Completed Interconnection Request - Appendix 1
  - Word document posted on caiso.com
- Completed Attachment A to the Interconnection Request
  - Excel document posted on caiso.com
- Load flow model
  - epc format
- Dynamic data file
  - dyd format
- Single line diagram
- Site map
- Inverter specification sheet

## Technical data requirements (continued)

- It has frequently taken several rounds of review over a couple of months in order for the technical data set to be complete and free of deficiencies
- Common deficiencies for energy storage additions include
  - Incomplete/missing data
  - data inconsistencies within the data set (e.g. data in Appendix 1 not corresponding to data in power flow (epc) and dynamic data (dyd) files)

# Technical bulletin for hybrid and co-located storage

- On October 19, 2016, the CAISO posted a technical bulletin for “Implementation of Hybrid Energy Storage Generating Facilities”
- Covers current master file modeling, metering and telemetry, interconnection and resource ID selection
- <https://www.caiso.com/Documents/TechnicalBulletin-ImplementationofHybridEnergyStorageGeneratingFacilities.pdf>

# Deliverability options when adding to online or queued projects

- Interconnecting customers seeking to increase plant capacity overall can pursue those increases through the ISO generation interconnection process
- Increasing deliverability – without increasing plant output
  - may be requested through annual allocation process
    - Projects with PPAs or shortlisted have higher opportunity to increase deliverability
- Energy storage may request deliverability transfer from existing portion of the project – *what we want to focus on today...*

# The “Transfer of Deliverability” situation is evolving

- How is deliverability transferred today?
  - The current deliverability methodology for solar resources studies a relatively high production level - approximately 90% of nameplate capacity
  - Generators adding storage to the site can currently transfer deliverability to the energy storage up to the study amount
- What are the changes that are being explored?
  - QC values for solar are dropping during the transition to the ELCC-based approach, and deliverability is going to be reassessed accordingly with lower solar study amounts
- What are the implications?
  - The proposed methodology will “close the window” for large transfers by reducing the solar study amounts to conceptually align with the new ELCC based QC methodology principles

## Transferring deliverability from existing portion of the project to storage – existing situation

- A project may currently retain the maximum deliverability associated with the maximum on-peak exceedance level (study amount) used in the **most recent** Deliverability Assessment in transferring deliverability to new on-site storage
- Example demonstrating two options for splitting deliverability:
  - 100 MW Solar project proposes to replace 20 MW with energy storage, resulting in 80 MW solar and 20 MW energy storage
  - The exceedance value for Solar is 90% and the deliverability study amount is 90 MW

	80 MW Solar	20 MW Energy Storage
Option 1:	97.2% PCDS $97.2\% \times 80 \times 90\% = 70\text{MW}$	20 MW FCDS
Option 2:	100% FCDS $80 \times 90\% = 72\text{MW}$	18 MW PCDS

# The ISO is proposing to transition to a new deliverability methodology

- The proposed methodology would lower study amounts for wind and solar projects, limiting the opportunity to “transfer”
- It is targeted for implementation in January 2020 (assuming ISO Board of Governors and FERC approval).
  - The 2020 TPD allocation process would be based on using the new methodology and after that process is complete the current transitional slack in deliverability will be eliminated
- MMA applications to transfer deliverability from solar to storage received on or before December 2 will be evaluated under the current deliverability methodology assumptions

## Implications and timeline to capture opportunity to transfer deliverability at existing levels

- MMA request submissions received on or before December 2 must be complete and valid by January 15 – as assessed by the ISO – to proceed.
- The 2020 TPD allocation will be based on assuming none of the complete and valid MMA requests are material modifications
- The MMA evaluation will be performed via "batch processing" in December through to the end of February
- Pre QC12 Network upgrade requirement determinations in the 2020 reassessment – which begin in March - will only consider MMA requests that have been fully evaluated and approved

The ISO notes that the CPUC does not currently have a “qualifying capacity” methodology for hybrid resources

- The ISO has recommended in Resource Adequacy workshop and in comments submitted in the IRP process, respectively, that:
  - The CPUC implement at least as an interim measure the qualifying capacity be the sum of the qualifying capacity of the renewable resource, plus the qualifying capacity of the battery, with the sum not to exceed the capacity at the point of interconnection
  - That the CPUC adopt this methodology (or a more nuanced approach) as quickly as possible to avoid impeding IRP-driven procurement



# ISO Study Process

# ISO study process - scope of modification analysis

- Modification analysis is a very high level simple analysis that evaluates the impact of the request based on:
  - Short Circuit Study
  - Protection Coordination Study
  - Limited Stability Analysis
  - Reactive Power Capability Analysis
  - Deliverability Assessment
- The studies for MMA requests seeking storage additions are primarily evaluating issues related to discharging.
- Normally, all of the requests are reviewed serially, but a batch review is envisioned for this transition period



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# Hybrid Resource Initiative Update

# Hybrid Resource stakeholder initiative

- Straw proposal discussed at stakeholder meeting on October 3, 2019
- Straw proposal includes
  - Definition of hybrid resource vs. two co-located resources
  - Use cases and business drivers
  - Forecasting
  - Markets and systems
  - Ancillary Services
  - Resource Adequacy counting rules and must offer obligation
  - Metering and telemetry



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Please note the December 2 requirement,  
and contact [QueueManagement@caiso.com](mailto:QueueManagement@caiso.com)  
for assistance as needed.