



# Hybrid Resources Phase 2B Training

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# INTRODUCTION

# Housekeeping



Make sure to keep yourself muted unless you have a question

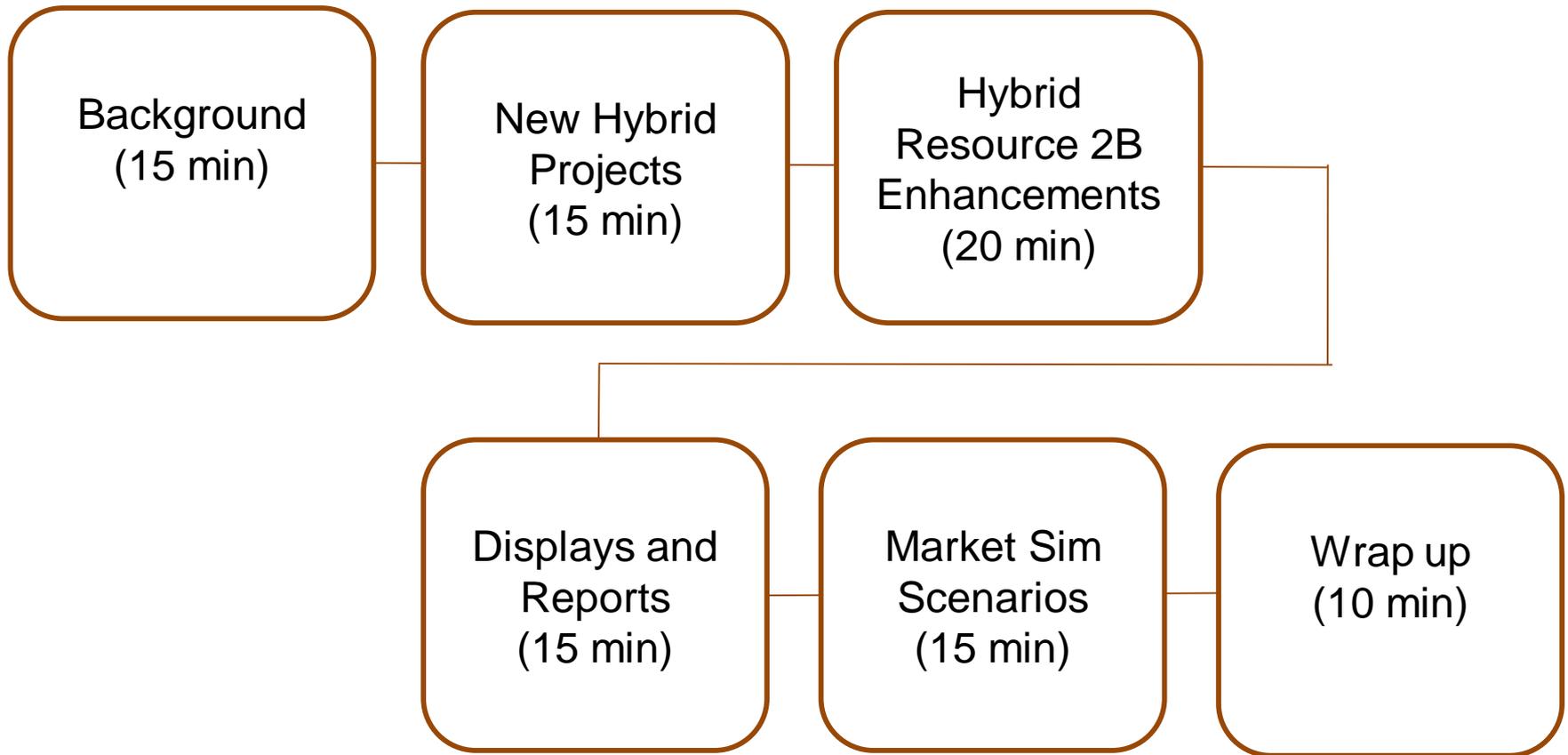


If you have a question, you may either ask over the phone or in the chat

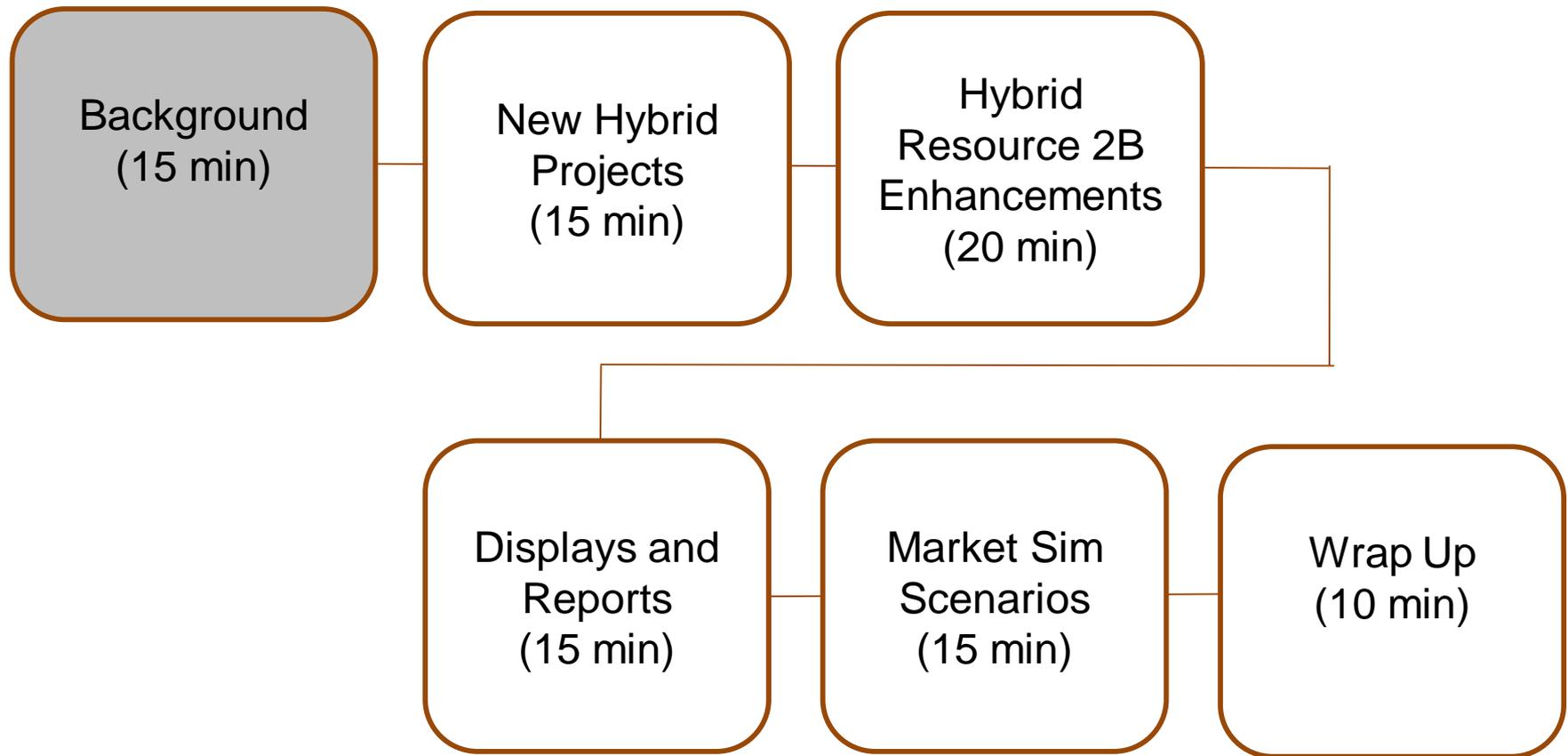


If you want to ask a question, you can virtually “raise your hand” in WebEx

# In today's session we'll cover:



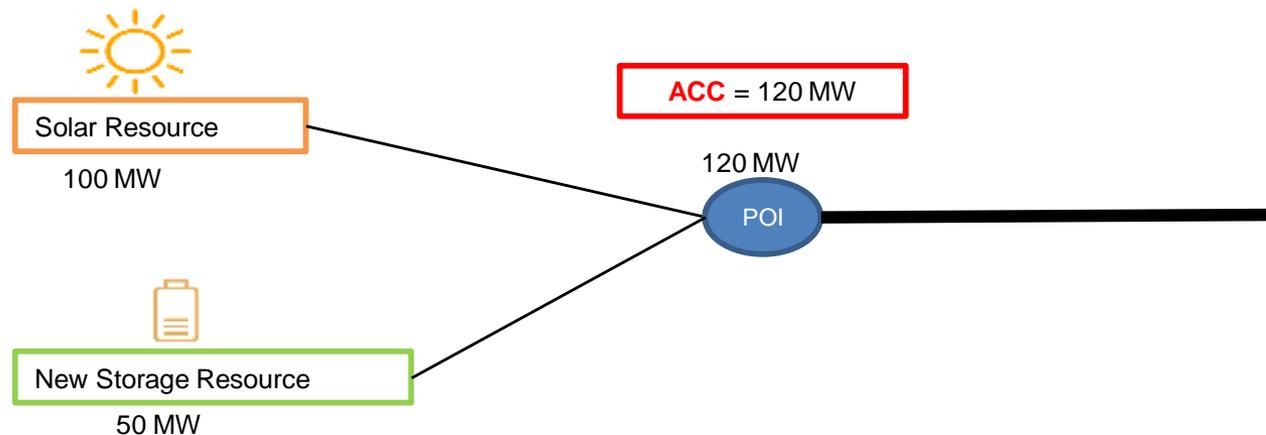
# In today's session we'll cover:



# Hybrid Resource Project - Phase 1

Co-located Resources - Multiple resources of different technologies that share a common point of interconnection but are modeled as individual resources

**Production date – December 2020**



## Hybrid Resource - Phase 2

Multiple resources of different technologies that share a common point of interconnection; these resources are modeled as one resource

### Phase 2-A

Implement High Sustainable Limit (HSL), Ancillary Services (AS),  
**Production Date – November, 2021**

### Phase 2-B

Implement Master/subordinate Aggregated Capability Constraint (ACC)

