Market Enhancements for Summer 2021 Readiness: Training – Part 3

Load, Export, and Wheeling Through Priorities

June 24, 2021

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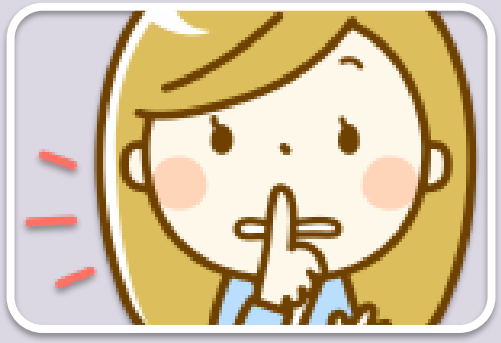
Customer Readiness

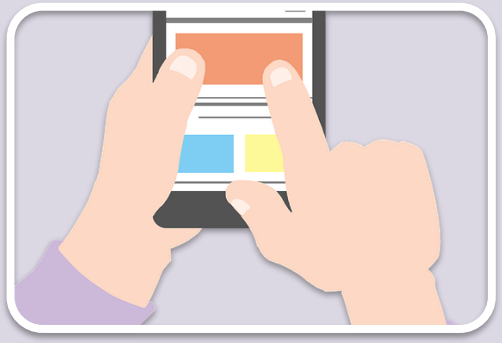
- Slide 39 updated
- Reference section added to end

Updated 9/23/2021

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

Objective: Market enhancements for summer 2021 readiness

- Load, export, and wheeling through priorities
  - Equitably balance the reliability of serving ISO balancing authority area load with the reliability of exports, while providing open access to the ISO transmission system

Agenda

In this training, you will learn about the following elements:

- How exports cleared in day-ahead are prioritized relative to ISO load in real-time
- Requirements for designating non-resource adequacy (RA) capacity backing high priority export schedules
- How outages are applied to partial RA resources that may back a high priority export
- Market prioritization of wheel-through self-schedules
- How transmission is allocated if the ISO's hour-ahead scheduling process is infeasible

Acronyms

Abbreviation	Term
BAA	Balancing Authority Area
CIRA	Customer Interface for Resource Adequacy
DA / DAM	Day-Ahead / Day-Ahead Market
DALPT	Day-Ahead Lower Price Taker
DAPT	Day-Ahead Price Taker
FERC	Federal Energy Regulatory Commission
GRDT	Generator Resource Data Template
HASP	Hour-Ahead Scheduling Process
IRDT	Intertie Resource Data Template
LPT	Lower Price Taker
MOO	Must Offer Obligation
NERC	North American Electric Reliability Corporation

Acronyms

Abbreviation	Term
PBC	Power Balance Constraint
PT	Price Taker
RA	Resource Adequacy
RT / RTM	Real-Time / Real-Time Market
RTLPT	Real-Time Lower Price Taker
RTPT	Real-Time Price Taker
RUC	Residual Unit Commitment
SC	Scheduling Coordinator
SIBR	Scheduling Infrastructure and Business Rules
SS-STD	Self-Schedule Standard
SS-LPT	Self-Schedule Lower Price Taker
UI	User Interface

Background

Implementation Details

Market Simulation

LOAD, EXPORT, AND WHEELING PRIORITIES

Implementation timeline

- Tariff Amendment filed with FERC on April 28, 2021
- ISO has requested FERC issue an order on this filing by June 27, 2021
- Market simulation: June 30 – July 6, 2021
- Effective dates:
  - Priority Wheeling Through – effective June 28, 2021
    - These changes will sunset May 31, 2022
    - New initiative “External Load Forward Scheduling Rights Process” kickoff in mid-July
  - Additional load, export, and wheeling through revisions – effective no later than July 15, 2021
    - Notify market participants at least 5 days before implementation

BACKGROUND: HIGH-LEVEL REVIEW OF CHANGES

Changes to market scheduling priorities for exports and wheel-through self-schedules relative to ISO load

- Change how exports cleared in the day-ahead residual unit commitment (RUC) process are prioritized relative to ISO load in the real-time market
- Enhance requirements for designating non-RA capacity backing high priority export schedules
- Change market prioritization of wheel-through self-schedules

No longer prioritize exports deemed feasible in RUC over serving ISO load

- The RUC process does not prevent RA capacity needed to serve ISO load in real-time from being used to support an export that cleared in day-ahead

- Enforce two classes of export schedules all the way through the real-time market:
  - Exports backed by capacity designated to serve external load have a higher priority (same as ISO load)
  - Exports not backed by capacity designated to serve external load have a lower scheduling priority than ISO load

Enhance rules specifying non-RA capacity to back high priority exports

- Identify resources that can be designated to support high-priority exports (via Master File flag)
- Resources identified as supporting high priority exports must confirm a load-serving entity outside of the ISO has a right to the capacity
- Resource will be notified if designated to support a high-priority export to ensure it can meet its obligations
- Variable energy resources can be designated to back high priority exports if export quantity is no greater than the lowest fifteen-minute forecasted output for the hour

Clarify how outages are applied to partial RA resources that may back a high priority export

- If a scheduling coordinator notifies the ISO of a contract term that specifies how outages are applied to the RA and non-RA portion of the capacity, those terms will be reflected in the outage distribution
- If not specified, the ISO will apply a pro-rata distribution of the outage against the RA and non-RA capacity

