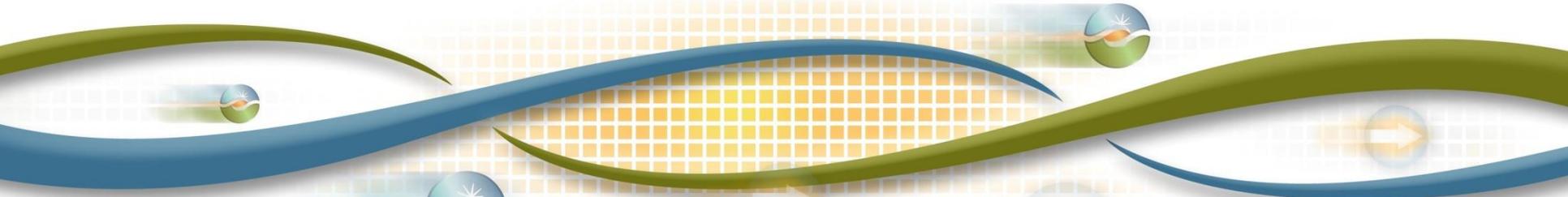




# FERC Order 764 Implementation

Spring 2014 Release



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# FERC Order 764 – Why are we making changes?

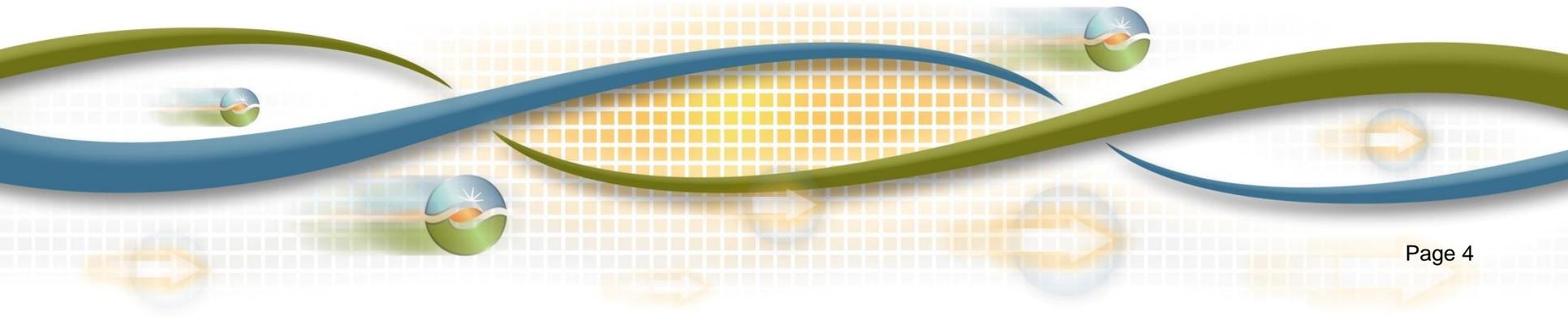
- “To remove barriers to the integration of variable energy resources:
  1. Offer an option to schedule energy with 15-minute granularity; and,
  2. Require variable energy resources to provide meteorological and forced outage data for the purpose of power production forecasting.”

# FERC Order 764 compliance

- FERC 764 provided ISO with an opportunity to enhance its markets
  - Introduction of a full 15 minute market for intertie and generation
  - Resolve existing real-time imbalance energy offset issues resulting from HASP and RTD optimizations
  - Address convergence bidding issues on the interties.
  - Meet the needs of VERs to self-schedule its forecasts closer to financially binding interval

# FERC Order 764

VER concepts and forecasts



# Basic Terminology

- **EIR = Eligible Intermittent Resource**
  - Wind and solar
  - PIR = An eligible intermittent resource that is certified to participate in the Participating Intermittent Resource Program (PIRP)
- **VER = Variable Energy Resource (FERC terminology)**
  - 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

Upon implementation  $EIR=VER$

## VER forecast facts

- Used as upper limit on schedules and bids
- Resources identified as VERs in the master file will have the two forecasting options:
  - ISO provided forecast
  - SC submitted forecast
    - Need to submit a generator resource data template (GRDT) to select this option
    - The forecast will be submitted through SIBR
    - If there are concerns (over time) the self-forecasting ability may be rescinded

## VER treatment in the 15-minute market

- For each 15-minute interval an upper dispatch limit will be set to the average of the VER's three forecasts for the corresponding 5-minute intervals.
  - A VER's bids will be limited or extended to a dynamic upper dispatch limit for each 15-minute interval in the time horizon
- Self schedules – FMM calculates a self-schedule for each 15-minute interval in the time horizon by taking an average of the three forecasts for the corresponding 5-minute intervals
  - This is treated like any other self-scheduled resource.