Implement Hybrid Dynamic Limit functionality

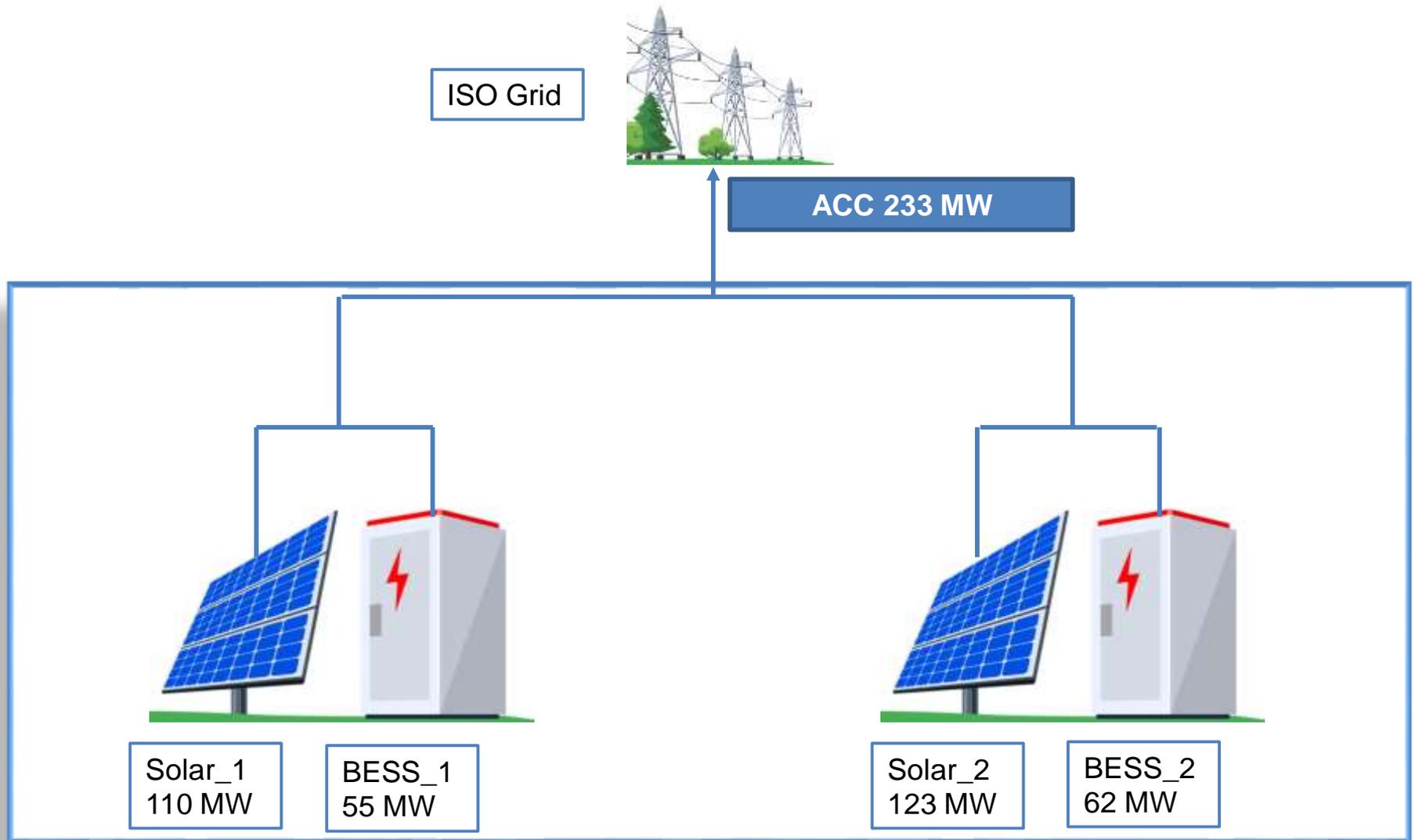
Changes to various applications, reports and displays

**Scheduled Production Date – November 1, 2022**

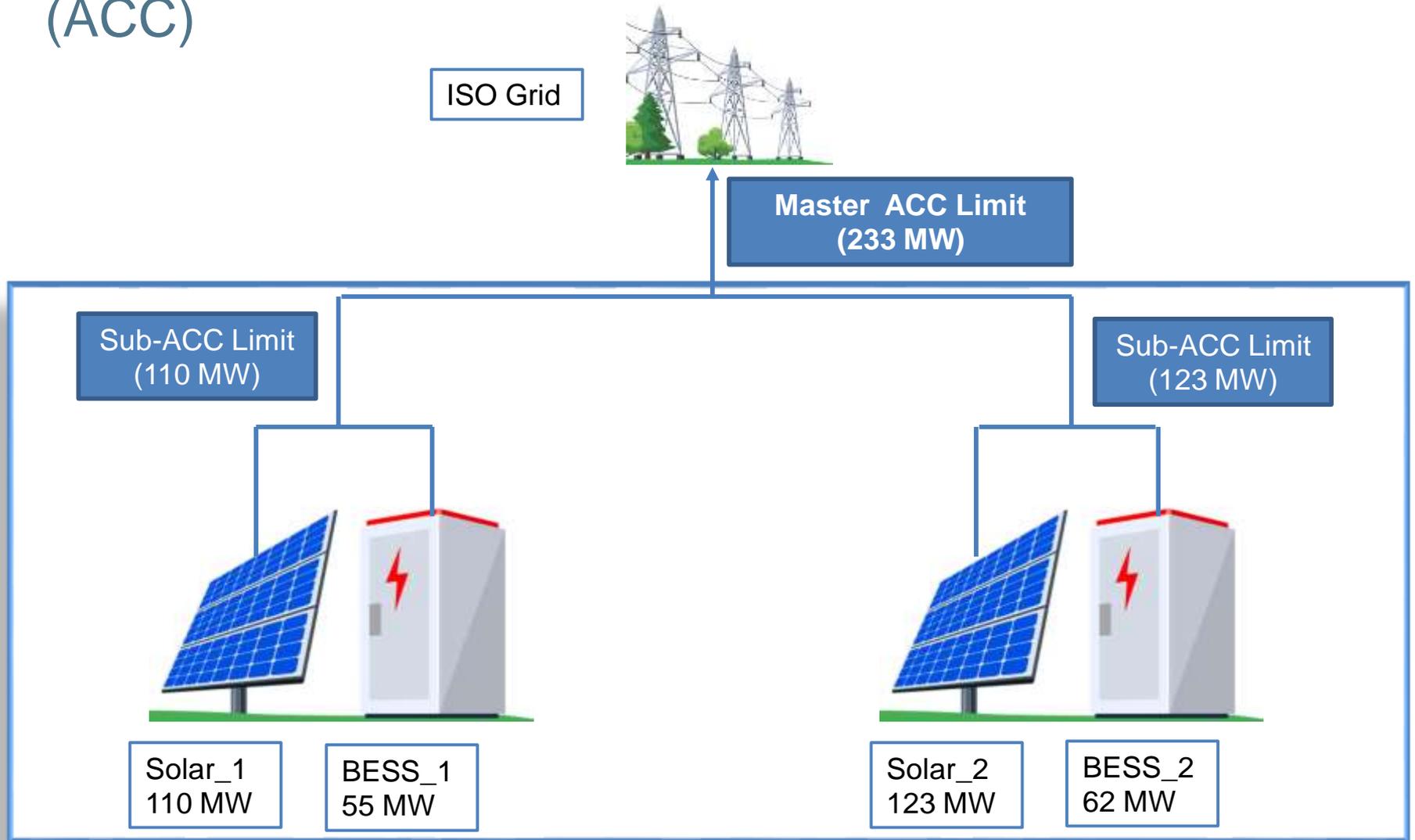


For more information about the Hybrid Resource Initiative visit :  
<https://stakeholdercenter.caiso.com/StakeholderInitiatives/Hybrid-resources>

# Standalone Aggregate Capability Constraint (ACC)

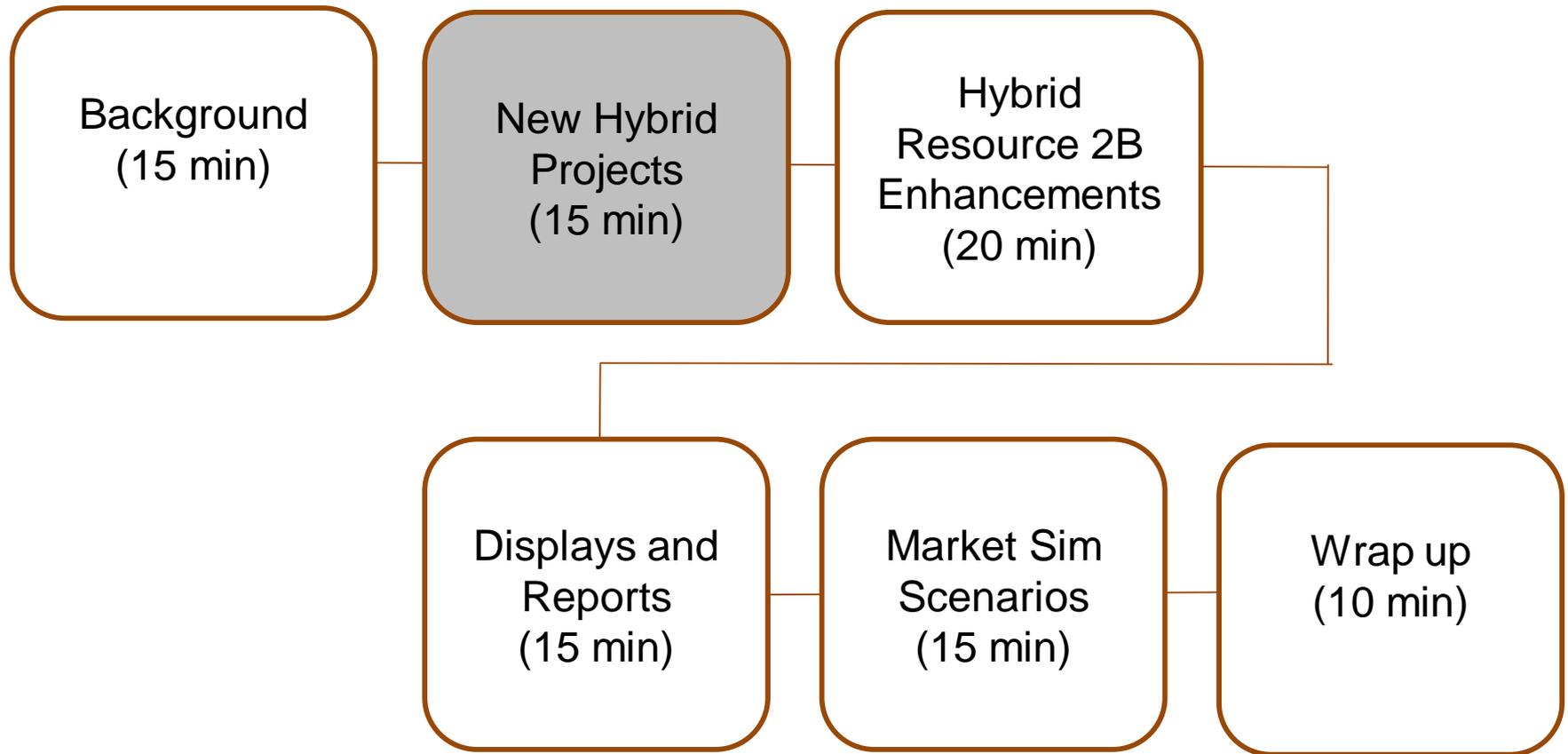


# Master and Sub-Aggregate Capability Constraint (ACC)



# Q&A

# In today's session we'll cover:



# Interconnecting to the Grid

## **What is changing?**

- Updated Interconnection Request form
- Updated Project Details form
- New “Hybrid Components” tab in the generator resource data template (GRDT)

**Where can I learn more about the interconnection process?** Look at the ISO website and attend the next Resource Interconnection Fair.