Change prioritization of wheel-through self-schedules

- Currently, wheel-through self-schedules cleared in the RUC process have a higher scheduling priority than imports or internal generation needed to serve ISO load
  - Wheel-throughs consist of balanced import and export legs
  - Wheel-throughs can use transmission capacity that is needed by resource adequacy supply to serve ISO load
- Change priorities so that high-priority wheel-through self-schedules have the same priority as serving load with self-scheduled supply

Differentiate high-priority and low-priority wheels

- High-priority wheels are available for external load serving entities that are planning on using the ISO system to meet their reliability needs
- High-priority wheels are established by:
  - Notifying the ISO 45 days prior to the month the MW quantity of the wheel
  - Attesting that they have secured firm transmission to the ISO border for the entire month
- These changes will expire May 31, 2022

Comparison of day-ahead self-schedule priority levels

- Demand-side priorities
  1) The export self-schedule of a priority wheel = CAISO load = high priority export
  2) Low priority export = The export self-schedule of non-priority wheel

- Supply-side priorities
  1) Self-scheduled supply (could be internal generation or import) = Import self-schedule of priority wheel
  2) Import self-schedule of non-priority wheel

Note: Complete list of priority levels is available in the following document: http://www.caiso.com/InitiativeDocuments/SecondRevisedDraftTariffLanguage-MarketEnhancements-Summer2021Readiness-LoadExportWheelingPriorities.docx

Comparison of real-time self-schedule priority levels

- Demand-side priorities
  1) CAISO load = export self-schedule of priority wheel = high priority export that clears RUC and designated resource provides RT bids to cover full export award = export with designated resource submitting bids above RUC schedule
  2) DA low priority export = DA high priority export and designated resource does not provide RT bids to cover full RUC award
  3) RT low priority export

Note: These dispatch priorities as defined in the RTM optimization may be superseded by operator actions and procedures as necessary to ensure reliable operations.

Comparison of real-time self-schedule priority levels

- Supply-side priorities
  1) RUC self-schedule supply (could be internal or import) = import leg of high priority wheel that cleared RUC
  2) RT self-scheduled supply (import leg of RT high-priority wheel)
  3) Import self-schedule of non-priority wheel through (DA or RT)

Note: These dispatch priorities as defined in the RTM optimization may be superseded by operator actions and procedures as necessary to ensure reliable operations.

New process to equitably allocate transmission if the ISO's hour-ahead scheduling process is infeasible

- Pro rata allocation between RA supply bidding into the hour-ahead scheduling process (HASP) and high-priority wheels bidding into HASP
  - Wheel quantity limited by day-ahead schedule
- Pro rata allocation applies to binding intertie constraints and binding constraints on Path 26
- Operator judgment ultimately determines what schedules are supported

Questions

Master File Data

Management of Outages on Partial RA Resources

SIBR Bidding & Validation Rules

IMPLEMENTATION DETAILS

MASTER FILE DATA

Identify resources that can support PT wheel

- New Master File flags identify export system resources that can support PT wheel (will default to null)
  - **PT_WHEEL_SCHED** and **PT_WHEEL_MW** added to IRDT
  - SC must request PT Wheel ID to activate fields, or designate an existing export resource ID by populating these fields in the IRDT
- SCs can define a wheel schedule as a high priority wheel by:
  - Creating new export system resource that will be designated through use of Master File flag as capable of supporting a PT wheel (i.e. meets all attestation criteria on next slide)

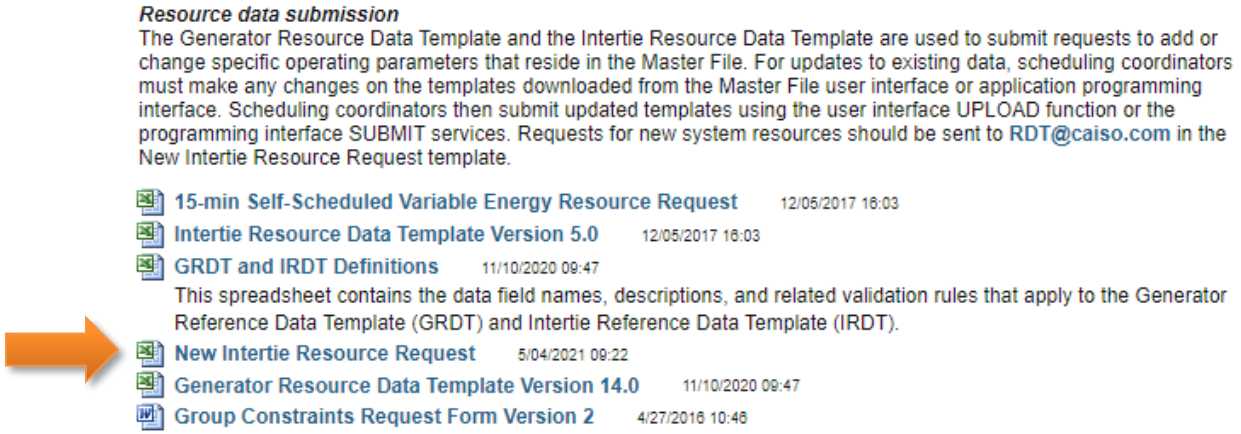
Identify resources that can support PT wheel (cont'd)