# FERC 764 Forecasting Accuracy

## Every 5 or 15 Minutes

- SC Submits a Complete Forecast in SIBR
- Forecast Can Be Submitted Up to 4 Hours Ahead, but No Later Than 10 Minutes Prior
- Forecast Contains 5 Minute Intervals, No Mixing
- Minimum of 2 ½ Hours Must be Submitted
- After Market Clears, SC Has Ability to See Which Forecast Used in CMRI

## At the Top of the Hour

- Forecasting Tool Takes a Snapshot of the Past Hour
- Forecasting Tool Calculates Hourly SC Forecast Difference ( $HFD_{sc}$ )
- Forecasting Tool Calculates Hourly ISO Forecast Difference ( $HFD_{iso}$ )
- Hourly Forecast Difference (HFD) = |Forecast – Actual|
- Hourly Forecast Difference (HFD) is stored

## At the End of the Period

- Period Forecast Difference Calculated for SC Forecast ( $PFD_{sc}$ )
- Period Forecast Difference Calculated for ISO Forecasts ( $PFD_{iso}$ )
- Period Forecast Difference (PFD) =  $\sum(HFD)$
- Min % ( $PFD_{sc}$ ,  $PFD_{iso}$ ) = Forecast Used for Next Period
  - Percentage under review
- $PFD_{sc}$  and  $PFD_{iso}$  provided to SC

### Period is defined as:

- Determined in BPM

# VER treatment in the 15-minute market

- FMM dispatches will be settled at the FMM price
- This dispatch will be subject to further modification in RTD

## VER forecast submission

- VER submission is not tied to any market timelines. Submitted in RT every 5 minutes on a rolling basis
  - Minimum duration of configurable multi-hours – 2.5 hours
  - Maximum duration of configurable multi-hours– 10 hours
- Although SIBR is used for submitting the forecast, the forecast is not a bid
  - Bids must still be submitted
  - However the forecast can affect the market award
- Who is subject to forecasting fees?
  - All internal VERs
  - All VERs outside of the balancing authority area that elect to use the ISO forecast

# FERC Order 764

15-minute and 5-minute markets

# Summary of real-time market design changes

- Interties:
  - Dispatch and settlement in 15-minute intervals
  - Option for hourly schedules, but price takers in 15-minute market
- Internal and dynamically-scheduled resources:
  - Financially binding 15-minute schedules
  - Existing 5-minute dispatch and settlement remains
- Intertie and internal convergence bids
  - Both closed-out at same 15-minute LMP
  - Addresses uplift costs that led to convergence bid suspension
- Variable energy resources:
  - Reduced scheduling lead time
  - Scheduling granularity reduced from hourly to 5-min
  - Eliminates PIRP's need for netting imbalance energy monthly

# Real-time bid submission

- Bids are used to:
  - Economically accept hourly block schedules
  - Economically schedule resources for energy in the 15 minute market
  - Economically dispatch resources in the 5 minute real-time market runs.
- Bid submission timeline will not change
  - The same economic bids will be used in FMM and RTD.
  - No changes to the hourly bid information by internal generators.

# The ISO FERC Order 764 RTUC 15 Min Scheduling Customer Touch Points

T-1 D	T-8 H	T-4 H 30 M	T-105 M	T-75 M	T-52.5 M	T-47.5 M	T-45 M	T-30 M	T-22.5 M	T-20 M	T-10 M	T-7.5 M	T-2.5 M	T	T+2.5 M	T+7.5 M	T+17 M	T+40 M
-------	-------	------------	---------	--------	----------	----------	--------	--------	----------	--------	--------	---------	---------	---	---------	---------	--------	--------

Submit Variable Energy (VER) Resource Forecast each 5 min up to 8 hours ahead

Submit RT Bids Post DAM Publish T-1 13:00	Retrieve Clean Bids Post RTM Close	Retrieve Trades Post RTM Publish
Submit Self Schedules Post T-1 13:00		

Submit Real Time IST  
T-1 00:01

SIBR

Public Market Results (OASIS)

View HASP Results

View RTUC Binding Schedule / AS  
Every 15 minute  
RTD Run

View RTUC Price Aggregate Schedule  
Every 15 min  
RTUC Run

View RTD Results  
Every 5 minute  
RTD Run

Private Market Results (CMRI)

View HAP Results

View RTUC Binding Schedule / AS  
Every 15 minute  
RTD Run

Receive ADS Start up Instructions

Receive Exceptional Dispatch Instructions for 5 min RTD

System Ops Interactions RT Generation

Receive HASP Intertie Schedule via ADS

Decline HASP Schedule via ADS

Receive RTUC ADS Binding Schedule for Each 15 min RTUC

Receive ADS Instructions Each 5 min RTD

System Ops Scheduling

eTagging for Transmission Only (HASP)