For more information resource interconnection procedures

<http://www.caiso.com/participate/Pages/ResourceInterconnectionGuide/default.aspx>

# Interconnection Request – Appendix 1 Sec. 4.c.

- c. Type of project (i.e., gas turbine, hydro, wind, etc.) and general description of the equipment configuration (if more than one type is chosen include gross installed MW for each).
- **If project is an increase to an existing project, provide values based on the MW increase only.**

## Technology

Select Gen Type	Select Fuel Type	<input type="checkbox"/>	(MW)	<input type="checkbox"/>	Co-Located	<input type="checkbox"/>	Hybrid
Select Gen Type	Select Fuel Type	<input type="checkbox"/>	(MW)	<input type="checkbox"/>	Co-Located	<input type="checkbox"/>	Hybrid
Select Gen Type	Select Fuel Type	<input type="checkbox"/>	(MW)	<input type="checkbox"/>	Co-Located	<input type="checkbox"/>	Hybrid

Other (please describe):  (MW)  Co-Located  Hybrid

Generator Type:  Fuel Type:

Comments:

General description of the equipment configuration (e.g. number, size, type, etc):

### Project Details Form

Submit a new request through the [Resource Interconnection Management System \(RIMS\) public site](#). 1) Fill out the "New Request" section 2) Choose the "NRI Project Details Form" drop down 3) Click "Register". A registration code will be emailed to the email contact in the New Request. 4) Place this code within the "Registration Code" section of the public site. 5) Click "submit" to access the upload screen for the project details form. You will receive an ISO Project code after the form validation is complete. The ISO project code will be used for all filenames.

**All fields must be filled in, additional fields for Natural Gas Combustion Turbines complete section 8 A-E.**

**RIG Reconfiguration, Meter Replacement and Meter Maintenance Project Types** please only fill out rows 1, 2A- 2G, 3A-C, 6A, 7A-C only.

The following characters are not allowed in any filename: ~ ' # % & @ \* { } ; ; < > ? / \ | ( ) [ ] - \_

1		<b>Project Type:</b> Select One	
2			<b>Authorized Contact(s) for the Resource</b>
A	<b>Project</b>	<ul style="list-style-type: none"> <li>Select One</li> <li>Solar</li> <li>Wind/Wind Repower</li> <li>Existing QF</li> <li>Wind QF</li> <li>Conventional</li> <li>Dynamic</li> <li>Dynamic New Construction</li> <li>Pseudo</li> <li>Pseudo New Construction</li> <li><b>Non-Generation</b></li> <li>Storage</li> <li>Load</li> <li>Custom LAP</li> <li>Meter Replacement</li> <li>Meter Maintenance</li> <li>RIG Reconfiguration</li> </ul>	<p>resource owner. A consultant or third party is not an acceptable contact. Consultants can be added using the email field below.</p>
B	<b>Project Contact Information</b>		
C	<b>Authorized Contact(s) Email</b>		<p>Multiple email addresses with a <b>semi colon</b> ";" between them. These email addresses will only receive project updates.</p>
D	<b>Full Legal Name of Contact</b>		<p>Secretary of State Business License.</p>
E	<b>Legal Address of Contact</b>		<p>City: <input type="text"/> State: <input type="text"/> Zip Code: <input type="text"/></p>
F	<b>Resource Name (facility; unit; subunit)</b> (Resource ID will not be accepted if resource name is not unique)		<p>Use the resource name that will be used in the CAISO Master File and in Regulatory contracts. This name is subject to CAISO approval. See resource naming guidelines found in the NRI Project <a href="#">RegulatoryContracts@caiso.com</a> for approval.</p>
	<b>Energy Information Administrator</b>		<p><input type="text"/> EIA Generator ID <input type="text"/></p> <p>The EIA Plant Code as generated and provided by the EIA.</p> <p>(Note: The generator ID supplied to the EIA. This ID must be uniquely defined within a plant.</p>
G	<b>Project Description</b>		<p>Provide an explanation of the project. Meter Replacement include CAISO meter device ID's</p>

**Generator Information**

A	PTO/UDC (transmission/utility owner): <b>Select One</b> (If not listed please pick closest)
B	<b>Net Output</b> Generation MW for this Resource: <input type="text"/> Note: May not exceed the Interconnection Agreement studied MW value.
C	<p>Configuration, Fuel Type(s) and MW(s):</p> <p><b>Configuration:</b> <b>Select One</b></p> <div style="border: 1px solid gray; padding: 5px; width: fit-content;"> <p>Select One</p> <p>Single</p> <p>Hybrid</p> <p>Co-located</p> <p>Hybrid Co-Located</p> </div> <p><b>Fuel Type:</b> <b>Select One</b></p> <p><b>MW:</b> <input type="text"/></p> <p><b>Forecast Election:</b> <b>Select One</b></p> <p><i>If possible, please specify the type of Load</i></p> <p><b>Additional Fuel Type 2:</b> <b>Select One</b></p> <p><b>MW:</b> <input type="text"/></p> <p><b>Forecast Election:</b> <b>Select One</b></p> <p><i>Choose Additional fuel type(s) for a mixed fuel resource</i></p> <p><b>Additional Fuel Type 3:</b> <b>Select One</b></p> <p><b>MW:</b> <input type="text"/></p> <p><b>Forecast Election:</b> <b>Select One</b></p> <p><i>Choose Additional fuel type(s) for a mixed fuel resource</i></p> <p><b>Additional Fuel Type 4:</b> <b>Select One</b></p> <p><b>MW:</b> <input type="text"/></p> <p><b>Forecast Election:</b> <b>Select One</b></p> <p><i>Choose Additional fuel type(s) for a mixed fuel resource</i></p>
D	<b>Point of Interconnection:</b> <b>If Known</b> The more detailed information provided here will expedite the modeling.
E	<b>Connection Voltage:</b> <b>SELECT</b> kV Connection at the utility substation or tap (Select closest value. If less than 12kV Select 12kV)
F	<b>Nearest 60kV or Up Substation Name:</b> <input type="text"/> (Can be pole/tower number, bank/bay number, and location name of a tap)
G	<p><b>Generator Interconnection Agreement?</b></p> <p><b>Agreement Type:</b> <b>Select One</b></p> <p><b>Enter number here:</b> <input type="text"/></p> <ul style="list-style-type: none"> <li>• <b>If 2-party</b>, enter Agreement number below (<u>i.e. WDAT Number, Rule 21 Number, etc.</u>)</li> <li>• <b>If 3-party</b>, look-up CAISO Queue Position number <a href="#">here</a> and enter Queue # below, if multiple Queue numbers apply to this project separate with a comma.</li> <li>• <b>If 3-party QF</b>, please enter Queue Position number in the number field, see Section 4 of <a href="#">NRI Guide</a>.</li> <li>• <b>If Dynamic or Pseudo Generator</b> choose the same <u>Agreement and Project Type</u></li> </ul>

# Generator Resource Data Template (GRDT)

OP RES RAMP	<b>HYBRID_COMPONENTS</b>	MSG
-------------	--------------------------	-----

Name of the Hybrid Resource

Name of individual component

Completed by Master File Team

Modifiable by customer

	A	B	C	D	E	F
1	Resource ID	Component_ID	FUEL_TYPE	GEN_TECH_TYPE	MAX_GEN	MIN_GEN
2	EXAMPLE_2_HYB1	EXAMPLE_2_HYB1_SOLR1	SOLR	PHOT	130	0
3	EXAMPLE_2_HYB1	EXAMPLE_2_HYB1_SOLR2	SOLR	PHOT	130	0
4	EXAMPLE_2_HYB1	EXAMPLE_2_HYB1_LESR1	LESR	OTHR	36	-36

Fuel type of the component

Specific technology used for the fuel type

Pmax and Pmin

# Generator Resource Data Template (GRDT)

OP RES RAMP	<b>HYBRID_COMPONENTS</b>	MSG
-------------	--------------------------	-----

Identifies VER component of NGR

ISO or SC Forecast

Completed by Master File Team

Modifiable by customer

	A	B	G	H	I	J	K	L
	Resource ID	Component_ID	VER_NGR	FORECAST_SELECTION	DISP	MIN_CONT_ENERGY_LIMIT	MAX_CONT_ENERGY_LIMIT	ENERGY_EFFIC
2	EXAMPLE_2_HYB1	EXAMPLE_2_HYB1_SOLR1	Y	ISO	N			
3	EXAMPLE_2_HYB1	EXAMPLE_2_HYB1_SOLR2	Y	SC	N			
4	EXAMPLE_2_HYB1	EXAMPLE_2_HYB1_LESR1			Y	1	144	0.9

N – Wind and Solar  
Y – Storage

(Used for Effective Flexible Capacity (EFC) calculations)