- By submitting PT wheel flag, the SC is attesting that they meet the following criteria:
  - PT Wheel supported by a firm supply contract to serve load in another BAA outside the CAISO for the month
  - PT Wheel supported by monthly firm transmission contract from source to CAISO scheduling point for HE 07:00-22:00, Monday through Friday, excluding NERC holidays

Process to register a high-priority wheel

- Submit **New Intertie Resource Request** form to RDT@caiso.com

- Navigation: caiso.com > Market & Operations > Network and Resource Modeling
  - Scroll down to the **Resource data submission** section to locate the form



Resource data submission

The Generator Resource Data Template and the Intertie Resource Data Template are used to submit requests to add or change specific operating parameters that reside in the Master File. For updates to existing data, scheduling coordinators must make any changes on the templates downloaded from the Master File user interface or application programming interface. Scheduling coordinators then submit updated templates using the user interface UPLOAD function or the programming interface SUBMIT services. Requests for new system resources should be sent to RDT@caiso.com in the New Intertie Resource Request template.

15-min Self-Scheduled Variable Energy Resource Request 12/05/2017 16:03

Intertie Resource Data Template Version 5.0 12/05/2017 16:03

GRDT and IRDT Definitions 11/10/2020 09:47

This spreadsheet contains the data field names, descriptions, and related validation rules that apply to the Generator Reference Data Template (GRDT) and Intertie Reference Data Template (IRDT).

New Intertie Resource Request 5/04/2021 09:22

Generator Resource Data Template Version 14.0 11/10/2020 09:47

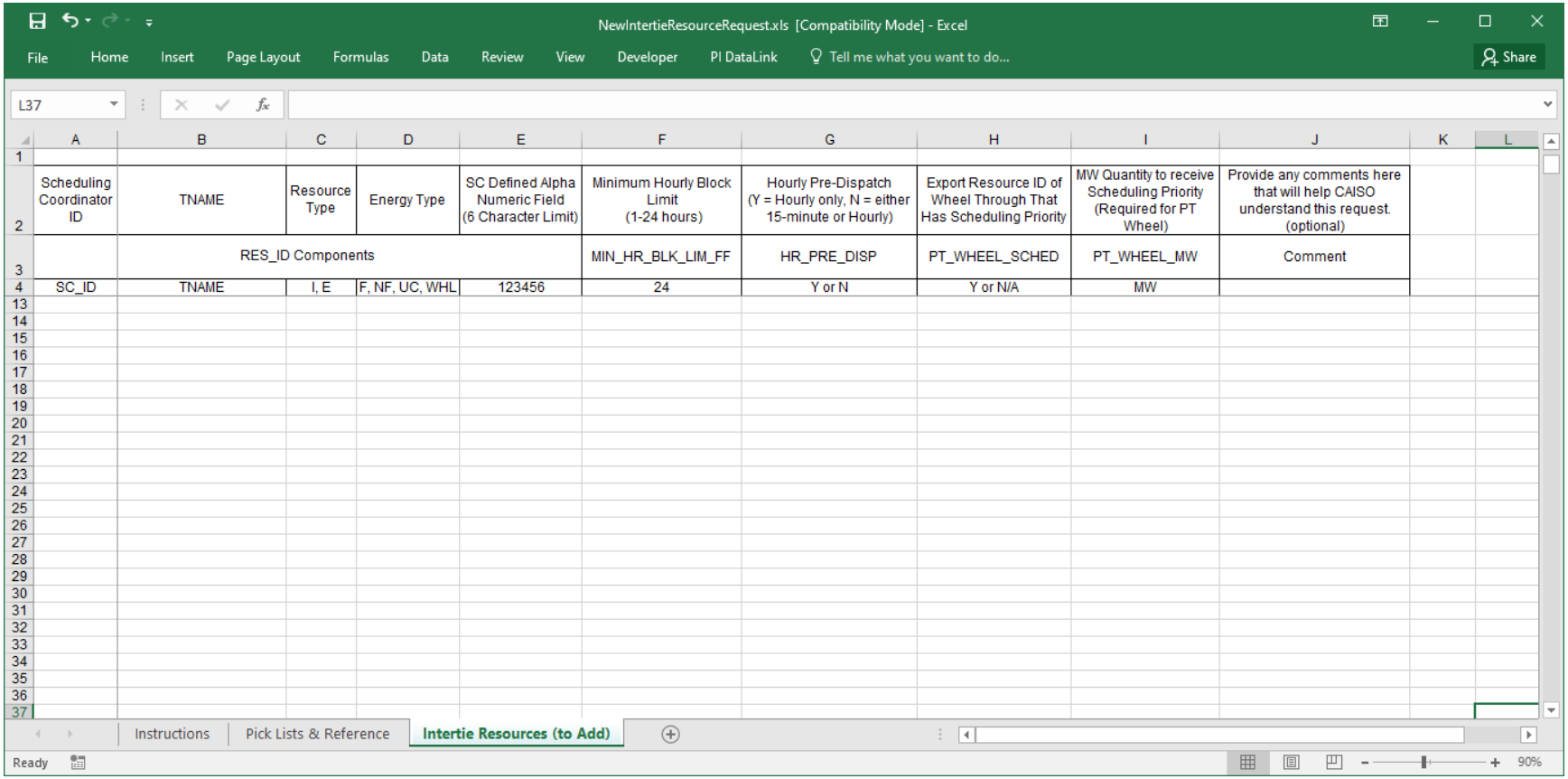
Group Constraints Request Form Version 2 4/27/2016 10:46