eTagging for RTUC Energy Profile

eTagging Historical True up

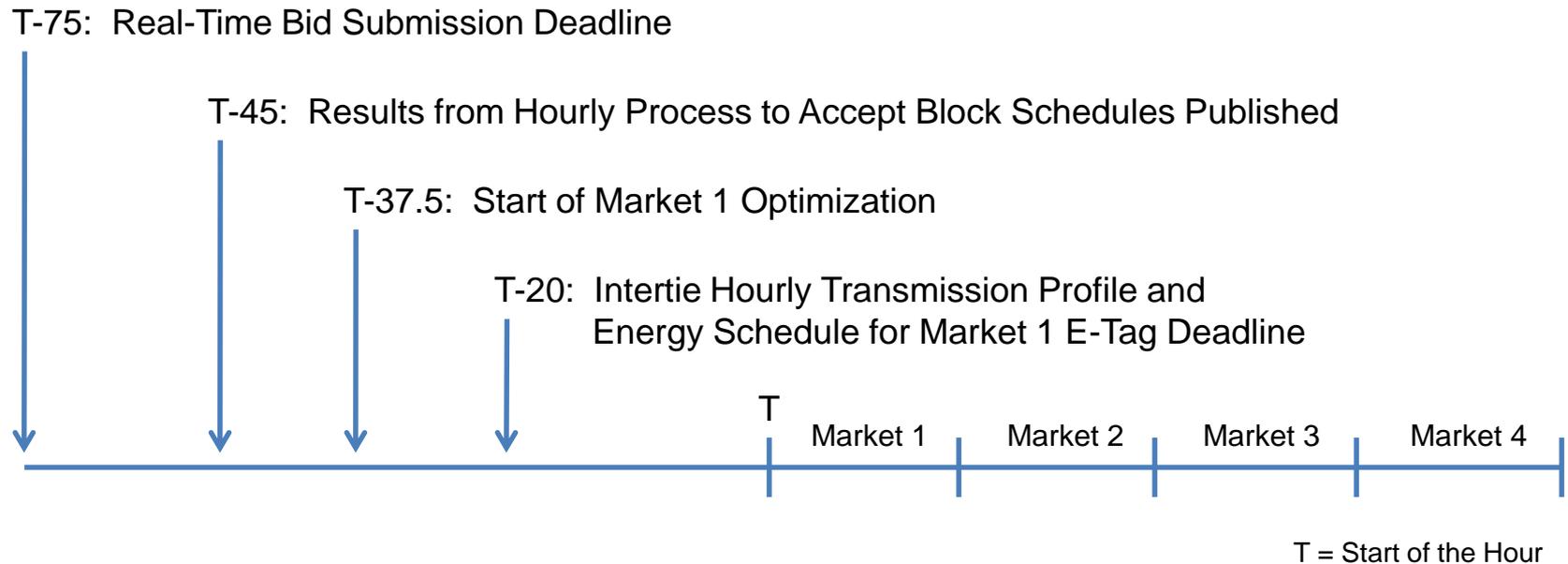
Resource Adequacy Availability Management (RAAM)

View RA Outage Approvals and Calculations

PIRP

View RTM Forecast  
5:30 AM

# Hourly process for real-time market



No hourly financially binding schedules

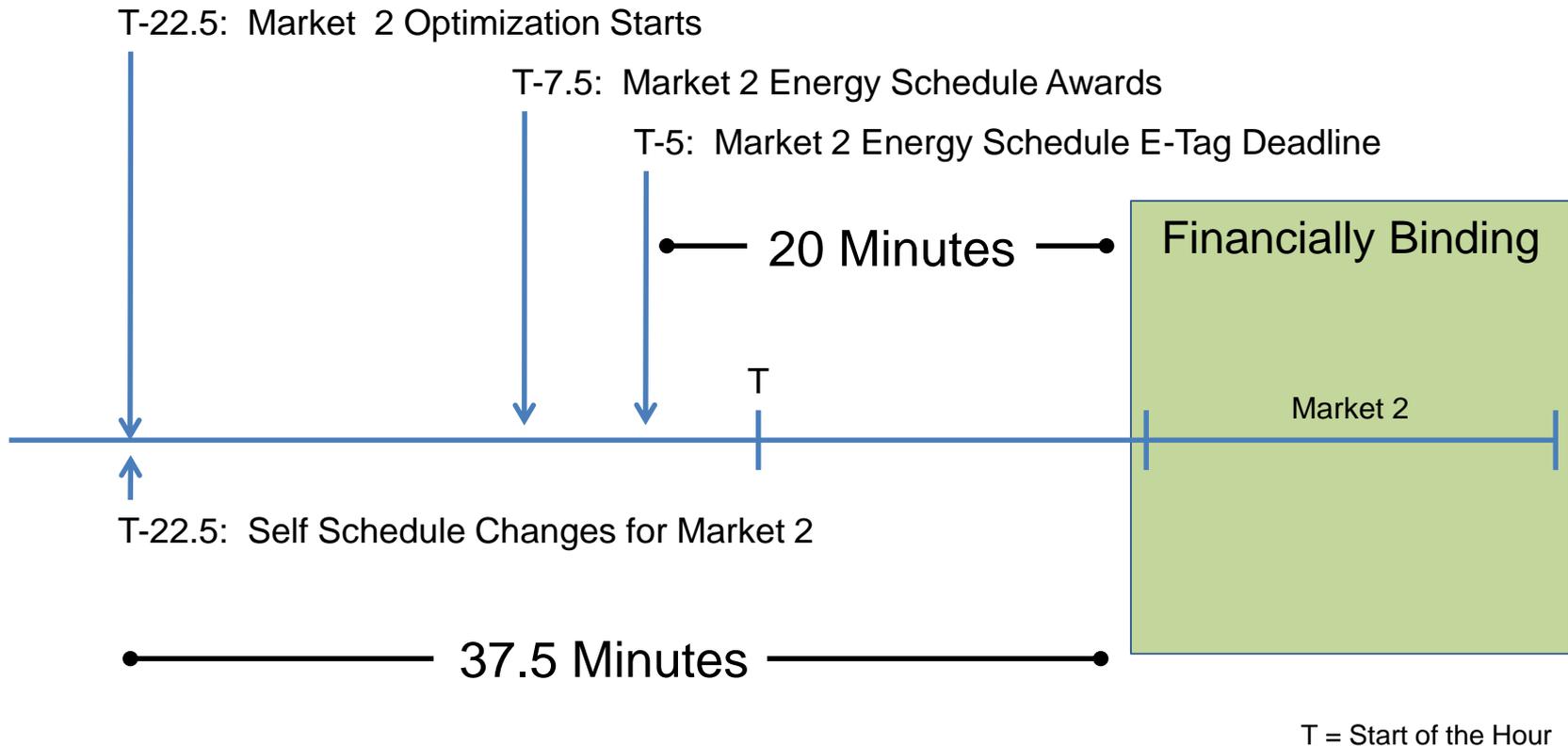
# The hour-ahead process HASP

- Produces
  - Advisory schedules for pricing nodes
  - Final hourly block intertie schedules for energy and AS
  - Intertie schedules and AS awards are published approximately 45 minutes before the start of the operating hour.
- Each hourly block has 4 equal 15 minute schedules
- Schedules are final unless operational curtailment. The FMM LMP is used to settle each 15 minute interval.

