



California ISO

Hybrid Resources Straw Proposal Stakeholder Meeting

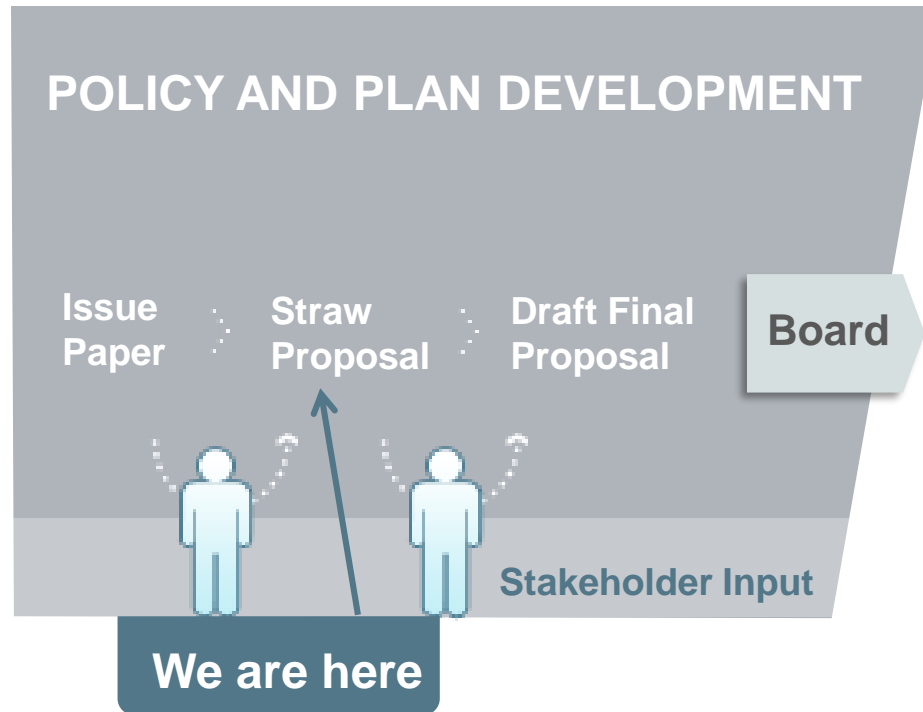
October 3, 2019

Agenda

Time	Item
10:00-10:05AM	Welcome and Introduction
10:05-10:20AM	Hybrid Resource Definition
10:20-10:50AM	Use Cases and Business Drivers
10:50-11:30AM	Forecasting
11:30AM-12:00PM	Markets and Systems
12:00-1:00PM	LUNCH
1:00-1:30PM	Markets and Systems (continued)
1:30-2:15PM	Ancillary Services
2:15-3:00PM	Metering and Telemetry
3:00-3:45PM	Resource Adequacy
3:45-3:50PM	Initiative Schedule and Implementation
3:50-4:00PM	Next Steps

WELCOME AND INTRODUCTION

Stakeholder Process



Policy initiative schedule

Date	Milestone
September 30	Publish Straw Proposal
October 3	Stakeholder Meeting on Straw Proposal
October 17	Comments Due on Straw Proposal
December	Revised Straw Proposal
February	Second Revised Straw Proposal
April	Draft Final Proposal
Q2	Board of Governors Meeting

Straw proposal elements

- Hybrid resources definition clarification
- Business drivers and use cases
- Proposes modifications:
 - Forecasting
 - Markets and systems
 - Ancillary Services
 - Metering and telemetry
 - Resource Adequacy

HYBRID RESOURCE DEFINITION

Hybrid resource definition

- CAISO proposes to define hybrid resources as those projects configured with only single resource IDs
 - Participates and optimized as single resource, for bidding, dispatch, settlements, etc.
- Co-located projects with two or more resource IDs are different from hybrid resources – effectively two distinct resources from CAISO view
 - Generally treated as completely separate resources for the purposes of market participation, bidding, resource adequacy, settlements, etc.
 - One main exception to this rule is coordination of dispatch and operations needed to limit output to project interconnection rights

Proposed Hybrid Resource definition

- “Hybrid Resources are a combination of multiple generation technologies that are physically and electronically controlled by a single owner/operator and Scheduling Coordinator and behind a single point of interconnection (“POI”) that participates in the CAISO markets as a single resource with a single market resource ID.”
 - CAISO also proposes to require that hybrid resources meet the minimum sizing requirements for at least one of the underlying generation components, either 500kW for a participating generator or 100kW for storage resources

Hybrid resources and co-located projects in the Queue

- CAISO Interconnection Queue includes over 35,000 MWs of hybrid resources and/or co-located projects seeking interconnection (as of July 3, 2019)
 - Comprises ~41% of total of requested capacity at point of interconnections (85,643 MWs total requests in queue)
 - Projects do not have to specify configuration as hybrid resource (single resource ID) or co-located (two or more resource IDs) until New Resource Implementation (NRI) process to achieve commercial operation
- Historically ~ 7% of the MWs of interconnection projects make it to commercial operation
 - CAISO expects approximately **2,500 MWs** of these hybrid resources and/or co-located projects currently in the queue to achieve commercial operation