New intertie resource request: Submission time frame

- Requests for the months of **July and August 2021** are due by **June 29, 2021**
- Requests for subsequent months are due 45 days prior to the month

New intertie resource request form

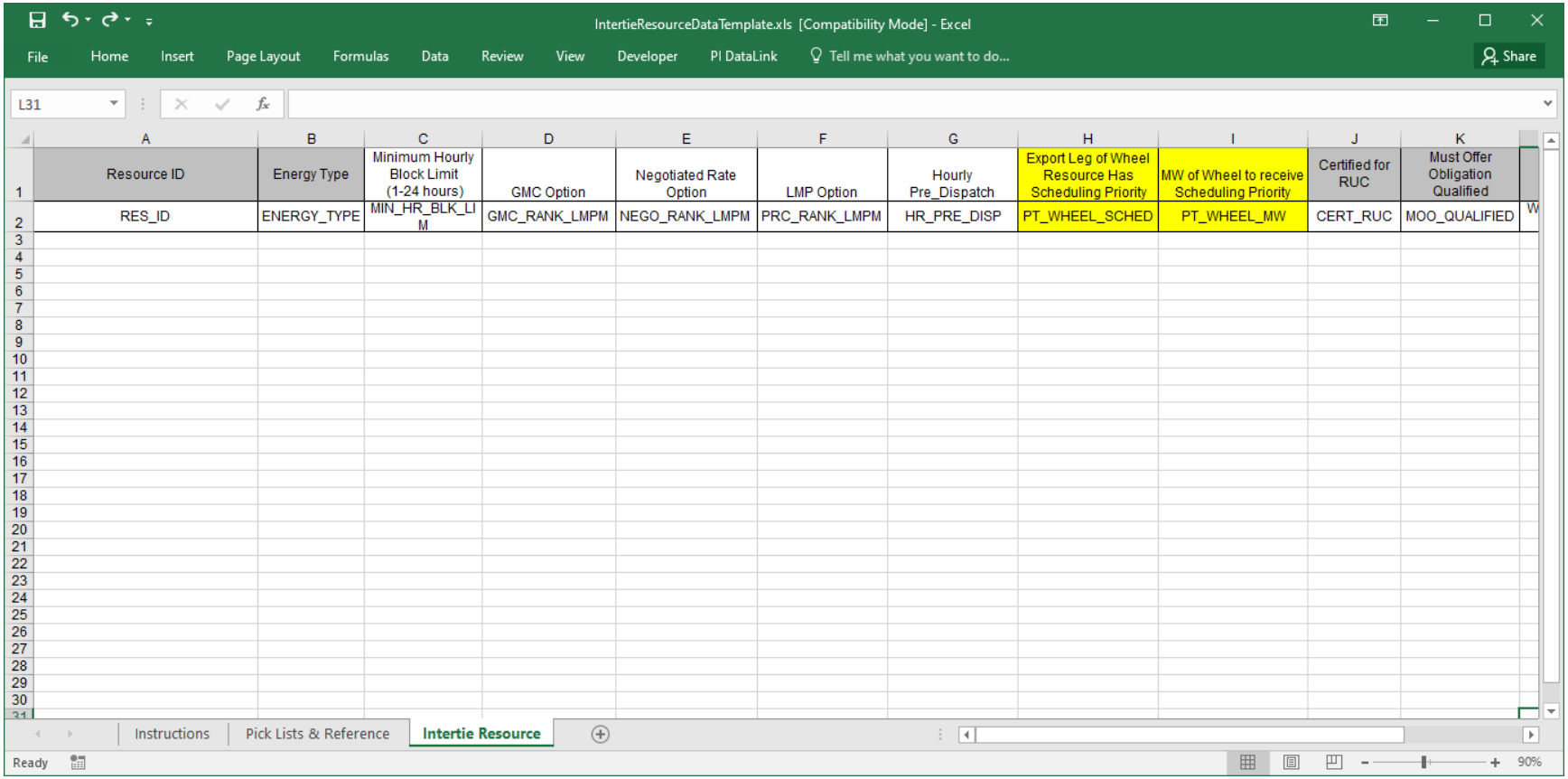
Refer to the Instructions tab for information on completing the form



Scheduling Coordinator ID	TNAME	Resource Type	Energy Type	SC Defined Alpha Numeric Field (6 Character Limit)	Minimum Hourly Block Limit (1-24 hours)	Hourly Pre-Dispatch (Y = Hourly only, N = either 15-minute or Hourly)	Export Resource ID of Wheel Through That Has Scheduling Priority	MW Quantity to receive Scheduling Priority (Required for PT Wheel)	Provide any comments here that will help CAISO understand this request. (optional)
	RES_ID Components				MIN_HR_BLK_LIM_FF	HR_PRE_DISP	PT_WHEEL_SCHED	PT_WHEEL_MW	Comment
SC_ID	TNAME	I, E	F, NF, UC, WHL	123456	24	Y or N	Y or N/A	MW	

Changes to intertie resource data template (IRDT)