Minimum/Maximum State of Charge

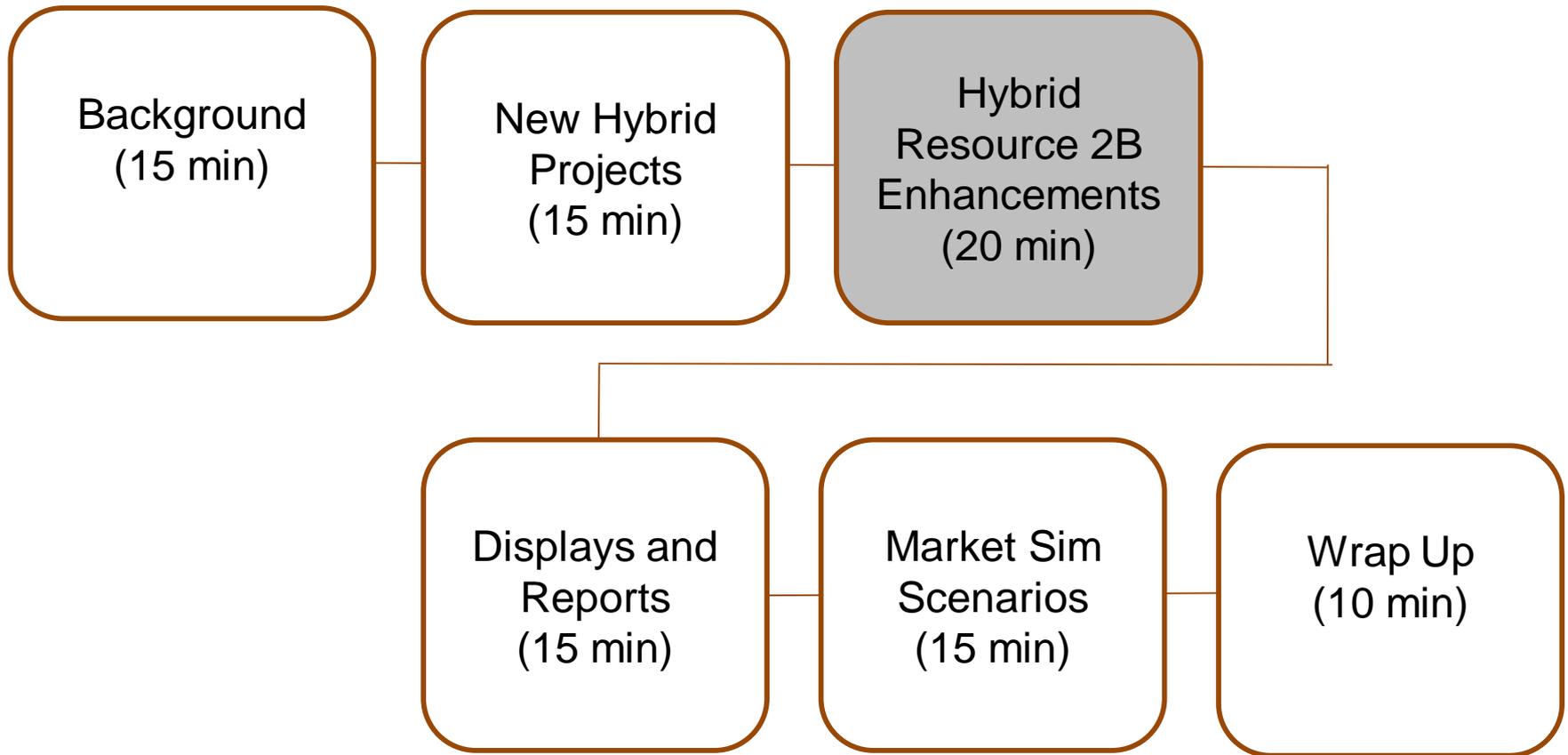
% of charging energy a battery can store and later discharge

## New Hybrid Resource – Action Items

- Use the updated Interconnection Request form and submit via RIMS
- Use the updated Project Details Form and submit via RIMS
- GRDT – Submit via RIMS (new) or Master File UI (updates)
  - Update modifiable fields, as necessary
  - Check non-modifiable fields for accuracy
  - Submit concerns to [RDT@caiso.com](mailto:RDT@caiso.com)

# Q&A

# In today's session we'll cover:



# Requesting Master and Sub-ACC

**Why would I do this?** Used in situations where there are contractual limitations on components that are subordinate to the aggregate capacity constraint of the interconnection.

**Why is this important?** So that co-located resources are dispatched appropriately.



## New Master and Sub-ACC– Action Items

- ISO BAA participants
  - Work with ISO contracts department to set up/update the Participating Generator Agreement (PGA)
  
- WEIM participants
  - New resources – include request in SC Letter
  - Existing resources – submit a CIDI ticket with this request

## SC Forecast Selection

**What is this?** Hybrid customers can choose to submit their own VER forecast data to the ISO, rather than using the ISO's forecast.

**Is this available for other VER resources?** Yes, for dispatch and settlement purposes only. An ISO forecast will still be needed for forecasting and internal DOT formation.

**How do SCs submit them?** Via the Automated Load Forecast System (ALFS) using the API



The technical specifications are located on the Developer's site (registration required):

<https://developer.caiso.com/>

# Signing up to provide SC Forecast

- New customers
  - WEIM participants – request during the onboarding process
  - CAISO BAA participants – request during the NRI process
- Existing customers that want to switch forecast options should submit a CIDI ticket request

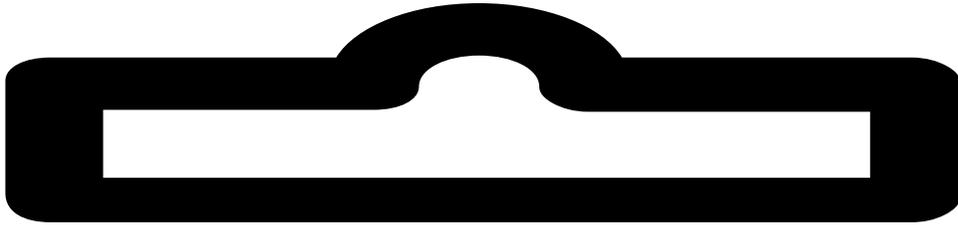
- ADS**  
Automated Dispatch System
- ALFS**  
Advanced Load Forecasting System
- BAAOP**  
Balancing Area Authority Operator Portal
- BSAP**  
Base Schedule Aggregation Portal
- CIRA**  
Customer Interface for Resource Adequacy

- MNS**  
Market Notification Service
- MRI-S**  
Market Results Interface - Settlements
- OASIS**  
Open Access Same time Information System
- OMS**  
Outage Management System
- RCBSAP**  
Reliability Coordinator Base Schedule Aggregation Portal Interface

## Tech Specs

[About status](#)

NAME	STATUS	RELEASE	LAST UPDATED
ALFS Interface Specification v1.0.0.pdf	PROD_LATEST	Fall 2017	12/6/2019
ALFS Interface Specification v1.2.pdf	PROD_LATEST	2020	3/13/2020
ALFS SC VER Interface Specification v1.0.pdf	UPCOMING	Fall 2022	5/25/2022
RC ALFS Interface Specification v1.0.0.pdf	PROD_LATEST	2019	12/6/2019



## **SC Forecast – Action Items**

- New customers – indicate your forecast choice in the onboarding process
- Existing customers – submit a CIDI ticket if you want to change your forecast option
- Submit forecast via ALFS (not SIBR)

## Dynamic Limits

**What are they?** Minimum and maximum MW limits for Hybrid Resources that can be submitted for every 5 minute interval.

**Why are they important?** Enables SC to limit the dispatch instruction from the ISO for positions of the bid curve that are unavailable for dispatch based on actual production limitations for the hybrid resource.

**How do SCs submit them?** Via SIBR using the API or the UI.



The SIBR User Guide is located at:

<http://www.caiso.com/participate/Pages/ApplicationAccess/Default.aspx>

# New – Hybrid Dynamic Limit

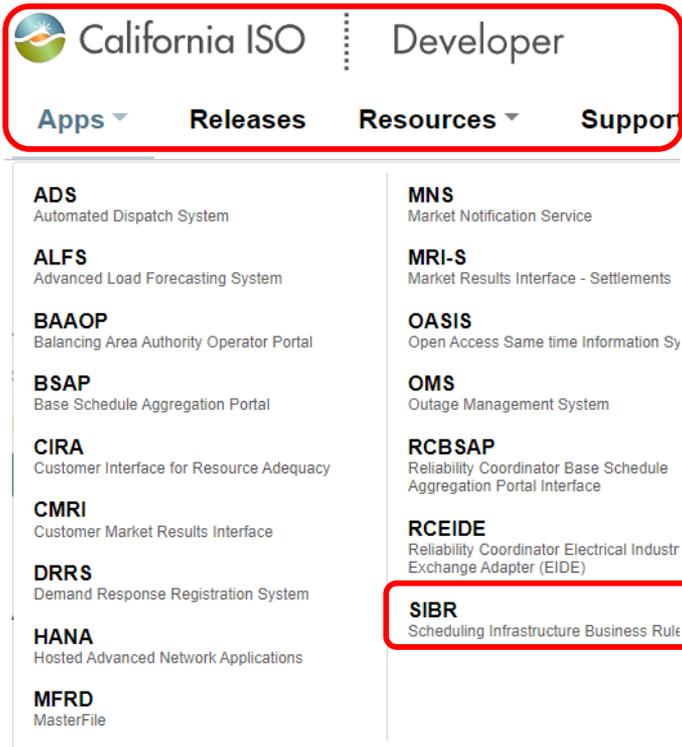


Real-Time Energy Bid  
25 MW for the hour

Forecast of resource availability forecast for the hour

Interval	:05	:10	:15	:20	:25	:30	:35	...	:00
<b>Upper Limit</b>	25 MW	23 MW	25 MW	22 MW	20 MW	22 MW	20 MW	...	19 MW
<b>Lower Limit</b>	1 MW	...	1 MW						

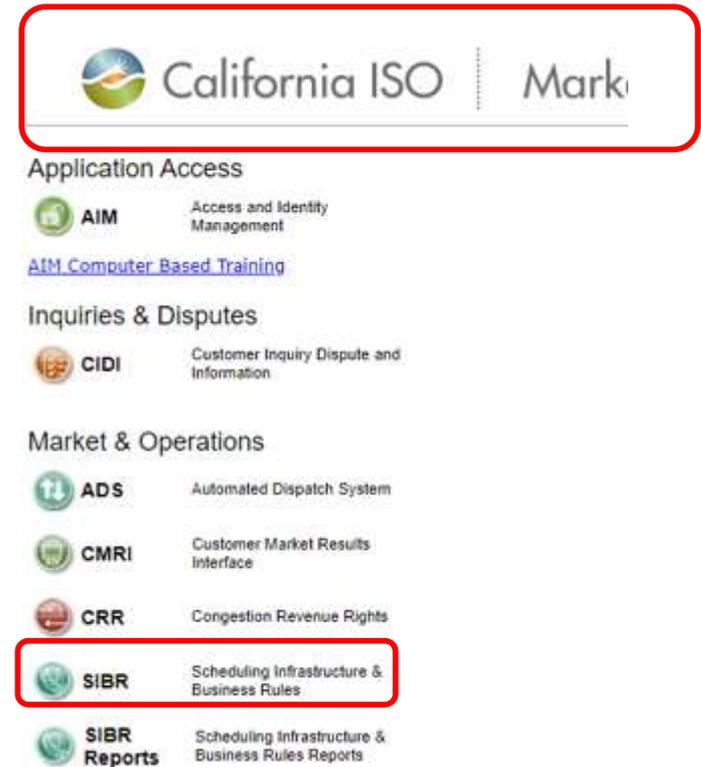
# Dynamic Limits



The screenshot shows the top navigation bar of the California ISO Developer website. The bar includes the California ISO logo, the word "Developer", and four main menu items: "Apps", "Releases", "Resources", and "Support". Below this bar is a grid of application links. The "SIBR" link, which stands for "Scheduling Infrastructure Business Rule", is highlighted with a red rectangular border.