USE CASE AND BUSINESS DRIVER DISCUSSION

Objectives of use case discussion

- Different business drivers and use cases contribute and motivate the development of hybrid resources and co-located projects
 - Discussion to begin a dialogue with stakeholders about drivers and motivations behind hybrid resource and co-located project development
- Inform the various options that should be provided and any modifications that may be needed to integrate these resources into CAISO markets
 - Can help provide guidance for resource developers to select appropriate project design/configuration necessary to accomplish their commercial objectives

Straw proposal identifies initial use cases and business drivers for further development

- Enhancing renewable energy production
 - Shifting energy production and price arbitrage
 - Providing ancillary services
 - Capturing Investment Tax Credit
 - Improving resource characteristics
 - Capturing resource adequacy value
 - Leveraging DC coupling benefits
- Many drivers will overlap with intended use cases and a few primary use cases will likely produce the majority of the development and participation of these resources

Enhancing Renewable Energy Production

- Renewable firming and smoothing is possible with the addition of energy storage
 - Renewable firming involves storage and renewable generation using storage to fill in variations in production so the combined output from renewable energy generation plus storage is more consistent and predictable
- Smooth short-duration variation in the production of renewables
- Energy storage can also help store excess renewable energy and release that energy when renewable energy is not available, avoiding curtailment

Shifting Energy Production and Price Arbitrage

- Energy shifting and arbitrage is accomplished by generating electricity at times when market prices are low and storing that energy for later release when market prices are high
- Energy storage used in conjunction with renewable energy generation can be charged using low-cost energy from the renewable generation so that stored energy may be used to offset other purchases or sold when it is more valuable

Providing Ancillary Services

- Hybrid resources can provide ancillary services similar to traditional generation
- Rather than being online, spinning, and synchronized with the grid, hybrid resources, being inverter-based technologies, can be available to the grid almost immediately
- Energy storage components simply need to be charged and available for dispatch

Capturing Investment Tax Credit

- Investments in renewable energy and storage are more attractive due to the contribution federal tax incentives
- The investment tax credit (ITC) for storage systems that are charged by a renewable energy system more than 75% of the time are eligible for the ITC
 - This ITC is currently 30% for systems 100% charged by PV and declining to 10% from 2022 onward

Improving Resource Performance Characteristics

- Traditional generators may be required to operate at less than optimal levels while waiting to be dispatched
 - Adding some energy storage can enhance the efficiency of resources by avoiding standby or minimum operating levels during periods when supply exceeds demand, which can be costly and may reduce environmental benefits
- Addition of storage to other generation technologies can enhance these resource's characteristics, such as ramp rates and minimum load
 - In combination, enhanced resources may be able to provide energy and ancillary services more efficiently and maximize resource owner profitability while reducing overall costs

Capturing Resource Adequacy Value

- Energy storage can be used to support peak capacity requirements by storing energy during times of low demand and acting as a peaking resource when demand is high
- When combined with renewable energy technologies, storage can drive synergies that may enhance overall resource adequacy value of hybrid resources
 - This can eliminate the need to procure more costly resource adequacy capacity, or longer term, defer the need to build additional generation capacity

Leveraging DC Coupling Benefits

- Traditional storage plus solar applications have combined independent storage and solar PV inverters at an AC bus
 - An alternative approach of coupling energy storage to solar arrays with a DC-to-DC converter can maximize production and improve profits for these hybrid resources
- DC coupling can allow for higher round-trip efficiencies
- DC coupling may also allow developers to capture new revenue streams not possible with traditional AC-coupled storage
 - Energy clipping recapture and low voltage harvesting
 - It can also help ensure eligibility for tax incentives

FORECASTING

Hybrid resources are not considered VER or EIR resources

- Any hybrid resource combining non-VER generation with VER generation is not eligible to be an EIR or PIR
 - FERC Order No. 764 defines a variable energy resource as “a device for the production of electricity that is characterized by an energy source that: (1) is renewable; (2) cannot be stored by the facility owner or operator; and (3) has variability that is beyond the control of the facility owner or operator.”
 - Appendix A to the CAISO tariff defines an Eligible Intermittent Resource as “A Variable Energy Resource that is a Generating Unit or Dynamic System Resource subject to a Participating Generator Agreement, Net Scheduled PGA, Dynamic Scheduling Agreement for Scheduling Coordinators, or Pseudo-Tie Participating Generator Agreement.”