New **PT_WHEEL_SCHED** and **PT_WHEEL_MW** fields on IRDT identify export system resources that can support PT wheel



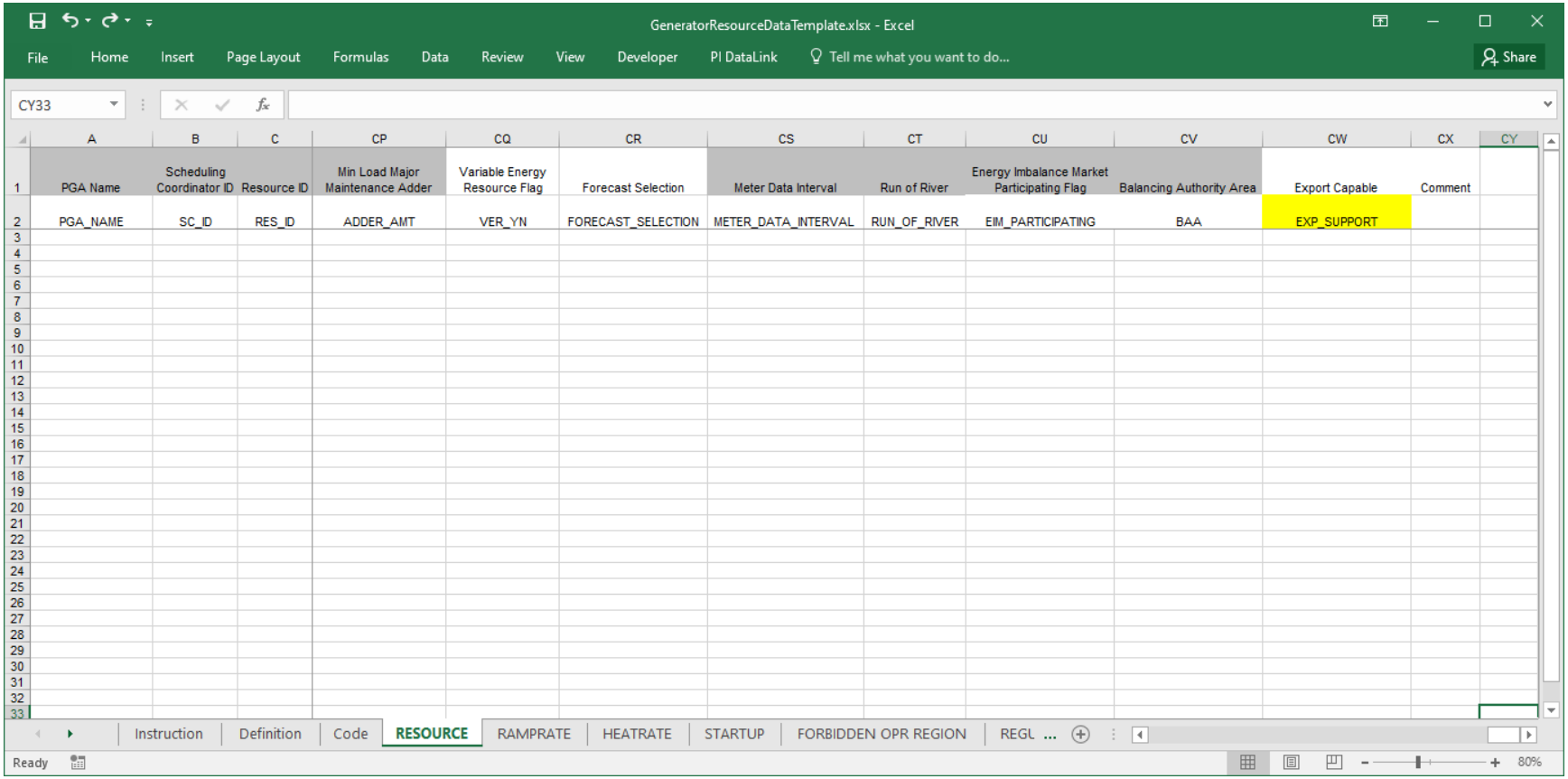
	A	B	C	D	E	F	G	H	I	J	K
1	Resource ID	Energy Type	Minimum Hourly Block Limit (1-24 hours)	GMC Option	Negotiated Rate Option	LMP Option	Hourly Pre_Dispatch	Export Leg of Wheel Resource Has Scheduling Priority	MW of Wheel to receive Scheduling Priority	Certified for RUC	Must Offer Obligation Qualified
2	RES_ID	ENERGY_TYPE	MIN_HR_BLK_LIM	GMC_RANK_LMPM	NEGO_RANK_LMPM	PRC_RANK_LMPM	HR_PRE_DISP	PT_WHEEL_SCHED	PT_WHEEL_MW	CERT_RUC	MOO_QUALIFIED

Identify resources that can support PT export

- New Master File flag identifies ISO internal supply resources that can support PT export (will default to null)
  - **EXP_SUPPORT** added to GRDT
- By submitting the flag for designated resource, the SC can confirm:
  - The resource is capable at the time of bid submission of supporting an hourly block schedule over the entire relevant operating hour equal to the PT export quantity
  - A variable energy resource can support the export quantity in all 15-minute intervals
  - The designated capacity has been forward contracted only with an external load serving entity