<b>ADS</b> Automated Dispatch System	<b>MNS</b> Market Notification Service
<b>ALFS</b> Advanced Load Forecasting System	<b>MRI-S</b> Market Results Interface - Settlements
<b>BAAOP</b> Balancing Area Authority Operator Portal	<b>OASIS</b> Open Access Same time Information System
<b>BSAP</b> Base Schedule Aggregation Portal	<b>OMS</b> Outage Management System
<b>CIRA</b> Customer Interface for Resource Adequacy	<b>RCBSAP</b> Reliability Coordinator Base Schedule Aggregation Portal Interface
<b>CMRI</b> Customer Market Results Interface	<b>RCEIDE</b> Reliability Coordinator Electrical Industry Exchange Adapter (EIDE)
<b>DRRS</b> Demand Response Registration System	<b>SIBR</b> Scheduling Infrastructure Business Rule
<b>HANA</b> Hosted Advanced Network Applications	
<b>MFRD</b> MasterFile	

<https://developer.caiso.com>



The screenshot shows the top navigation bar of the California ISO Market website. The bar includes the California ISO logo, the word "Market", and a horizontal line below. Below the bar is a list of application access links. The "SIBR" link, which stands for "Scheduling Infrastructure & Business Rules", is highlighted with a red rectangular border.

**Application Access**

- AIM** - Access and Identity Management
- [AIM Computer Based Training](#)
- Inquiries & Disputes**
- CIDI** - Customer Inquiry Dispute and Information
- Market & Operations**
- ADS** - Automated Dispatch System
- CMRI** - Customer Market Results Interface
- CRR** - Congestion Revenue Rights
- SIBR** - Scheduling Infrastructure & Business Rules
- SIBR Reports** - Scheduling Infrastructure & Business Rules Reports

Bids

Trades

Convergence Bids

Energy Forecast

Ind Viewer

OTC Viewer

Messages

Dynamic Limit

Ancillary Service

Date: 02/11/2022



Coordinator:

Apply

Dynamic Limit



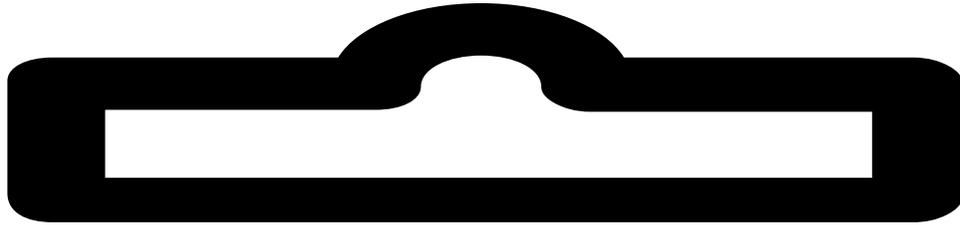
Status Resource Limit [MW] Submitted

Enter the date and the Scheduling Coordinator ID  
Select Apply to reveal the grid

Select the new Dynamic Limit Tab







## Dynamic Limits – Action Items

- Using SIBR UI or API, submit dynamic limit information (minimum and maximum MW) for hybrid resources, every 5 minutes

## Other features of Hybrid Resources

Meters must be installed at the component level

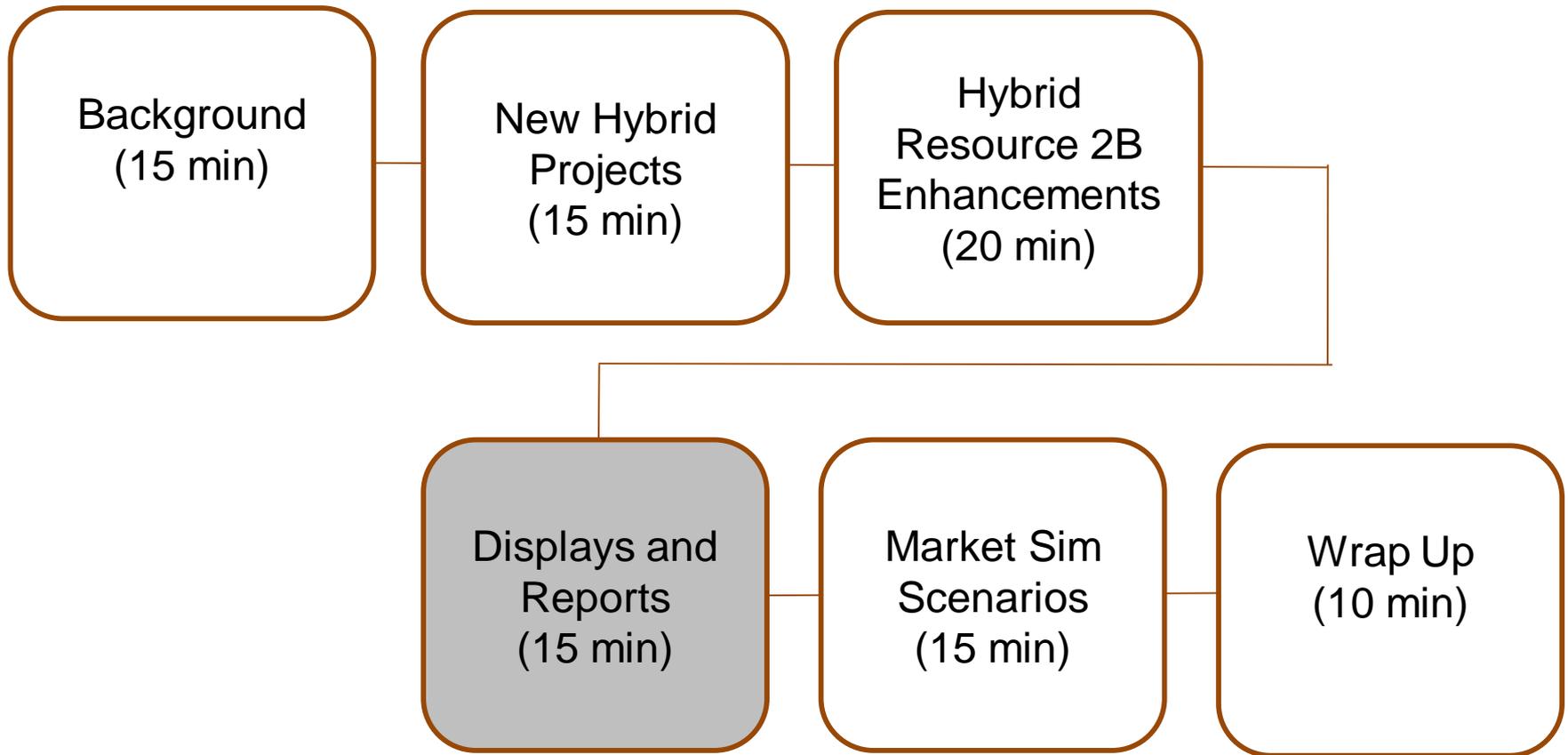
Hybrid resources are excluded from Generic RAAIM

Forecast fee is waived for those that choose SC forecast

Bids are not subject to market power mitigation

# Q&A

# In today's session we'll cover:



# Balancing Authority Area Operations Portal (BAAOP) - WEIM Application

**What is it?** Used by the WEIM operators to monitor market operations.

**Is there a new display?** Yes, Dynamic Limits.

**Is anything else changing?** Yes, We are adding a new “Type” column to the ACC Schedules and ACC Constraints displays.

# BAAOP – Coming Soon – Hybrid Resources Phase 2B

The screenshot displays the California ISO software interface. At the top left is the California ISO logo with the tagline "Shaping a Renewed Future". To the right is a blue navigation bar with the "SIEMENS" logo. Below the navigation bar is a breadcrumb trail: "EIM | Transmission | Input | System | NA | Coming Soon – Live Data". The main content area is titled "RTD > Interval > Dispatch Execution Control". Under "Case Definition", there are input fields for "Trading Period Start" (08/09/2022 20:10), "Trading Period End" (08/09/2022 21:00), "Trading Interval [mins]" (5), and "No of Intervals" (10). A dropdown menu is open under "Coming Soon – Live Data", showing options: "EIM 2020", "BPA", "Hybrid Resources - Phase 2B" (selected), "ACC Constraints", "ACC Schedules", and "Dynamic Limits" (highlighted by a mouse cursor). A sub-menu for "Dynamic Limits" is also visible, listing "RTD", "RTPD", "STUC", and "RTBS", each with a small icon to its right.

# BAAOP – Dynamic Limits Display

The screenshot displays the California ISO EIM interface. The top navigation bar includes 'Transmission', 'Input', 'Schedules', 'System', 'NA', and 'Coming Soon - Live Data'. The main breadcrumb trail is 'EIM > Coming Soon - Live Data > Hybrid Resources - Phase 2B > Dynamic Limits > RTD'. Filter settings are set to 'BAA: [ALL]', 'Resource Name: [ALL]', 'Interval End: [ALL]', and 'Pass: RTD'.