Hybrid resource forecasting proposal (Single resource ID)

- CAISO provides forecasting for EIRs only
 - CAISO is not proposing to provide forecasting for hybrid resources
- Propose hybrid resource Scheduling Coordinators self-provide forecasts for any hybrid resources with renewable (VER) generation components
 - Will not apply to hybrid resources without renewable generation components

CAISO will use resource self-provided forecast in market processes

- Hybrid resources viewed by CAISO as a dispatchable generator and will have market awards and dispatch targets based upon self-provided forecasts
 - Hybrid resources will be required to follow dispatches similar to any other non-EIR generation resources
 - Extends use of existing functionality to update hybrid resource upper economic limit dynamically based on forecast
 - Similar to current VER resource treatment to ensure feasible market awards and dispatch instructions

Hybrid resource self-provided forecasting

- Hybrid resource forecasts should be provided to the CAISO and updated with 5 or 15 minute granularity for a minimum of a rolling 3-hour forward basis
- Self-provided forecasting allows flexibility
- Given this flexibility – CAISO will monitor all hybrid resource forecasts for any strategic forecasting that attempts to inappropriately arbitrage price differences or otherwise manipulate market outcomes inappropriately
 - Between the CAISO day-ahead and real-time markets and in real-time between FMM and five minute markets

Meteorological station requirements

- For SC/operator of a hybrid resource to be able to create and submit a forecast for the resource, the forecaster will need the VER component of the resource to have meteorological station(s) to feed accurate meteorological data into the forecast
- CAISO also proposed to require hybrid resources to follow current provisions for meteorological station data for the VER components of these resources
 - As described by Appendix Q Section 3.1 of CAISO Tariff to ensure all resources have adequate data being used in their wind or solar forecast creation
 - CAISO does not intend to require that resources also provide all MET station data to CAISO as part of this proposal

Forecasting for co-located projects with common POI (two or more resource ID configuration)

- CAISO is evaluating how impacts of proposed interconnection rights constraint for co-located projects may need to be considered or incorporated in the VER forecasting process
- Likely need to introduce a requirement for CAISO to incorporate these constraints and any related reductions in VER market awards or output as an input to CAISO forecasting
 - Need to allow CAISO to adjust VER forecasts for any VER resources with interconnection constraint for co-located resources
 - CAISO has a similar forecasting methodology in place for VER resources when supplemental dispatch is present

MARKETS AND SYSTEMS

Incorporating Hybrid Resource forecasts in market processes

- CAISO proposes to modify the market processes to consider the resource self-provided forecast
 - For hybrid resources (single resource ID configurations) with VER components
- Similar to the manner the market considers VER forecasts today
 - CAISO believes it can leverage this existing functionality for VERs
 - Updated upper economic limit dynamically every 5 minutes based upon forecast

Utilizing hybrid resource forecasts in market processes

- SC for a hybrid resource submit an economic bid (either with or without a self-schedule) and a self-provided forecast
- CAISO will receive and process the forecast to establish the upper economic limit for that resource
 - If a hybrid resource submits a self-schedule the resource will be a price taker at the submitted forecasted output
 - In other words, CAISO will ensure a feasible dispatch for any self-scheduled hybrid resources by setting the resources upper economic limit at the provided forecast output

Bidding timeframes

- CAISO also considered the possibility of modifications to market systems that would provide for bids/offers for these hybrid resource units to be updated more frequently than current timeframes, closer to real time
 - Currently generator bids and self-schedules can be updated once an hour at 75 minutes prior to the operating hour
- CAISO has determined that it would require extensive systems and software modifications to incorporate more granular bidding capabilities
- Therefore, CAISO is not proposing such extensive system and market timeline changes through this initiative at this time

Two or more resource IDs overall output limitation – project interconnection rights

- Current implementation limits Pmax on each resource and can result in stranded capacity that cannot be utilized

Example of stranded capacity on co-located resource with two resource IDs	
Project characteristics	Size (MWs)
Project POI maximum injection rights:	100 MW (total POI rights)
Co-located project resources:	Solar PV resource: 100 MW installed capacity (Master file Pmax: 50MW)
	Energy Storage resource: 100 MW installed capacity (Master file Pmax: 50MW)
Project installed capacity:	200 MW (total installed capacity)
Project master file Pmax:	100 MW (total master file Pmax)
Potential stranded capacity:	50 MW (100 MW POI right – 50 MW Pmax of each individual resource ID)

Proposing to develop interconnection rights constraint to address issue

- For co-located projects – two or more resource IDs (NOT hybrid resources), intended to limit output to the maximum of the project interconnection rights
- Will ensure co-located resource outputs remain less than or equal to the co-located project's maximum POI injection rights without stranding capacity from either of the co-located resource IDs
 - Developing functionality to optimize for both energy and AS
 - Existing intertie functionality has the capability to consider energy and AS together, this intertie functionality will need to be developed for internal resource constraint to incorporate the ancillary services aspect into final solution