# 15 minute market (FMM) process

- ISO will leverage the existing real-time unit commitment process to co-optimize energy schedules and ancillary service awards
  - Financially binding 15-minute energy schedule for imports, exports, and generation
  - Financially binding ancillary service awards for specific imports and generation
  - FMM will be cleared against ISO real-time demand forecast
- Runs every 15 minutes and looks ahead in 15 minute intervals spanning the current trading hour and the next trading hour.

# 15-minute market timeline

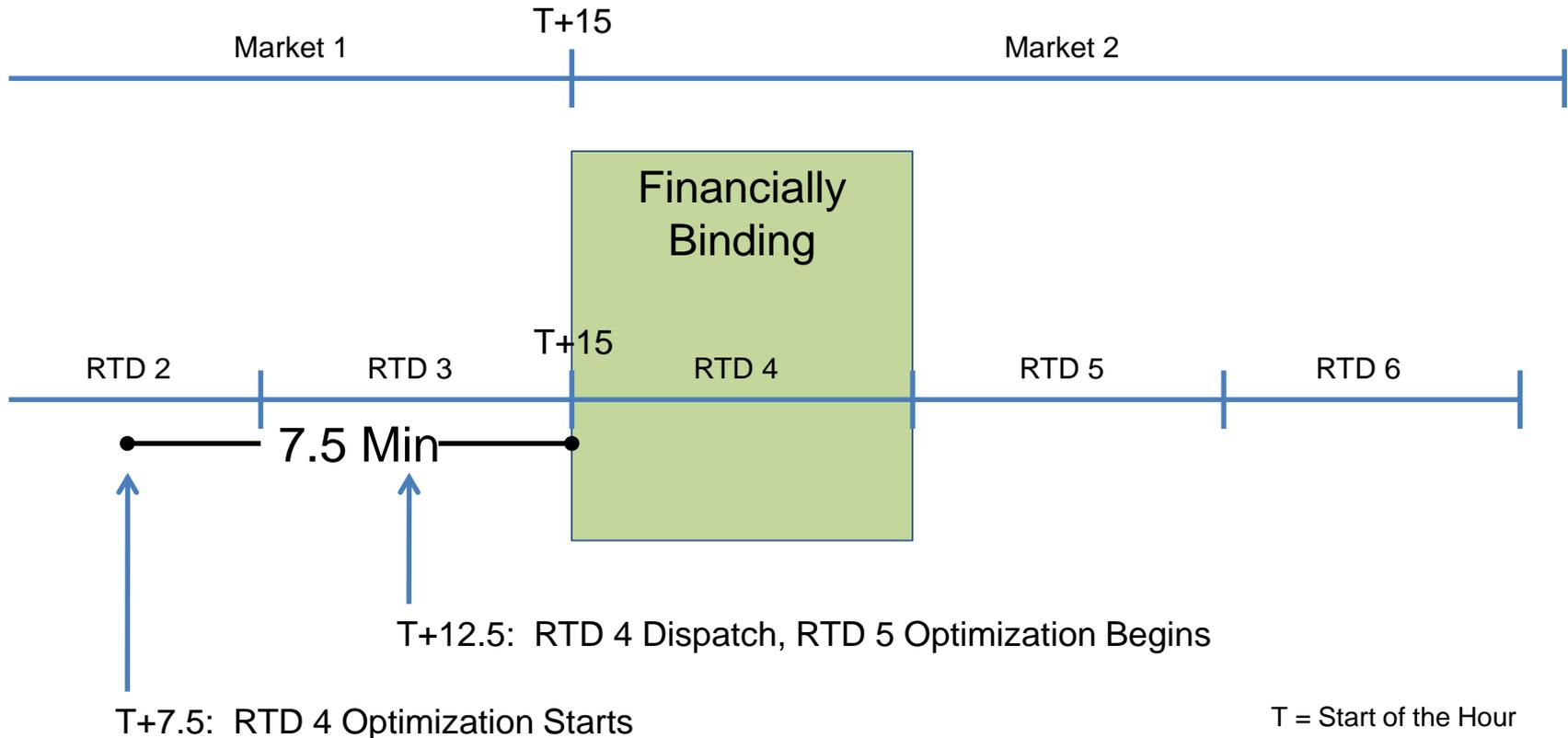


- Second interval of RTUC optimization used to avoid seams issues
- RTPD 2 becomes the first interval in new 15 minute market

## FMM uses security constrained unit commitment to:

- Make commitment decisions for fast start and short start unit. For MSG it also includes transition decisions for resources that are able to start within the time horizon of the FMM process
- Determine financially binding FMM schedules and corresponding LMPs including system resources
- Procure additional AS and re-calc ASMP prices used for the next 15-minute RT AS interval
- Determine LAP LMP for settling demand
- Process forecasts and limits for VERS

# RTD Market Timeline



- No changes to RTD 5-minute dispatch
- RTD provides operational instruction to all generation and demand response resources

# AS procured in real-time

- Procured (as needed) from:
  - Resources internal to the ISO system
  - System resources that do not submit hourly block bids through the FMM process
- Procured on an hourly basis in the HASP from non-dynamic system resources that submit hourly block bids
- AS awards for all:
  - Resources except non-dynamic system resources that submit hourly block bids are only considered binding in the first 15 minute interval of each FMM run.
- Non-dynamic system resources that submit hourly block bids are considered binding for the trade hour.