Changes to generator resource data template (GRDT)

Submit updated GRDT with **EXP_SUPPORT** column set to Y to identify ISO internal supply resources that can support PT export



GRDT: Submission time frame

- Updates are subject to the Master File 5-business day timeline
- Due to the timing of the FERC decision on the tariff provisions (expected by June 27, 2021), SCs should send an email to RDT@caiso.com if they want to request an expedited effective date

Questions

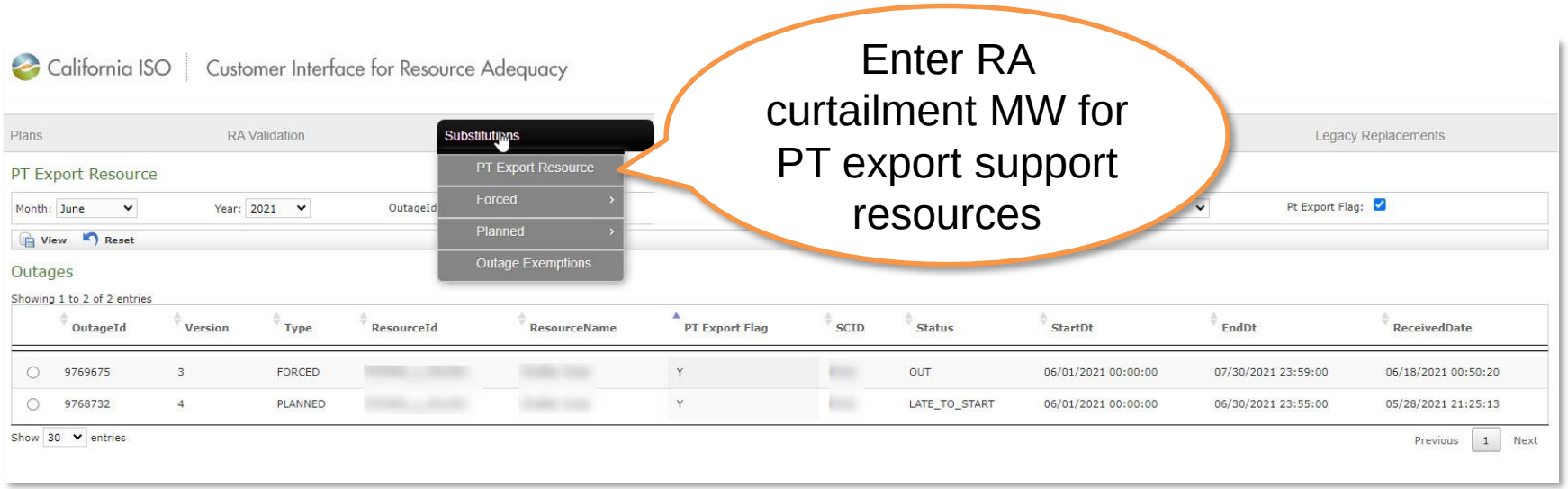
MANAGEMENT OF OUTAGES ON PARTIAL RA RESOURCES

Impact of outages

- Calculate how outages impact RA and non-RA capacity on a supporting resource
  - The SC of supporting resource shall notify the ISO via the Customer Interface for Resource Adequacy (CIRA) if their RA capacity changes, else,
  - To account for the outages, system shall pro-rata allocate the outage MW between the RA capacity and the remainder of the resource's capacity up to its Pmax

New screen in CIRA: PT Export Resource

- Enter RA curtailment MW in CIRA using the following navigation path:
  - Substitutions > PT Export Resource



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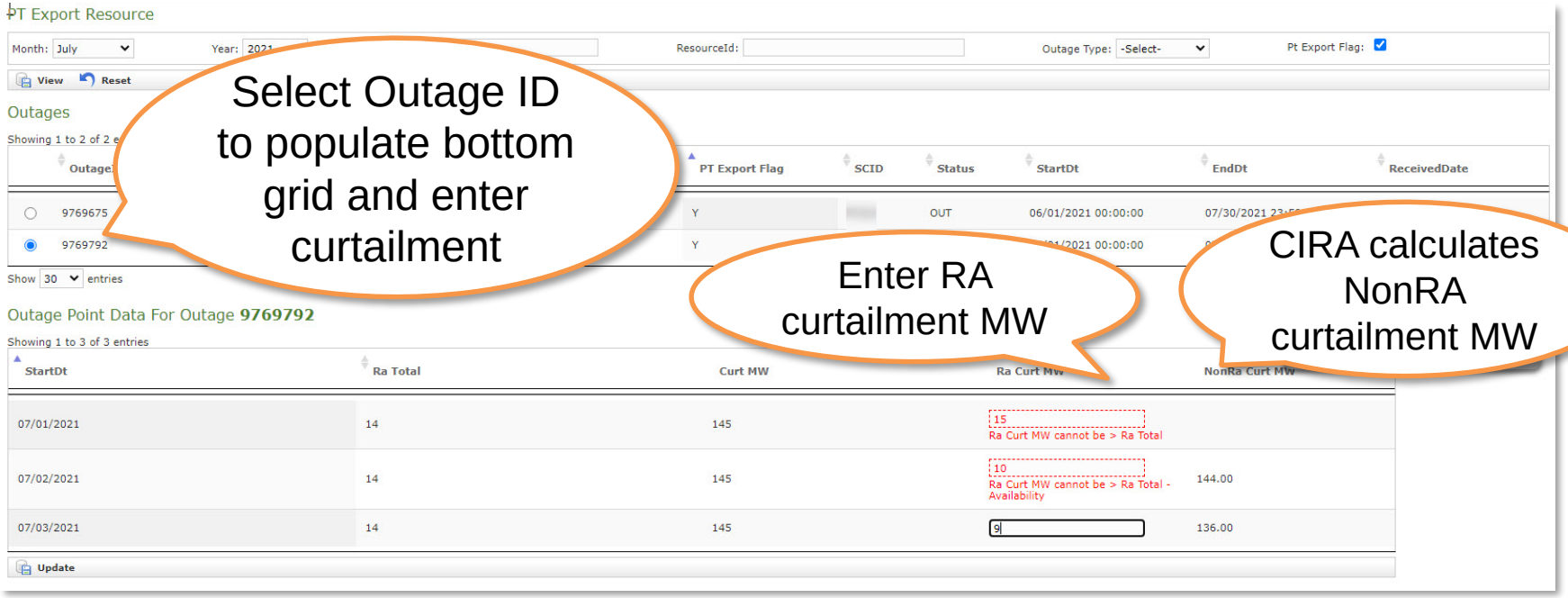