Interconnection rights constraint for co-located projects

- Proposed constraint will reflect the co-located project's total interconnection rights
 - Adjust market awards, schedules and dispatches to the injection limits included in a new master file field
 - Can be modeled in CAISO Energy Management System (EMS) outside of full network model process, easing implementation
- Constraint will not limit or impact the bid amount (MW) or bid price (\$) of the co-located resources subject to the proposed constraints
- CAISO will be able to incorporate multiple interconnection rights constraints at a single POI
 - Allows for multiple different sets of co-located projects under multiple resource ID configurations to be managed to their individual interconnection rights at a single POI

CAISO has reviewed other potential solutions

- CAISO also explored the use of other solutions, such as grouping constraints and extension of MSG functionality
 - CAISO believes that these other options would be too complex and have adverse pricing impacts
- CAISO believes the most feasible solution is to pursue development of proposed interconnection rights constraint

Interconnection rights constraint implementation timing

- Previously targeted fall 2020 potential implementation
 - Project sizing will not fit in 2020 release with the AS solution that requires a larger implementation lift
 - To develop both AS and energy under one project requires moving to fall 2021 implementation

Co-located interconnection limits: interim solution

- CAISO proposes to maintain current approach – limit combined Pmax of co-located resources to interconnection rights
 - Allow resource developers to select Pmax for each co-located resource to have some choice in split of total interconnection among co-located resources
 - Will not resolve issue of stranded capacity on some portion of installed capacity of each co-located resource (if project is oversized)
- CAISO considered other options to allow true Pmax in master file such as tariff requirement that SCs ensure bidding to manage to POI limit
 - Would require modifications to systems to allow for controls and reporting to be provided and must consider feasibility of implementing this approach
 - Unable to implement controls and system changes quickly

ANCILLARY SERVICES

Ancillary Services provision by hybrid resources

- Any hybrid resources that have been defined as either NGR or mixed fuel type generating facilities will be eligible to participate in ancillary services market
- Co-located projects with two or more resource IDs are eligible to provide ancillary services depending upon the individual generating unit certification
- Specific rules for the various ancillary services are defined in Appendix K
- Hybrid projects with a single resource ID are eligible to provide ancillary service as a single combined generating facility, provided it complies with appropriate provisions of Appendix K

Metering and telemetry for AS provision by hybrid resources

- Additional telemetry and submission of underlying resource components forecasts and other data is needed to certify that hybrid resources are able to provide the ancillary services they have been awarded
- Propose to require additional data and telemetry for hybrids resources to qualify for AS provision
 - Plant potential for renewable resource components
 - State of Charge for storage components
- Need this info to ensure actual production capabilities, confirm the resource ability to provide the services awarded, and apply payment rescission if needed

Plant potential forecasts

- CAISO proposes that hybrid resources (single resource ID) providing Spinning Reserve, Non-Spinning Reserve, and Regulation that have a VER component (renewable energy generation) must provide a new data point for the “plant potential” of the VER component from the plant side of the inverter/control system
 - Needed for hybrid resources so that CAISO is aware of the potential output of the resource if it has a VER generation component

Storage component state-of-charge

- State-of-charge for storage devices is a current data point for NGR resources
- CAISO believes it is necessary to extend requirements for knowing the state-of-charge of storage generation components of hybrid resources

AS capabilities must be provided

- CAISO believes it is necessary to propose these requirements for hybrid resources that wish to provide Spinning and Non-Spinning Reserves and Regulation service to allow the CAISO markets to maintain capacity for provision of these ancillary services
- Already undertaking related modifications to ensure market systems will protect for the necessary headroom by adjusting awards for resource's output based on their potential output, or the plant potential, of the VER components and the state-of-charge of energy storage components of hybrid resources providing ancillary services

Proposal for additional data and telemetry limited to hybrid resources

- Proposed requirements will only apply to those hybrid resources seeking to provide AS and do not apply to co-located projects with two or more resource IDs
- Co-located projects with two or more resource IDs will continue to be treated as separate resources for provision of AS
 - Required to meet any certification and AS provisions requirements on a standalone basis, *i.e.*, existing AS provisions apply to each individual resource for co-located projects with two or more resource IDs

Frequency response capability from hybrid resources

- CAISO proposes that for hybrid resources with energy storage to be certified to provide Spinning Reserves, the resource must demonstrate that they can provide the frequency response as outlined in Appendix K
- Specifically for hybrid resources with gas-storage combinations, the energy storage component must be of sufficient size to provide the frequency response for the entirety of the certified spinning reserve for situations where the gas portion of the unit is off-line

Frequency response capability from hybrid resources – minimum sizing requirement for gas + storage hybrids

- Minimum sizing requirement for gas-storage hybrid resources depends on the modeling of the resource and if it has governor response
 - If modeled as a traditional generation resource: A gas-storage hybrid will have governor response – this modeling configuration will need to provide frequency response according to the Minimum Governor Performance requirements under Appendix K
 - No minimum storage component sizing requirement necessary under this approach because governor response requirements should be sufficient to provide required response

Frequency response capability from hybrid resources – minimum sizing requirement for gas + storage hybrids (continued)