AS awards will be sent through ADS and CMRI as follows:

- For all resources except Non-Dynamic System Resources that have submitted Hourly Block Bids every **fifteen minutes**, as required for dispatchable resources.
- For Non-Dynamic System Resources that have submitted Hourly Block Bids, AS awards will be for the **target hour** once an hour after each associated HASP run.

# Resource bid options

Bid Option	Internal gen	Non-dynamic	TG – non-dynamic	TG - dynamic	Pseudo-tie
Hourly	N	Y	Y	N	N
15 minutes	N	Y	Y	N	N
Once	N	Y	Y	N	N
RTD	Y	N	N	Y	Y
VER forecast	Y*	N	Y*	Y*	Y*

\*If telemetry and meteorological data are available

# Energy bids for system resources

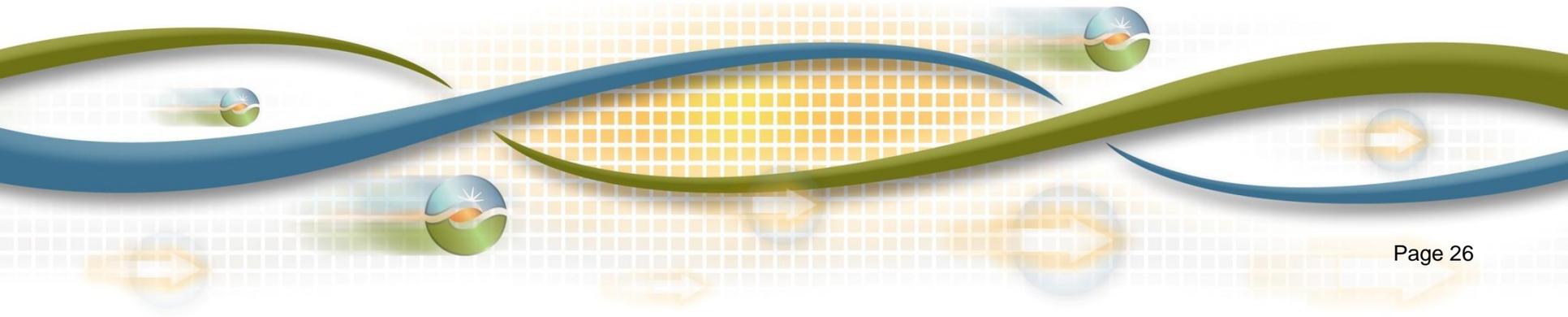
- For non-dynamic system resources registered as an hourly pre-dispatch in the master file, bid options include:
  - A flag to require the bid to be considered as an hourly block schedule
  - A flag to allow a single curtailment for the remainder of the hour for accepted block schedules
- For non-dynamic system resources not registered as an hourly pre-dispatch in the master file, bid options include:
  - Same as above
  - May participate as a 15 minute dispatchable resource

## Energy bids for EIRs

- For generating units or dynamic system resources
- To be dispatched for energy in the RT market the EIR must either
  - supply the ISO with a short term forecast of its output
  - Use the ISO's resource specific forecast
- If the resource:
  - Self schedules, the forecast value will be used as an adjustment
  - Bids economically, the forecast value will be the upper economic operating limit.

# FERC Order 764

Intertie bidding options



Based on bid information provided, the following intertie options are available

1. Self-scheduled hourly block
2. Self-scheduled variable energy resource forecast
3. Economic bid hourly block
4. Economic bid hourly block with single intra-hour economic schedule change
5. Economic bid with participation in 15-minute market
6. Dynamic Transfer

Only option 5 & 6 eligible for bid cost recovery

# 1. Self-scheduled hourly block

- SC submits self-schedules that are fixed for the hour.
  - Settled at the 15-minute prices over the operating hour
- ISO will run an optimization to accept hourly block schedules; results published at T-45 (same as today)
- HASP enforces constraint that energy schedule must be equal in each financially binding 15-minute interval
- Resource dispatch from HASP will be treated as a self-schedule and will be treated like any other self-schedule

## 2. Self-scheduled variable energy resource forecast

- SC will schedule output of VER in 15-minute intervals based on their forecast output.
  - Settled at the 15-minute price
- Market optimization uses the forecasted energy for each 15 minute interval; there is no restriction that the expected energy is flat for the hour.
- In the 15 minute binding interval the VER can update its self schedule based on the most current forecast which will be used in the 15 minute market .