Questions

SIBR BIDDING & VALIDATION RULES

Scheduling Infrastructure & Business Rules (SIBR) terminology

- The following terms relate to self-schedules submitted in SIBR:
  - PT export [or SS-STD (Self-Schedule Standard) in SIBR UI]:
    - Self-schedule with designated resource
  - LPT export [or SS-LPT in SIBR UI]:
    - Self-schedule with no identified resource
  - PT wheel:
    - Self-scheduled wheel that meets tariff criteria for high priority wheeling through transaction
  - LPT wheel:
    - Self-scheduled wheel that does not meet tariff criteria for high priority wheeling through transaction

Wheels in SIBR are a bit more complex. The wheel will indicate **SS-STD** from the import side and could be **SS-STD** or **SS-LPT** from the export side.
Note: If the wheel is on a registered intertie, the export cannot name a supporting resource.

Bidding requirements for resources that can support PT export

In addition to meeting the attestation requirements listed on Slide 29:

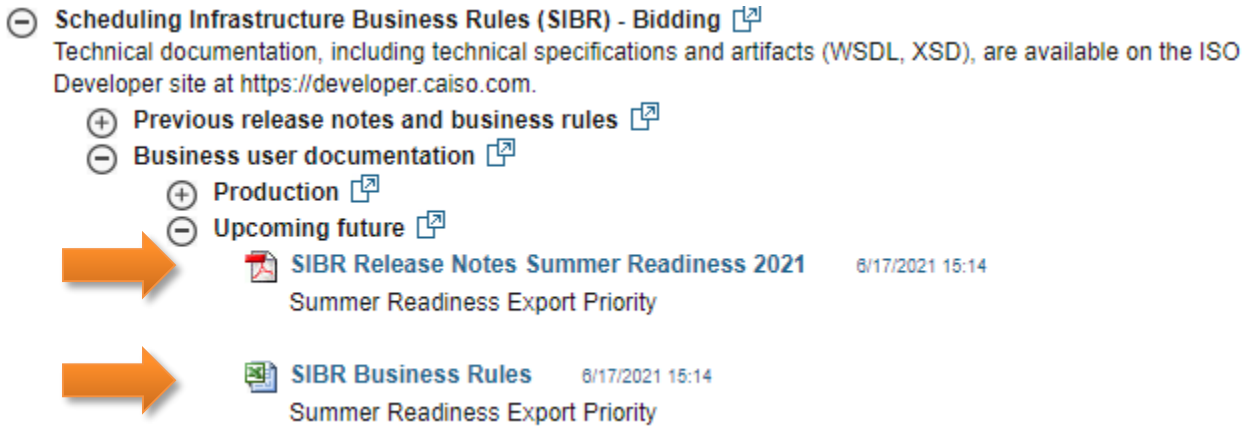
- Designated resource must participate in RUC up to the PT export
- Designated resource must bid in RTM at least up to the PT export
  - RUC schedule may require higher quantity
- The designated resource cannot be an energy-only resource

RUC RA obligation for supporting resources to support PT exports

- For supporting resource RUC bid, SIBR will:
  - Insert/replace/extend RUC RA obligation
  - RUC availability bids ($0/MW) shall cover the capacity range that supports the sum of PT self-schedules PT exports which are associated with the resource
  - Set the portion above the PT export quantity to the submitted RUC availability bid price

SIBR validation rules

- The new SIBR validation rules are posted to the application access page
  - Navigation: caiso.com > Participate > Application Access
    - Scroll down to the **Scheduling Infrastructure Business Rules (SIBR) – Bidding** section to locate the documents



SIBR will validate supporting resource and set export priority in day-ahead market

- For PT export (has designated supporting resource):
  - Supporting resource must have flag to support export
  - The resource total supported PT export capacity shall be limited to the non-RA capacity bid in the market excluding ancillary services self-provision and awards, as applicable
  - If the resource total supported PT export capacity is not sufficient to cover all associated PT export self-schedules, all these PT self-schedules shall be converted to DALPT export self-schedules