- Minimum sizing requirement for gas-storage hybrid resources needed if modeled with frequency responsive device (i.e., inverter based response)
 - If modeled as a NGR resource: A gas-storage hybrid will not have governor response, instead it will have a frequency responsive device
 - These configurations will need to provide frequency response according to the Minimum Frequency Responsive Device Performance requirements under Appendix K
 - NGR configurations need a 10% minimum storage sizing requirement to enable equivalent provision of frequency response
 - i.e., energy storage will need to comprise 10% of the capacity certified for provision of Spinning Reserves under these configurations

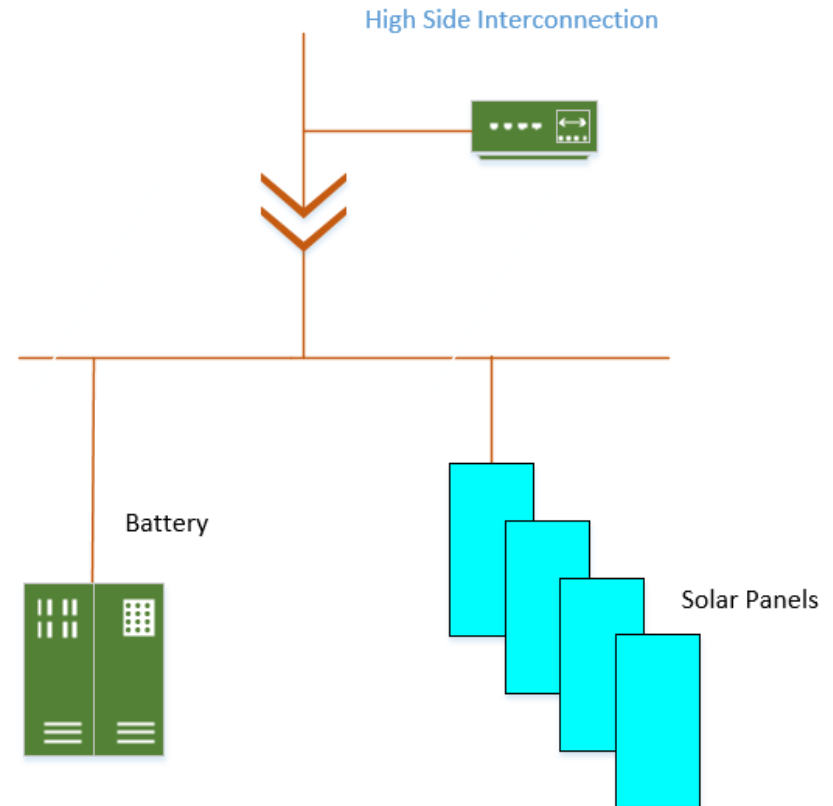
METERING AND TELEMETRY

Metering and telemetry for AS provision by hybrid resources

- Proposing to require additional data and telemetry for hybrids resources to qualify for AS provision discussed previously
- CAISO is also considering this data and telemetry be required for all hybrids regardless of AS certification status
 - Plant potential, state-of-charge, telemetry on each component
 - Ensure CAISO can forecast expected renewables production on a five-minute basis and better understand the expected renewable production in advance of actual operations so the CAISO commits needed dispatchable resources to meet all NERC real-time control performance standards
 - State policy goal tracking – renewable production

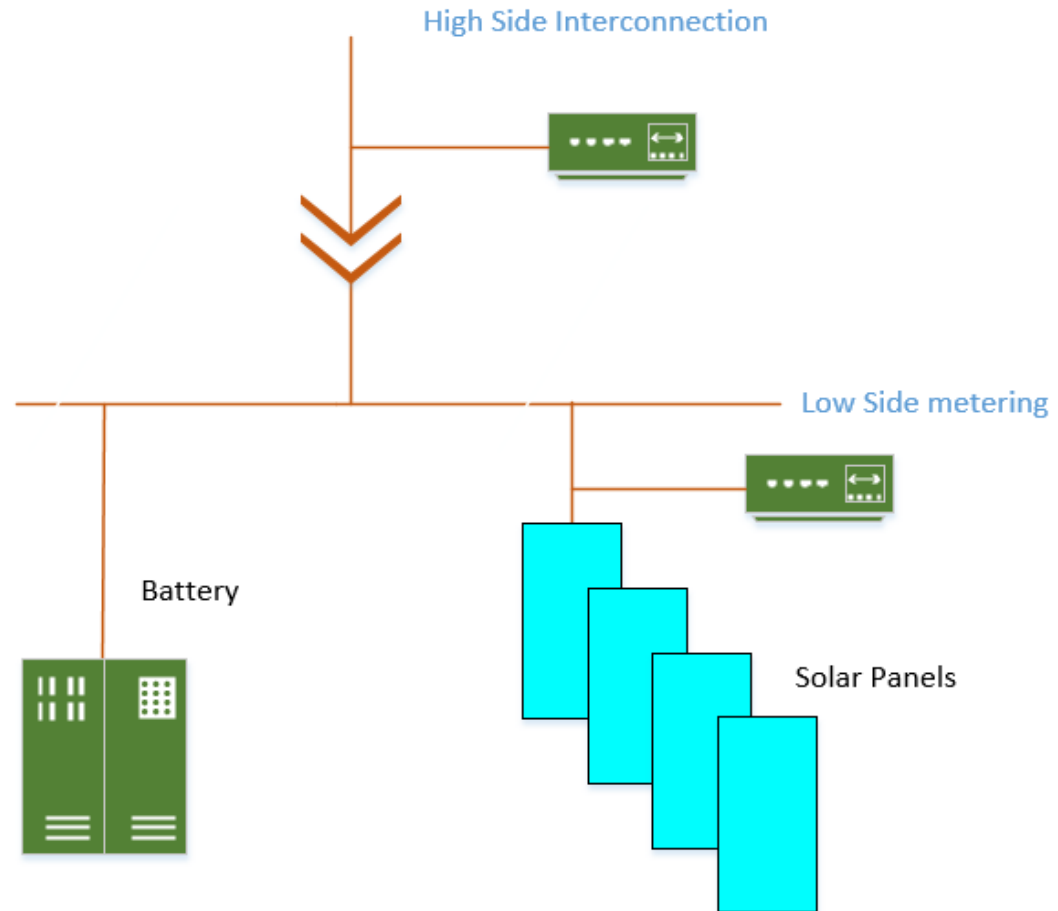
Hybrid resources: High Side metering, charging from on-site generation