## 2. Self-scheduled variable energy resource forecast (continued)

- Each VER has a series of 5-minute forecasts of output. FMM calculates a self-schedule for each 15-minute interval in the time horizon by taking an average of the three forecasts for the corresponding 5-minute interval
- Latest updated forecast used to update self-schedule in the 15-minute market

### 3. Economic bid hourly block

- SC will submit economic bids that will be a fixed quantity for the hour and that the ISO can schedule based on price.
  - Settled at the actual 15-minute prices over the operating hour
- Resource dispatch from HASP will be treated as a self-schedule and will be treated like any other self-scheduled resource
- Hour ahead process enforces constraint that energy schedule must be equal in each 15-minute interval

## 4. Economic bid hourly block with single intra-hour economic schedule change

- SC will submit economic bids that will be a fixed quantity for the hour and that the ISO can schedule based on price.
  - Allows for the schedule to be changed one per hour if the 15-minute prices meet criteria specified by the SC
  - Settled at the actual 15-minute prices over the operating hour
- HASP enforces constraint that energy schedule must be equal in each 15-minute interval

## 4. Economic bid hourly block with single intra-hour economic schedule change (continued)

- Resource dispatch from HASP will initially be treated by FMM as an advisory schedule with the caveat that the resource dispatch must be economic for the binding interval and any remaining advisory intervals of the trading hour (as if they were constant schedules similar to HASP).
- If the resulting dispatch is different than the HASP dispatch, then for any subsequent FMM runs in the trading hour the previous FMM dispatch will be treated as a self-schedule and will be treated like any other self-scheduled resource.

## 5. Economic bid with participation in 15-minute market

- SC will submit economic bids that the ISO can schedule in the 15-minute intervals based on price.
  - Settled at the 15-minute price
- Hour ahead process can result in advisory energy schedule that differs in each 15-minute interval
- May be economically dispatched by the optimization engine and the resulting dispatch is binding. If the resource is a VER, then for each 15-minute interval an upper dispatch limit will be set to the average of the VER's three forecasts for the corresponding 5-minute intervals.

## 6. Dynamic Transfer

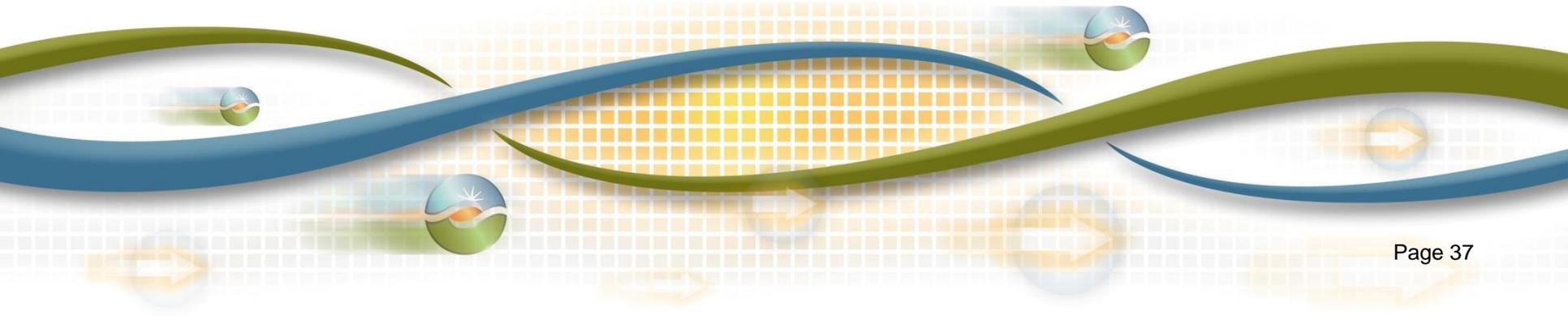
- SC will establish dynamic transfer agreements that enable 5-minute dispatch and settlement of intertie transactions.
  - Settled similar to internal generation
- The resource is treated the same as a generating resource by FMM
- Hour ahead process can result in advisory energy to differ in each 15-minute interval

# Operating Reserves procured in HASP

- In HASP, only spin and non-spin are available. Can only be procured from Non-dynamic system resources with the following options:
  - Self-schedule hourly block
  - Economic hourly block
  - Economic hourly block bid with intra-hour option.

# FERC Order 764

Dynamic Transfers



# Dynamic Transfers - Variable Energy Resources

- Existing imports from variable energy resources can register as a Tie Generator with “VER” option to participate in 15-minute market;
- If dynamic scheduling agreement exists, then it can also participate as a dynamic tie generator.

# Dynamic Transfer - Primary and alternate intertie

- Example - System resource X has one primary tie and an alternate tie
  - When the primary tie is out, the alternate tie becomes the scheduling point.
  - In the checkout process the CAS will recognize the alternate tie

# Open/Isolated Intertie validation

- Bids for system resources which have registered an alternate tie path in the master file will be considered in the IFM to be bid at the alternate path if the primary tie path is open or isolated. For these resources if both the primary and alternate path is open/isolated, only then will the bid be considered inadmissible for the ISO Market processes.