The 'Dynamic Limits' table shows the following data:

BAA	Resource	Interval End	Upper	Lower
CISO		08/09/2022 19:50	163.00	12.35
CISO		08/09/2022 19:55	163.00	12.35
CISO		08/09/2022 20:00	163.00	12.35
CISO		08/09/2022 20:05	163.00	12.35
CISO		08/09/2022 20:10	160.00	0.00
CISO		08/09/2022 20:15	160.00	0.00
CISO		08/09/2022 20:20	160.00	0.00
CISO		08/09/2022 20:25	160.00	0.00
CISO		08/09/2022 20:30	160.00	0.00
CISO		08/09/2022 20:35	160.00	0.00
CISO		08/09/2022 20:40	160.00	0.00
CISO		08/09/2022 20:45	160.00	0.00
CISO		08/09/2022 20:50	160.00	0.00
CISO		08/09/2022 20:55	160.00	0.00
CISO		08/09/2022 21:00	160.00	0.00
CISO		08/09/2022 21:05	160.00	0.00
CISO		08/09/2022 21:10	160.00	0.00
CISO		08/09/2022 21:15	160.00	0.00
CISO		08/09/2022 21:20	160.00	0.00
CISO		08/09/2022 21:25	160.00	0.00
CISO		08/09/2022 21:30	160.00	0.00
CISO		08/09/2022 21:35	160.00	0.00
CISO		08/09/2022 21:40	160.00	0.00
CISO		08/09/2022 21:45	160.00	0.00
CISO		08/09/2022 21:50	160.00	0.00

The 'Resource' table shows the following data:

BAA	SC ID	Resource	Interval End	Pmin	Pmax	Status	RJ	RD	SPIN	NSPIN	DOT	Market Override
CISO			08/10/2022 10:00	-36	166	On-Line Production	0	0	0	0	0	
CISO			08/10/2022 10:05	-36	166	On-Line Production	0	0	0	0	166	
CISO			08/10/2022 10:10	-36	166	On-Line Production	0	0	0	0	166	
CISO			08/10/2022 10:15	-36	166	On-Line Production	0	0	0	0	166	
CISO			08/10/2022 10:20	-36	166	On-Line Production	0	0	0	0	166	
CISO			08/10/2022 10:25	-36	166	On-Line Production	0	0	0	0	166	
CISO			08/10/2022 10:30	-36	166	On-Line Production	0	0	0	0	166	
CISO			08/10/2022 10:35	-36	166	On-Line Production	0	0	0	0	166	
CISO			08/10/2022 10:40	-36	166	On-Line Production	0	0	0	0	166	
CISO			08/10/2022 10:45	-36	166	On-Line Production	0	0	0	0	166	
CISO			08/10/2022 10:50	-36	166	On-Line Production	0	0	0	0	166	

# BAAOP – ACC Constraints

The screenshot displays the California ISO web application interface for managing ACC Constraints. The main navigation bar shows 'California ISO' and 'Coming Soon - Live Data'. The breadcrumb trail indicates the current view is 'ACC Constraints' under 'Hybrid Resources - Phase 2B'.

**ACC Constraints Table:**

ACC ID	BAA	ACC Name	Type	Injection Limit [MW]	Withdrawal Limit [MW]	Override Limit [MW]	Start	End
225	CISO		Sub	70.00	-150.00			
777	CISO		Master	100.00	-25.00			
181	CISO		Sub	2.50	-1.00			

**Sub-ACC Constraints Table:**

ACC ID	BAA	ACC Name
225		
181		

**ACC Resources Table (ACC Name: MASTER\_ACC):**

BAA	SC ID	Resource	Price Node	Resource Type	Unit	Type	Pmin	Pmax	Ramp Up	Ramp Dn	Min Up Time	Min Down Time	Max Starts	Daily
CISO				G	LES		-35.00	35.00			0	0		300
CISO				G	IP		0.00	70.00	35.00	35.00	0	0		100
CISO				G	LES		-0.65	0.70			0	0		300
CISO				G	VER		0.00	2.50	0.40	0.40	0	25		8

**Generator Detail Table (Resource: 1):**

Quantity [MW]	Lower Ramp Rate [MW/min]	Raise Ramp Rate [MW/min]
-35.00	999.00	999.00
0.00	999.00	999.00
35.00	999.00	999.00

**Ramp Rates Graph:**

**Summary Table (Bottom):**

CISO	BLST			G	LES		-43.00	43.00	999.00	999.00	0	0		98
CISO	BCE1			G	LES		-115.00	115.00	999.00	999.00	0	0		100
CISO	BCE1			G	LES		-115.00	115.00	999.00	999.00	0	0		1
CISO	BLST			G	VER		0.00	110.00	20.00	20.00	0	18		10
CISO	BCE1			G	VER		0.00	125.00	12.00	12.00	0	18		5

# BAAOP – ACC Schedules

California ISO  
 Home > Coming Soon - Live Data > Hybrid Resources - Phase 2B > ACC Schedules > BTD  
 BAA: [All] Resource: [All] Time Date: 09/13/2022

ACC Constraint Schedules

List view Time stamps/Data points

ACC ID	BAA	ACC Name	Direction	Type	09/13/2021 15:00					09/13/2021 15:15					09/13/2021 15:30					09/13/2021 15:45					09/13/2021 16:00														
					Sched	Eff Lim	Inj	Eff Lim	With	Viol	SPrice	Sched	Eff Lim	Inj	Eff Lim	With	Viol	SPrice	Sched	Eff Lim	Inj	Eff Lim	With	Viol	SPrice	Sched	Eff Lim	Inj	Eff Lim	With	Viol	SPrice	Sched	Eff Lim	Inj	Eff Lim	With	Viol	SPrice
264	CISO		DN	Sub	0.00	70.00	-150.00	0.00	0.00	0.00	0.00	0.00	70.00	-150.00	0.00	0.00	0.00	0.00	0.00	70.00	-150.00	0.00	0.00	0.00	0.00	0.00	70.00	-150.00	0.00	0.00	0.00	0.00	70.00	-150.00	0.00	0.00	0.00	0.00	
264	CISO		UP	Sub	0.00	70.00	-150.00	0.00	0.00	0.00	0.00	0.00	70.00	-150.00	0.00	0.00	0.00	0.00	0.00	70.00	-150.00	0.00	0.00	0.00	0.00	0.00	70.00	-150.00	0.00	0.00	0.00	70.00	-150.00	0.00	0.00	0.00	0.00		
181	CISO		DN	Sub	2.50	2.50	-1.00	0.00	0.00	0.00	2.50	2.50	-1.00	0.00	0.00	0.00	2.50	2.50	-1.00	0.00	0.00	0.00	2.50	2.50	-1.00	0.00	0.00	2.50	2.50	-1.00	0.00	0.00	2.50	2.50	-1.00	0.00	0.00		
181	CISO		UP	Sub	2.50	2.50	-1.00	0.00	0.00	0.00	2.50	2.50	-1.00	0.00	0.00	0.00	2.50	2.50	-1.00	0.00	0.00	0.00	2.50	2.50	-1.00	0.00	0.00	2.50	2.50	-1.00	0.00	0.00	2.50	2.50	-1.00	0.00	0.00		

VACADX

ACC Member Schedule

List view Time stamps/Data points

BAA	SC ID	Resource	Price Node	Resource Type	Unit Type	Follow DOT	Telem [MW]	15:00	15:15	15:30	15:45	16:00	
								Sched AS					
CISO				G	VER	1.06		2.50	0.00	2.50	0.00	2.50	0.00
								2.50	0.00	2.50	0.00	2.50	0.00

# Open Access Same-time Information System (OASIS) Reports

**What does it contain?** Market and operations data that is available to the public via caiso.com.

**Which existing reports are impacted?**

None

**Are there new reports?**

Aggregate Capability Constraint Shadow Prices



# Market Participant Portal (MPP) Reports

**What does it contain?** It provides links to reports and applications used by market participants.

**Which existing reports are impacted?**

Transmission Limits

**Are there new reports?**

No



**MPP Home**

Market Modeling Data

System Integration Discussions

RC Working Groups

HANA

## Market Modeling Data

This data is protected under ISO tariff and can only be viewed by or shared with persons that have fully executed the applicable Non-Disclosure Agreement.

**PLEASE NOTE THAT THIS DATA IS AVAILABLE FOR A LIMITED TIME PERIOD (90-DAY ROLLING LOOK BACK), AFTER WHICH IT WILL NOT BE ACCESSIBLE. PLEASE ACCESS AND DOWNLOAD ACCORDINGLY.**

To the best of CAISO's knowledge, the information contained herein is true and accurate as of the date published and is provided for informational purposes only. CAISO does not assume any liability whatsoever for the accuracy and completeness of the published information.

### Load Distribution Factors (LDF)

Displays the load distribution factors by node used in the Day-Ahead Market. To protect confidential data the load distribution factors for single customer nodes are aggregated and reported by DLAP.

### Shift Factors (SF)

Displays the complete list of shift factors for all binding constraints. In the IFM, HASP, and RTD markets.

### Transmission Limits (TL)

Displays the transmission limits for all critical constraints in the IFM, HASP, FMM (RTUC), and RTD markets. The term "critical" refers to being close to or at the limit.

Current View

...