- For Self-scheduled export (without a designated resource):
  - The submitted export schedule without designated resource shall be DALPT export

RTM import resource MOO applies to RA imports instead of RUC schedule if RUC PBC is relaxed

- If the day-ahead market is RUC under-gen infeasible, the must offer obligation (MOO) will apply to RA import resources in real-time for the corresponding RA capacity in the trading hours with a RUC under-generation power balance constraint (PBC) relaxation
- Instead of the RUC schedule, MOO will apply to RA import resources in real-time in those RUC under-gen infeasible hours
  - SIBR will insert bids for these resources if they haven't done so

Self-schedule PT export submitted or re-submitted in RTM (Tier 1 validation rules for export with DAPT)

- Tier 1 and Tier 2 validation occurs in RTM
- For the export to receive **DAPT** priority in RTM, sum of applicable PT exports designating the one supporting resource shall not exceed the supporting resource's RUC schedule. Otherwise, all applicable exports will convert to **DALPT**
- The supporting resource for DAPT export shall be the same resource in RTM (Tier 1 validation)
- In general, one supporting resource can support multiple exports, each export only has one PT priority, DAPT (Tier 1 validation) or RTPT (Tier 2 validation)

Self-schedule PT export submitted or re-submitted in RTM (Tier 2 validation rules)

- The supporting resource for RTPT export can be the same or a different resource in RTM relative to what is used in DAM
- If supporting resource is a different resource, the SS export is eligible for RTPT / RTLPT export (Tier 2 validation)
  - (Reminder: DAPT and RTPT are the same priority level)

Notify SC of supporting resource if it supports PT Export

- Notify the designated supporting resource SC in DAM/RTM
- SIBR shall notify the SC of the designated resource that its resource supports DAPT export
- The notification shall include:
  - SC of export, export resource ID, market, start/end time
  - SC of designated resource, designated resource ID, designated MW

New process to equitably allocate transmission if the ISO's hour-ahead scheduling process is infeasible

- Post-HASP process will pro rata allocate available transmission capacity between CAISO load and priority wheel through transactions if HASP cannot meet CAISO forecast of CAISO demand or fully accommodate a priority wheeling through transaction, constrained in import direction or path 26 N-S direction

Example: Self-schedule export with DAPT that is re-bid in RTM

Export re-designates Generator A with RTM bid

Resource	DAM Bid	Supporting Resource	IFM Schedule	IFM Priority	RUC Schedule	RUC Priority	RTM Bid	RTM Priority
Export A	80 PT 40 LPT	Generator A	120	80 DAPT 40 DALPT	100	80 DAPT 20 DALPT	80 PT 20 LPT	80 DAPT 20 DALPT
Generator A	80		80		80		80	

- If the supporting resource RUC schedule **can** support DAPT export schedule, system shall set DAPT export schedule equal to DAPT export that cleared in RUC
- System shall set DALPT export schedule equal to the difference between Export RUC schedule and DAPT export schedule
- In this example, the RUC schedule for the export is 100 because RUC cut 20 MW of DALPT because the market was short supply

Example: Self-schedule export with DAPT that is not re-bid in RTM

Resource	DAM Bid	Supporting Resource	IFM Schedule	IFM Priority	RUC Schedule	RUC Priority	RTM Bid	RTM Priority
Export C	80 PT 40 LPT	Generator C	120	80 DAPT 40 DALPT	100	60 DAPT 40 DALPT	*(100 MW inserted by SIBR)*	100 DA LPT
Generator C	80				60		70	

- The supporting resource must submit bid to cover the RUC award in RTM (existing requirement)
- In this example, because the RUC schedule of the supporting resource did not clear 80 MW, and the export did not re-bid in RTM, it lost DAPT status. SIBR will insert a bid at 100 MW PT, but that will fail validation and be converted to DA LPT
- Export should have re-bid 60 PT and 40 LPT to maintain DAPT status for 60 MW

Questions

MARKET SIMULATION

Market participant pre-market simulation actions

- Market simulation structured scenarios provide customers with the ability to preview and test new functionality from bid to bill
- Attend the market simulation calls to stay informed on the timing of activities for this and other releases

Market Sim Scenarios

- Scenarios have been developed and are posted to the Release Planning page
- Here is a direct link to the scenarios:
  - http://www.caiso.com/Documents/MarketSimulationStructuredScenariosSummer2021Readiness.pdf

Final Questions

Thank you for your participation!

For more detailed information on anything presented, please visit our website at:
www.caiso.com

Or send an email to:
CustomerReadiness@caiso.com

REFERENCE MATERIAL

Reference Material

- BPM for Market Operations
  - https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Market%20Operations
    - Section 2.5.5 – Scheduling Priorities for Exports and Load
    - Section 2.5.5.2.1 – Identify Resource that can support Export
      - Includes process for updating Master File via RDT
    - Section 2.5.5.2.3 – Scheduling Priorities for Wheels
      - Includes process for registering export system resource via IRDT

Reference Material

- SIBR Business Rules
  - http://www.caiso.com/Documents/SIBRBusinessRulesforBiddingv1123.xlsx
- SIBR Scheduling Coordinator User Guide:
  - http://www.caiso.com/Documents/SIBRSchedulingCoordinatorUserGuide.pdf