- Storage device will only charge from on-site generation and will not charge from the grid
- A limiting scheme must be in place to prevent charging from the grid
- High side meter will measure the total resource output for settlements and RPS reporting if generation source is eligible



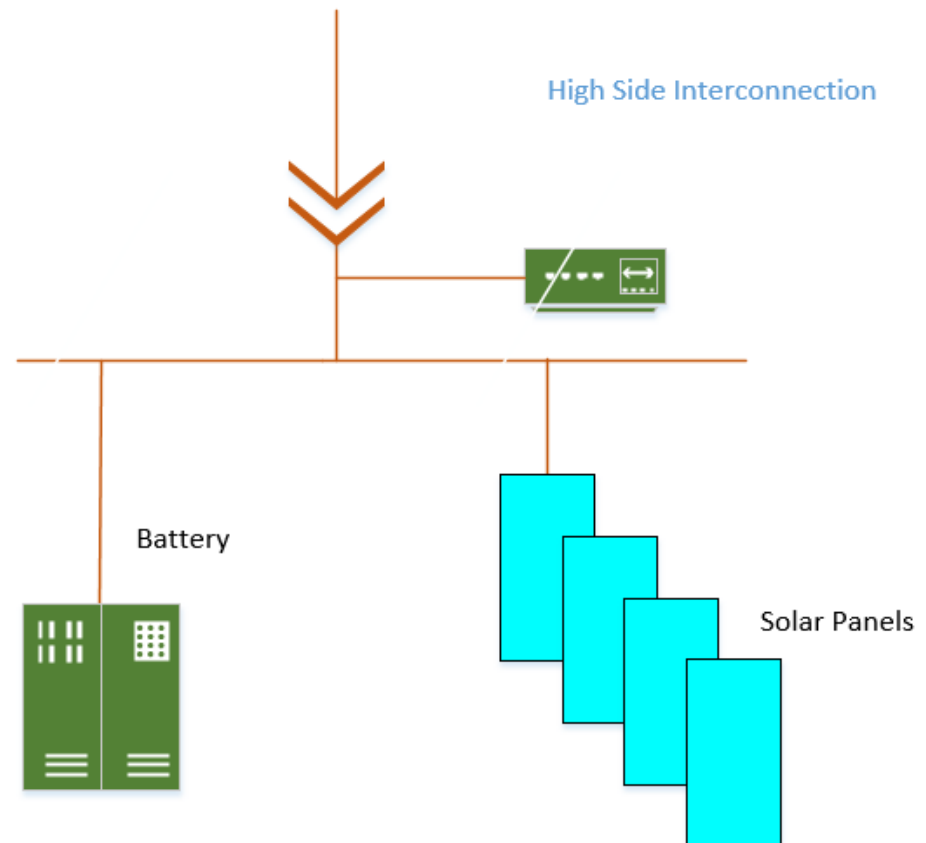
Hybrid resources: High Side metering, charging from both on-site generation and the grid

- Storage device will charge from on-site generation and the grid
- High side meter will measure the total resource output (gen and load) for settlements, and a second meter is required for RPS reporting calculations if generation source is eligible