Find a file



✓	Name	Modified
📁	Transmission Limits	... December 12, 2012
📁	Shift Factors	... December 12, 2012
📁	Load Distribution Factors	... December 12, 2012

# Customer Market Results Interface (CMRI) Reports

**What does it contain?** CMRI reports contain customer-specific market results and information.

**Which existing reports are impacted?**

Interval Variable Energy Resource Forecast Report

Variable Energy Resource Forecast Report

**Are there new reports?**

ACC Definition

Trade Date:  Entity:  Resource:  Forecast

## Interval Variable Energy Resource Forecast

1 - 12 of ??? GO

Forecast Type	Trade Date	SC ID	Resource	Interval	HE01 [MW]	HE02 [MW]	HE03 [MW]	HE04 [MW]	HE05 [MW]	HE06 [MW]	HE07 [MW]	HE08 [MW]
Rolling 5MIN	07/29/2022			1	0.00	0.00	0.00	0.00	0.00	0.00	0.31	15.26
Rolling 5MIN	07/29/2022			2	0.00	0.00	0.00	0.00	0.00	0.00	0.98	17.53
Rolling 5MIN	07/29/2022			3	0.00	0.00	0.00	0.00	0.00	0.00	1.74	20.09
Rolling 5MIN	07/29/2022			4	0.00	0.00	0.00	0.00	0.00	0.00	2.59	22.87
Rolling 5MIN	07/29/2022			5	0.00	0.00	0.00	0.00	0.00	0.00	3.27	28.58
Rolling 5MIN	07/29/2022			6	0.00	0.00	0.00	0.00	0.00	0.00	4.34	31.38
Rolling 5MIN	07/29/2022			7	0.00	0.00	0.00	0.00	0.00	0.00	5.53	34.03
Rolling 5MIN	07/29/2022			8	0.00	0.00	0.00	0.00	0.00	0.00	6.84	36.55
Rolling 5MIN	07/29/2022			9	0.00	0.00	0.00	0.00	0.00	0.00	8.27	38.92
Rolling 5MIN	07/29/2022			10	0.00	0.00	0.00	0.00	0.00	0.00	9.83	41.15
Rolling 5MIN	07/29/2022			11	0.00	0.00	0.00	0.00	0.00	0.00	11.50	43.24
Rolling 5MIN	07/29/2022			12	0.00	0.00	0.00	0.00	0.00	0.00	13.30	45.19

CMRI - Interval Variable Energy Resource Forecast

Displays 5 minute forecast for VER components

Day-Ahead Real-Time Post-Market Default Bids Convergence Bidding Forecast

Trade Date:  Entity:

### Variable Energy Resource Forecast

Forecast Type Trade Date SC ID Resource

Forecast Type	Trade Date	SC ID	Resource
Day-Ahead	07/29/2022		
Day-Ahead	07/30/2022		
Day-Ahead	07/31/2022		
Day-Ahead	08/01/2022		
Day-Ahead	08/02/2022		
Day-Ahead	08/03/2022		
Day-Ahead	08/04/2022		

Forecast Type:

- Day-Ahead
- Locked Hour-Ahead
- Rolling Hour-Ahead

HE11 [MW]	HE12 [MW]	HE13 [MW]	HE14 [MW]	HE15 [MW]	HE16 [MW]	HE17 [MW]
61.47	62.54	62.93	62.72	62.49	62.26	62.03
62.13	62.22	62.37	61.99	61.47	60.80	60.13
60.05	60.13	59.84	59.05	58.78	58.70	58.62
58.93	61.02	61.60	61.22	60.15	58.88	58.50
60.59	60.95	61.30	61.01	59.93	58.53	58.15
62.26	62.73	63.00	63.00	62.55	61.74	61.36
62.79	62.97	62.99	62.99	62.76	62.25	61.87

CMRI - Variable Energy Resource Forecast

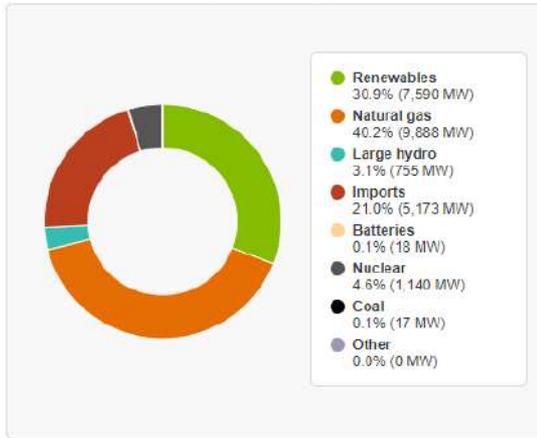
Displays forecasts for VER components in various time frames

# CMRI – ACC Definition



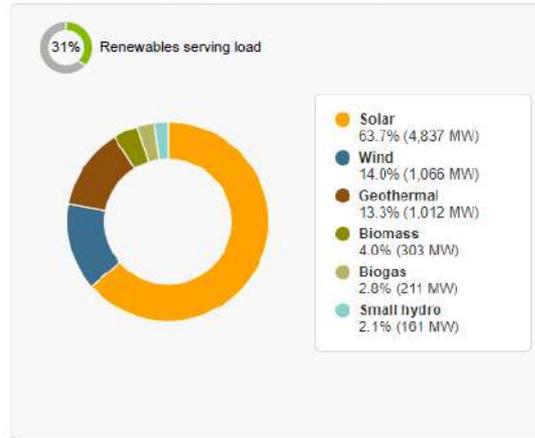
# ISO Today/Today's Outlook – Pie Charts

Current supply includes hybrids

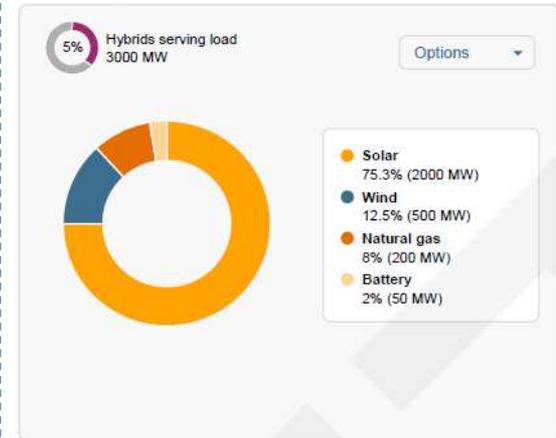


Update existing graph

Current renewables includes hybrids



Current hybrids



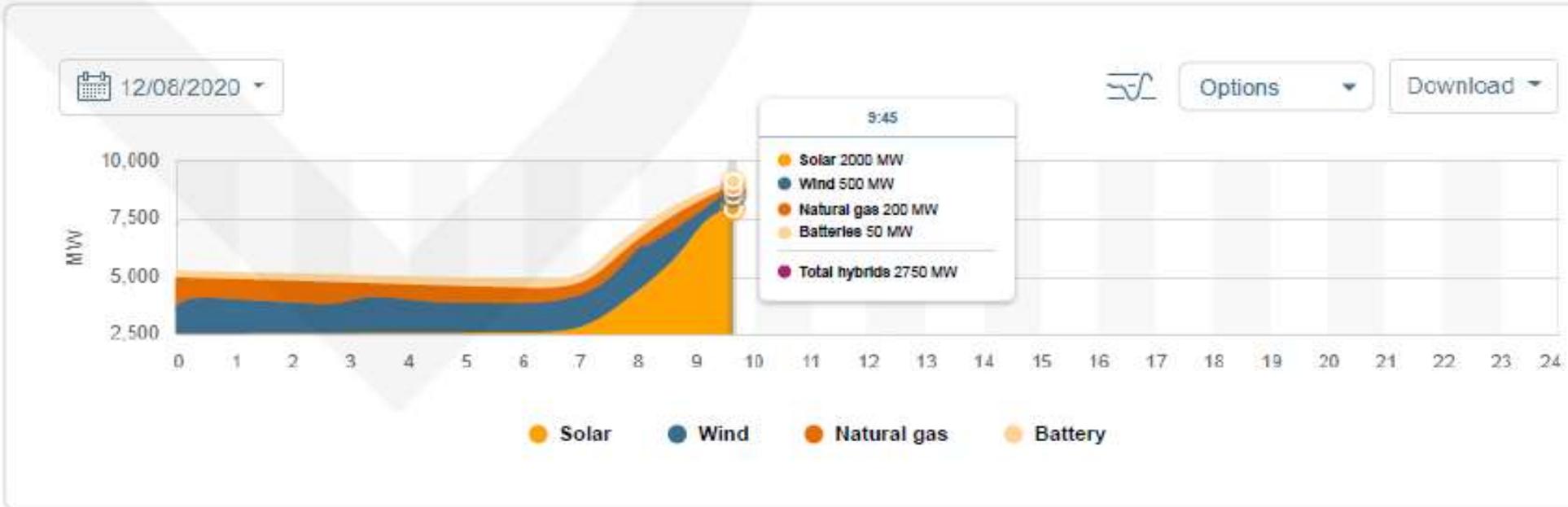
New graph

# ISO Today/Today's Outlook – Trend Charts

## Hybrids trend

New graph

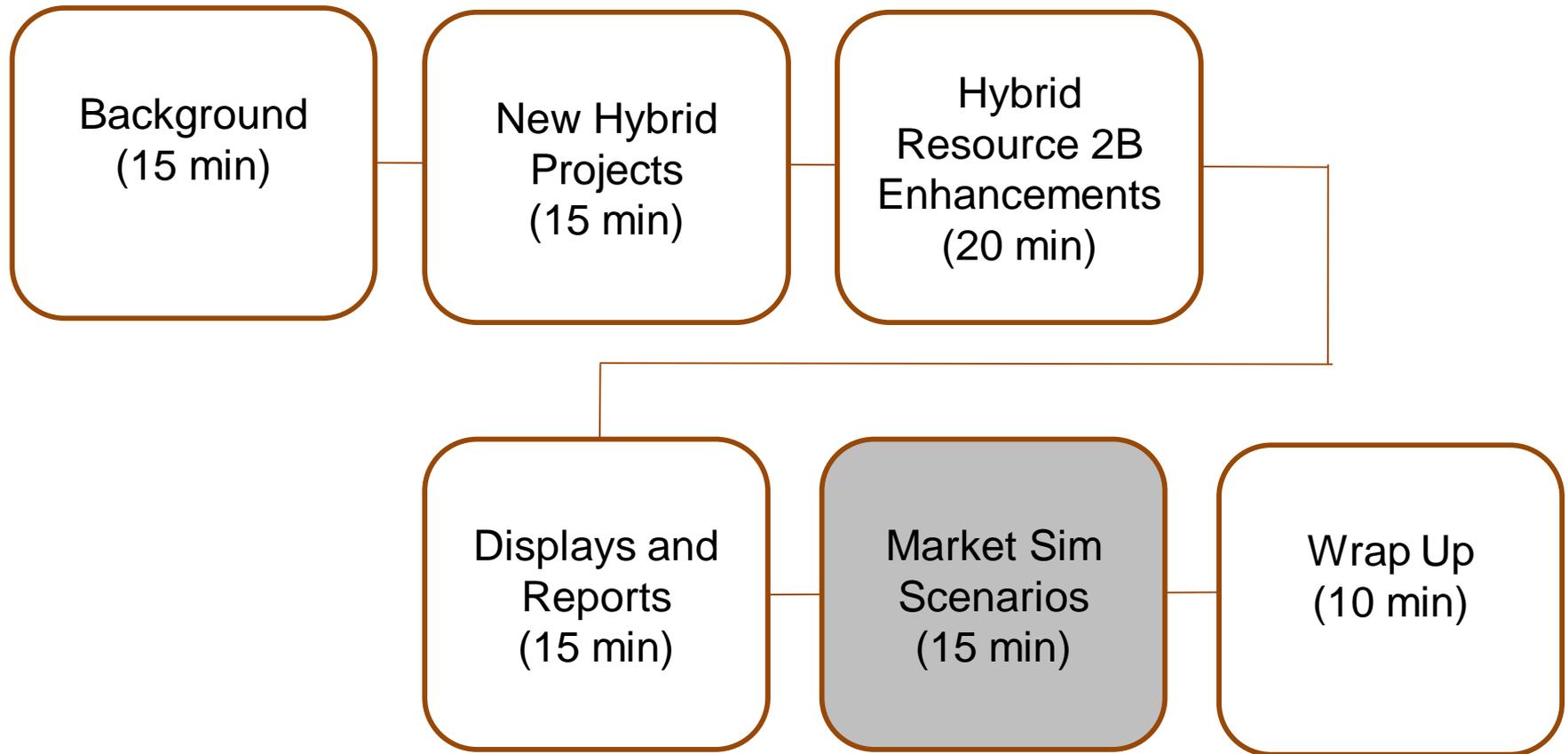
Amount of energy in megawatts broken down by hybrid resource in five-minute increments.