# FERC Order 764

PIRP protective measures

# PIRP Protective Measures - Rules

- Applies to resources that meet specified limited criteria to continue to be settled under the current PIRP monthly netting methodology for a maximum of 3 years
  - Old technology
  - Contract issues
- Resource owners must seek to resolve during the transition period
- Resource owner must sign affidavit certifying that it meets the criteria

# PIRP Protective Measures – Forecast information

- Resource must provide meteorological data
  - PIRP certification required
- Must use the ISO forecast – not their own

# PIRP Protective Measures - Settlement

- There will be a daily settlement based on FMM, RTD awards and uninstructed deviations
- End of month, daily settlement will be reversed out and resettled based on the
  - An hourly schedule will be set using the forecast that is provided 90 minute prior to the trade hour
  - The hourly schedule (less the DA schedule) will be settled at the 12 five-minute LMPs
  - Deviations between the meter and the hourly schedule will be netted over the month. The amount will be settled at the output-weighted average of the five-minute LMPs over the month

# PIRP Protective Measures - Settlement

- Settlement allocation
  - To net negative deviations
- These settlements may not be ready at go live but will be trued up later
- PIRP export charge codes also applicable to resources under PIRP protective measures

# PIRP Protective Measures- Process

- Must submit affidavit within 30 days of the order
  - The ISO will notify resource within 10 days if we intend to audit
  - Audit will be completed within 60 days
- Legal will approve eligibility
- ISO will post a list of requests and their disposition (per BRS)

# Master File Changes

FERC Order 764, Dynamic Transfers

# Generator Resource Data Template (GRDT)

Version GRDT.8.0

Report generation timestamp :

SCID :  
Resource Type :  
Resource ID :  
Trade Date :

Version	Effective Date	Description of Change
8.0	Spring Release 2014	Changes for Spring Release 2014: Add new columns: RESOURCE tab: Remove fields: RA Flag, RA Capacity Add new fields: CERT_BLKSTRT, ADDER_AMT, VER_YN, FORECAST_SELECTION STARTUP tab: Start_Up MMA MSG_CONFIG tab: Remove field: Default RA Provider Add new fields: ADDER_AMT, RA_RANGE_MIN, RA_RANGE_MAX TRANSITION tab: Remove field: Default RA Path Sequence CONFIG_STRT tab: Start_Up MMA

## Intertie Resource Data Template (IRDT)

Version IRDT 5.0

Report generation timestamp :

SCID :

Resource Type :

Resource ID :

Trade Date :

For general information regarding the Intertie Resource Data Template, please refer to the CAISO website at the following location:

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

[www.caiso.com/1f94/1f94cd5447620.html](http://www.caiso.com/1f94/1f94cd5447620.html)

5.1	Spring Release 2014	Removed: RA Flag and RA Capacity Added: <b>HR_PRE_DISP (Hourly Pre-Dispatch)</b>
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# VER Forecast

- All VERs will have access to the DA and HA forecast currently applicable only to PIRP certified resources
- All VER forecasts used in the markets will be posted in CMRI (FMM and RTD)

# Changes to the Generator Resource Data Template

Column Name	Column Code	Unit	Definition
Variable Energy Resource Flag	VER_YN	Y/N	Indicator of a Variable Energy Resource – currently wind and solar (not modifiable on RDT)
Forecast Selection	FORECAST_OWNER	SC/ISO	Indicator for whether a resource will provide its own forecast (select “SC”) or will rely on the ISO’s forecast (select “ISO”).

# Changes to the Intertie Resource Data Template

Column Name	Column Code	Unit	Definition
Hourly Pre-dispatch	HR_PRE_DISP	Y/N	Y- Indicates a resource that is scheduled on an hourly basis N- Indicates a resource that a resource may elect to schedule on a 15-minute or hourly basis

# FERC 764 Registration Changes – Internal VER

	Variable Energy Resource (VER)	Forecast Selection	CERT_PIRP	Energy Type	HR_PRE_DISP
<b>ISO Internal VER resources</b>					
<b>Resource Type = 'GEN'</b>	ISO will set flag to 'Y' for all Wind and Solar resources	<p>ISO – ISO provides forecast SC – SC submits forecast</p> <p>Default to 'ISO' for resources that have telemetry. Resources without telemetry will be set to 'SC'</p> <p>Resources may elect 'SC' via the RDT change process beginning on Spring Release 2014 Activation date</p>	<p>Y – All Wind and Solar with telemetry P – PIRP Protection* Blank – resources without telemetry and non-VERs</p>	Blank	Blank

\*PIRP Protection must be requested within 30 days of Spring Release 2014 Activation date

# FERC 764 Registration Changes – External VER

	Variable Energy Resource (VER)	Forecast Selection	CERT_PIRP	Energy Type	HR_PRE_DISP
<b>ISO External VER Resources</b>					
<b>Resource Type = 'TG' - Dynamic Scheduling Agreement holder</b>	Existing TG Resource must make a request to set VER flag to 'Y'  Note: This specific resource must meet definition of a VER.	Resource may elect 'ISO' if it has telemetry, otherwise must elect 'SC'	Y – if resource is VER and has telemetry P – N/A Blank – resources without telemetry and non-VERs	DYN	Blank
<b>Resource Type = 'TG' No DSA; VER imports</b>	VER flag will be set to 'Y'	Default to 'SC'. 'ISO' option is not available without telemetry	Blank	FIRM	N – 15-min