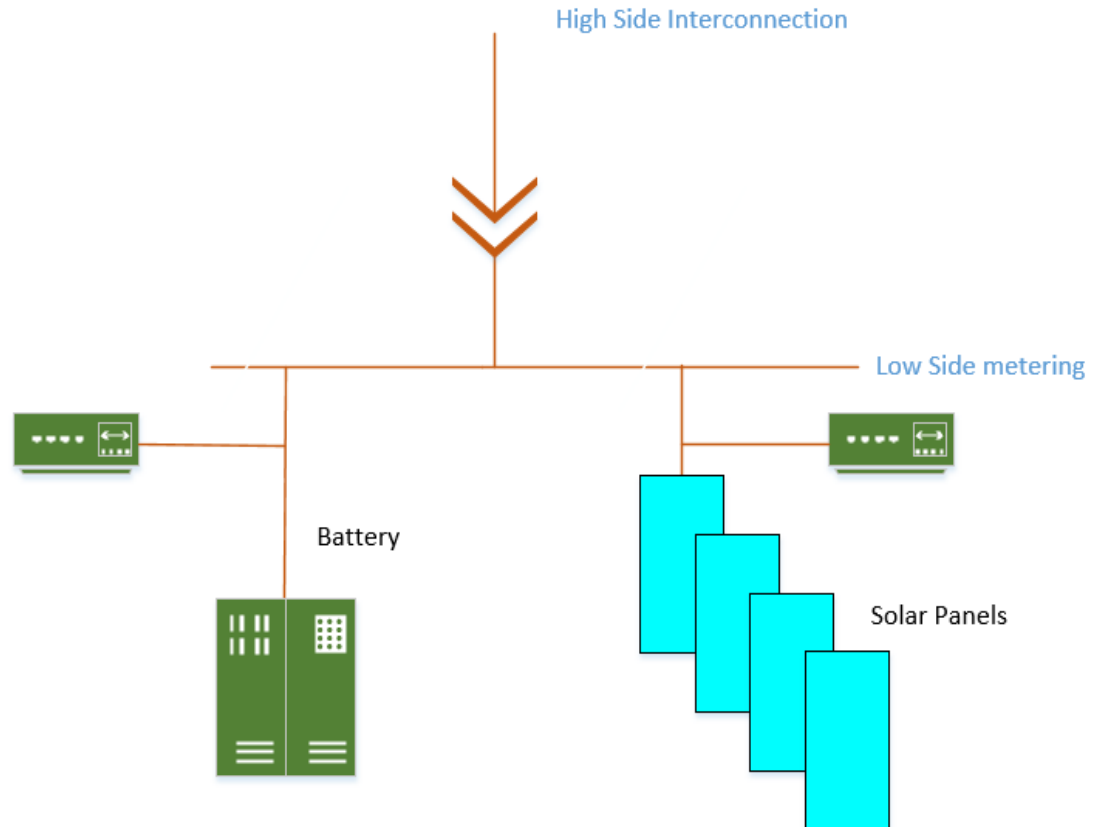
Hybrid resources: Low side metering, charging only from on-site generation

- Storage device will only charge from on-site generation and will not charge from the grid
- A limiting scheme must be in place to prevent charging from the grid
- Low side meter will measure the total resource output (gen and load) for settlements, and for RPS Reporting calculations if the generation source is eligible



Hybrid resources: Low side metering, charging from both on-site generation and the grid

- Storage device will charge from on-site generation and the grid
- Low side meter will measure the total resource output (gen and load) for settlements, and a second meter is required for RPS reporting calculations if generation source is eligible



RPS reporting

- CAISO is currently registered with WECC as a Qualified Reporting Entity (QRE)
 - CAISO role as a QRE is to submit meter data associated with renewable energy on behalf of ISO Metered Entities using the WREGIS application
 - CAISO intends to continue to provide QRE related RPS reporting to WREGIS in the future for hybrid resources
- CAISO believes current metering configuration options provide flexibility needed to report RPS production accurately
 - CAISO will work closely with project developers during design and implementation of new hybrid resources to ensure that metering configurations allow for RPS reporting and any necessary netting and losses calculations are appropriately developed

RPS reporting – storage conversion losses

- Some stakeholders provided feedback on the issue paper stating that they disagree with the required treatment of losses for hybrid resources with storage components
- CEC RPS Eligibility Guidebook provides:
 - The reportable RPS energy from this hybrid resource configuration would be equal to the renewable energy produced net of any losses from storage
- Treatment of storage conversion losses for RPS purposes is outside of the CAISO's purview
- CAISO does not consider this issue to be in scope of the hybrid resources initiative

RESOURCE ADEQUACY

Resource Adequacy (RA) background

- RA counting rules and Must Offer Obligations (MOO) for hybrid resources are vital
- CAISO defers to Local Regulatory Agencies (LRA's) Qualifying Capacity (QC) RA counting rules
- LRAs establish resource QC values (e.g., CPUC publishes an annual QC list with QC values for all applicable resources)
 - CAISO takes this information and studies resources for deliverability, produces Net Qualifying Capacity (NQC) list annually
- Once QC and NQC of resources are established, resources can be used to meet RA requirements, be shown on RA and Supply plans that establish resource's RA status with CAISO
 - These shown RA resources are then subject to CAISO's RA provisions regarding availability, including CAISO Must Offer Obligations (MOO) requirements