Existing trend charts will also incorporate hybrid data:  
Supply Trend                      Renewables Trend  
Import Trend                      Batteries Trend

# Q&A

# In today's session we'll cover:



# Market Simulation Logistics

- Market participants will need to register their request with the ISO to participate in the Hybrid Resources Phase 2 project simulation via the MarketSim@caiso.com mailbox.
- Please submit your request and any additional information identified above by August 12, 2022.
- <http://www.caiso.com/Documents/MarketSimulationStructuredScenarios-HybridResourcesP2.pdf>

Scenario Number	Unstructured guided Scenario	
	Description	Verify submitted hybrid resource data and component level data
	ISO Actions	ISO to dispatch Hybrid resources
	EIM Market Participant Actions	EIM SCs to submit dynamic limits and real-time (RT) forecasts for hybrid resources
	ISO Market Participant Actions	SCs to submit dynamic limits and real-time (RT) forecasts for hybrid resources
1	Expected Outcome	<p>Verify Hybrid Resource data in Master File</p> <p>Verify submission of upper and lower resource limit in Market (Dynamic Limit Tool)</p> <p>Verify the following in CMRI:</p> <ul style="list-style-type: none"> <li>• Hybrid resource award is within the dynamic limit as submitted by Market Participant <ul style="list-style-type: none"> <li>○ When the LMP is higher than the hybrid resource bid and the resource has ramping capability, hybrid resource award is at the upper dynamic limit MW value, including cases when the upper dynamic limit MW value is greater than the original upper bid limit MW value.</li> <li>○ When the LMP is lower than the hybrid resource bid and the resource has ramping capability, hybrid resource award is at the lower dynamic limit MW value, including cases when the lower dynamic limit MW value is lower than the original lower bid limit MW value.</li> </ul> </li> </ul>

		<p>original lower bid limit MW value.</p> <ul style="list-style-type: none"> <li>Hybrid resource forecast data is published at the VER component level</li> </ul> <p>Verify utilization of ISO forecast of Hybrid Resources in MRI-S Settlements Statement</p>
Anticipated Settlement Outcome	701	
Expected Settlement Outcome		<p>EIM Participants: Verify Hybrid Resources are assessed a forecast fee.</p> <p>ISO Market Participants Only: Verify Hybrid Resources are fully exempted from RAAIM in Settlements and assessed a forecast fee.</p>

# Market Sim Recommendations – Scenario 1

- Master file – verify the data for your hybrid resources
- Market –
  - SIBR
    - Submit bids; submit dynamic limits that either limit or extend the upper and/or lower bid limits
    - Verify the dynamic limit information
  - CMRI
    - Verify market awards are within the dynamic limits
    - Verify forecast data is published at the VER component level
  - MRI-S
    - Review Forecast Fee (Charge Code 701) to ensure that it was applied appropriately
    - Verify that there was no RAAIM settlement

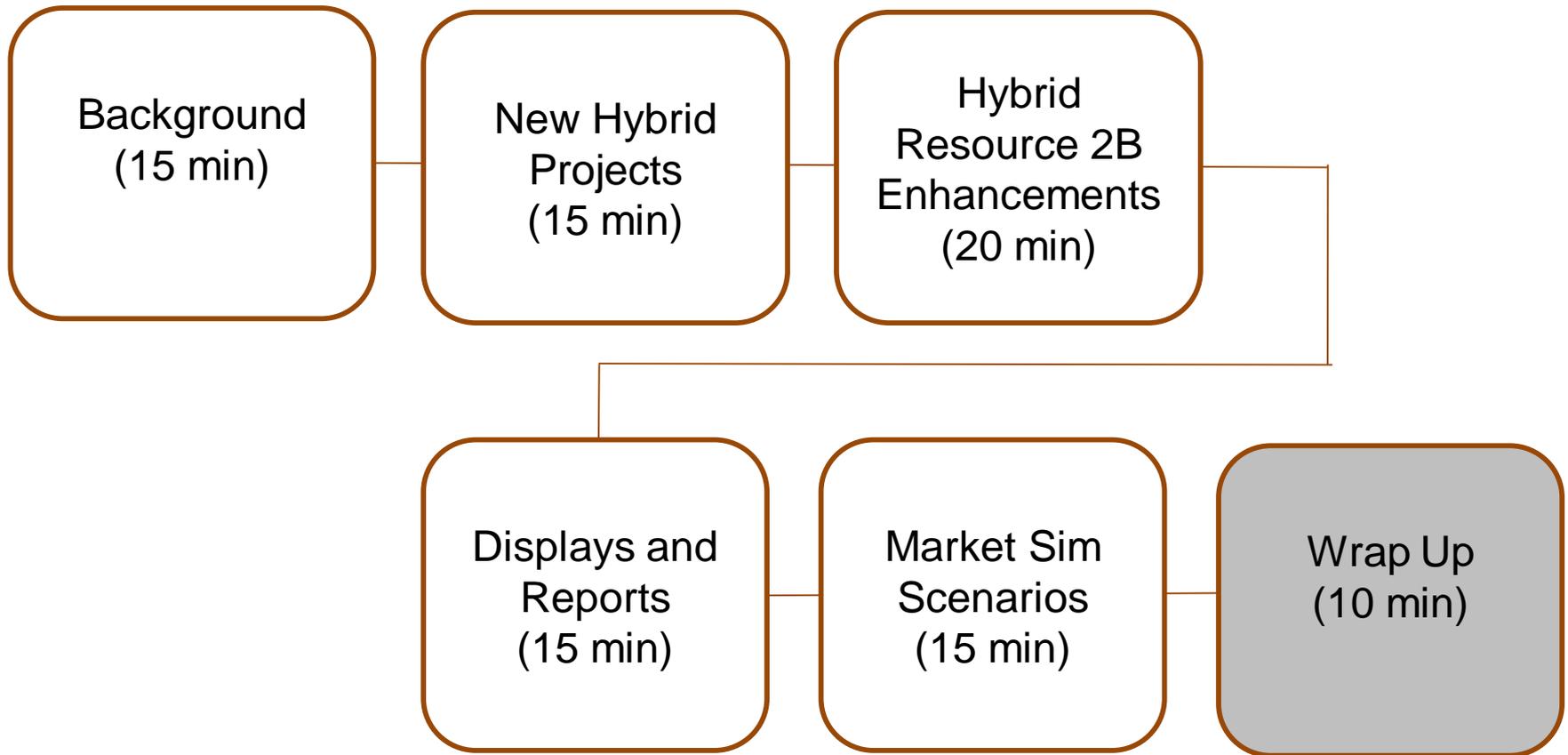
Scenario Number	Unstructured guided Scenario	
2	Description	Verify that VERs behind any given Sub-ACC have their “Follow DOT” flags set equal to ‘Y’ whenever one of their co-located resources has an AS award/AS base schedule.
	ISO Actions	ISO to normally enforce ACCs and dispatch their resources as per the regular EIM clearing process.
	EIM Market Participant Actions	EIM SCs to submit AS base schedules for non-VER resources behind Sub-ACCs with VERs.
	ISO Market Participant Actions	SCs to submit economical AS bids in the DAM and RTM for non-VER resources behind Sub-ACCs with VERs.
	Expected Outcome	<ul style="list-style-type: none"> <li>• Verify non-VER resources behind Sub-ACCs with VERs have AS awards/AS base schedules going into RTD.</li> <li>• Verify in Market and ADS that VERs behind a Sub-ACC whose co-located resources have an AS award/AS base schedule have their “Follow DOT” flags set equal to ‘Y’.</li> <li>• Verify that the aforementioned logic only applies on a per “Sub-ACC” basis, i.e., if a collocated resource in Sub-ACC1 has an AS award/base schedule, then VERs in Sub-ACC2 do not necessarily have their “Follow DOT” flags set equal to ‘Y’.</li> </ul>
	Anticipated Settlement Outcome	N/A
	Expected Settlement Outcome	N/A

## Market Sim Recommendations – Scenario 2

- SIBR (ISO BAA only)
  - Submit ancillary service bids for co-located resources that are part of the sub-ACC.
- BSAP (WEIM only)
  - Submit base schedules with ancillary services for co-located resources that are part of the sub-ACC.
- CMRI
  - Verify that ancillary services were awarded appropriately
- ADS
  - Verify that VERs behind a sub-ACC, with a co-located resource that has an AS award, have their “Follow DOT” flag set equal to “Y”
  - VERs in *other* Sub-ACCs do not necessarily have their “Follow DOT” flag set equal to “Y” (unless their own co-located resources within the same Sub-ACC also has an AS-award).

# Q&A

# In today's session we'll cover:



# Summary of Hybrid Resource 2B changes

- Interconnection
  - Interconnection Request
  - Project Details Form
  - Generator Resource Data Template
- New Master and Sub-ACC Configuration
- SC Forecast Option
- Submit Dynamic Limits
- BAAOP Displays
- New and Updated Reports
  - OASIS
  - CMRI
  - Transmission Limits
  - ISO Today/Today's Outlook

Coming soon-  
External BRS V1.5

# Final Q&A



**Thank you for your participation!**

For more detailed information on anything presented, please  
visit our website at:

[www.caiso.com](http://www.caiso.com)

Or send an email to:  
CustomerTraining@caiso.com