RA counting proposal for hybrid resources

- CAISO supported CPUC adopting the following approach that would be more appropriate as an interim methodology:

ELCC for VER component + Pmax (4 hour duration sustained output) of storage component

- *Subject to deliverability*
- *Capped at interconnection capacity rights*
- Also proposing to adopt additive underlying tech/generation type approach as default QC methodology
 - e.g., Thermal – Pmax, Hydro – historical

Hybrid resource QC example

Resource/ component	QC methodology for tech type	Installed capacity	QC value
Solar	ELCC (Assume 44% ELCC value for solar for example monthly QC value)	100 MW	44MW (100MW x 44% ELCC = 44MW)
Storage	4-hour sustained duration	100 MW (4 hour duration: 400MWh)	100 MW
Combined hybrid resource	ELCC for solar component plus Pmax for storage component	200 MW	144 MW

RA counting rules for co-located projects with two or more resource IDs

- RA counting rules for co-located projects with a common POI and two or more resource IDs are relatively straightforward and do not present significant concerns or barriers to participation from CAISO's perspective
- RA value for each separate resource ID based upon the applicable counting methodology for the resource type/technology as established by LRAs
- One related issue that must be addressed is the relationship of the co-located resources QC and proposed interconnection rights constraint

Interconnection constraint RA issue for co-located projects with two or more resource IDs

- Easy to apply QC counting under current approach – the resource developers will work with CAISO to set the Pmax of each resource, which limits the QC of both resources below the interconnection limit
- More complex when considering the interconnection rights constraint CAISO is proposing
 - Once constraint is implemented, co-located resources will have true Pmax reflected in the master file, which means their combined Pmax will exceed their total interconnection rights
 - Will not limit their QC in same way it does under the current implementation

Options for addressing QC related to interconnection constraint

- The QC or NQC process needs to capture that the resources are co-located and have a POI limit that applies to the overall project
- Two options to address this issue:
 - CPUC could choose to work with resource developers to set the total amount of the co-located resource's QCs based upon their preference (split and limited to the POI rights)
 - Alternatively, CAISO could perform a similar split and limit the capacity values when developing the NQC list if CPUC does not want to perform this split
 - CPUC still establish the individual QC values for each resource without consideration of co-located nature/need to cap combined QC at interconnection rights and CAISO could work with developers to limit the NQC of the co-located resources

Must offer obligations for co-located resources

- Must offer obligations for co-located resources with two or more resource IDs are straightforward
- Each resource ID would receive separate NQCs and could be shown for RA separately as well
- Result in separate and distinct MOOs for each resource ID that would reflect the resource's technology type and applicable QC and MOO
 - CAISO notes that under these configurations with more than resource ID, there is no possibility for different resources to meet the offer obligations or market awards of other RA resources, each resource ID is viewed as a standalone RA resources if shown on RA showings

Must offer obligation proposal for hybrid resources

- No existing MOO provisions for these resources
 - CAISO intends to establish the MOO provisions through this initiative
- CAISO has proposed a default counting rule for QC of hybrid resources and proposal to allow hybrid resources to self-provide forecasts to be utilized by CAISO markets
- CAISO proposes to set the MOO for hybrid resources equal to their self-provided forecasts
- MOO will be variable/updated matching hybrid resource self-provided forecasts
 - Includes both renewable and storage components forecasted capability, similar to current approach for VER MOOs

Hybrid resource RA participation requirements

- CAISO is still considering how these resource's offer obligations should be established in either the Day Ahead and/or Real Time markets, or both
 - Initially, CAISO believes that hybrid resources providing RA should be required to participate in the Day Ahead market similar to other traditional generation
 - Any hybrid resources shown for RA would have a Day Ahead MOO equal to their self-provided forecast
- CAISO is still considering how to treat the offer obligation for these hybrid resources shown for RA in the Real Time market
 - CAISO is currently contemplating Day Ahead market design enhancements and RA offer obligation modifications in other active stakeholder initiatives
 - Any hybrid resource MOO proposals will be coordinated with those efforts to refine this proposal for future iterations

INITIATIVE SCHEDULE AND IMPLEMENTATION

Policy and Implementation Schedule

- Comprehensive policy complete in Q2 2020
 - Provides policy certainty provided for developers and participants as soon as possible
- Implementation
 - Initially targeting implementation Fall 2021
- Certain tariff items may be able to be implemented before other tech and system upgrades without systems impacts – e.g. tariff items such as default QC methodology for hybrid resources

Next Steps

- Stakeholder written comments requested by October 21, 2019
 - Submit to initiativecomments@caiso.com
 - Comments template will be available at:
<http://www.caiso.com/informed/Pages/StakeholderProcesses/HybridResources.aspx>