# FERC 764 Registration Changes – Energy and AS Import

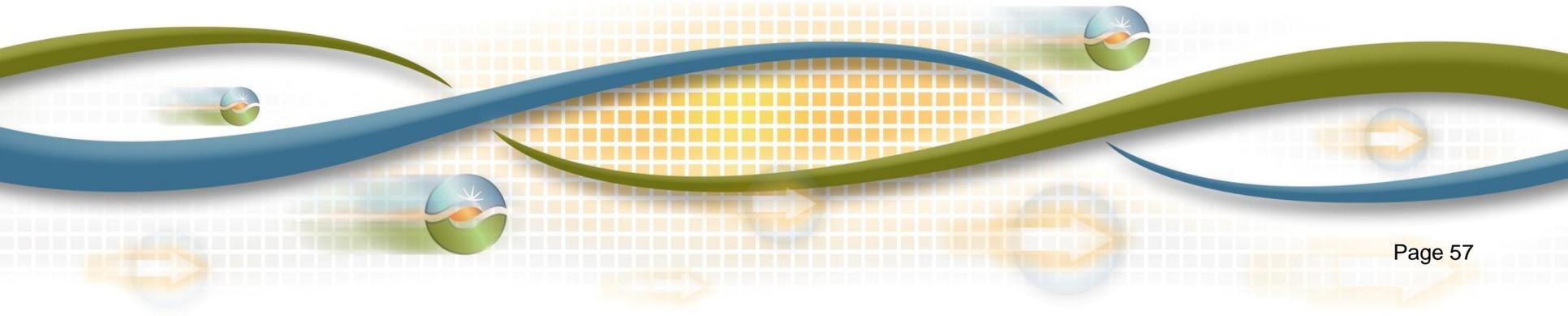
	Variable Energy Resource (VER)	Forecast Selection	CERT_PIRP	Energy Type	HR_PRE_DISP
<b>ISO Existing Energy and AS Imports</b>					
Resource Type = 'TG' No DSA; A/S imports	N/A	N/A	Blank	FIRM	Y – Hourly N – 15-min  Default to 'Y', SC must request 'N' via RDT change process
Resource Type = 'ITIE,'ETIE"; non-resource-specific system resource imports	N/A	N/A	N/A	FIRM NFRM UCTG WHL	Y – Hourly N – 15-min  Default to 'Y', SC must request 'N' via RDT change process

## If a resource wants to use its own forecast

- On April 1 submit:
  - Resource data template (GRDT) selecting “SC” in the FORECAST\_SELECTION
  - Forecast data through SIBR
- Master file change will be completed within 5 business days consistent with current business process

# SIBR

FERC Order 764, Dynamic Transfers



# Directions to submit forecast in SIBR – section 5



California ISO  
Shaping a Renewed Future

**SIBR Interface Specification  
for Bidding Services**  
(Business Rules v 7.x(Spring 2014) or later)  
Version: 10.2

December 17, 2013



Day Ahead Bids

Real Time Bids

Trades

Adv Submit

Portfolios

Ind Viewer

Convergence Bids

OT

Bid Summary

Daily Components

Hourly Components

Product Display

Hourly Display

Market: Day Ahead

Sched

Resource:

DAISY\_7\_UNIT 2

Refresh

Saturday January 4, 2014

01/04/14

Display Mode:

Hourly Bid Components

Clear Undo Update

	HR	Wheeling Reference	Open Tie Indicator	NERC Tag	Gen Capacity Limit
<a href="#">clear</a>	01	[None]			
<a href="#">clear</a>	02	[None]			
<a href="#">clear</a>	03	[None]			
<a href="#">clear</a>	04	[None]			
<a href="#">clear</a>	05	[None]			
<a href="#">clear</a>	06	[None]			
<a href="#">clear</a>	07	[None]			
<a href="#">clear</a>	08	[None]			
<a href="#">clear</a>	09	[None]			

## Example – Generator biddable capacity limit

- Assumptions
  - $P_{\min} = 0$  MW
  - $P_{\max} = 120$  MW
  - Hourly capacity limit submitted by the SC
    - HE 10 = 100 MW
    - HE 11 = 110 MW
  - Bid price is \$1/MWh (well below the LMP)

## Example – Generator biddable capacity limit

- For RTUC run #1 executed at 9:52.5

Interval	Start time	End time	MW award	Binding/ Advisory
1	9:15	9:30	100	
2	9:30	9:45	100	B
3	9:45	10:00	100	A
4	10:00	10:15	110	A
5	10:15	10:30	110	A
6	10:30	10:45	110	A
7	10:45	11:00	110	A

- The generator is capped at their capacity limit.



Day Ahead Bids | **Real Time Bids** | Trades | Adv Submit | Portfolios | Ind Viewer | Convergence Bids | OT

Admin

Bid Summary | Daily Components | **Hourly Components**

Market: Real Time

Scheduling Coordinator: ABCD

Resource: Inter-Tie ROSE\_IVLY2\_I\_F\_12345

Thursday January 2, 2014

01/02/14

Display Mode: Edit New Bid(s)

Hour: 24

Refre

Hourly Bid Components					
Clear Undo Update					
	HR	Wheeling Reference	Open Tie Indicator	NERC Tag	Dispatch Option
<a href="#">clear</a>	24	[None]			[None] [None] Hourly Once 15min Dynamic



- Day Ahead Bids
- Real Time Bids
- Trades
- Adv Submit
- Portfolios
- Ind Viewer
- Convergence Bids
- OTC Viewer
- Energy Forecast**

EF Summary

Refresh?  Interval [secs] 10

Scheduling Coordinator: [dropdown]

Tuesday January 21, 2014

Resource: VER SUNNY\_2\_SOLAR

Refresh

01/21/14 [calendar icon]

Display Mode: [ALL]

Submit EF(s) Cancel EF(s)

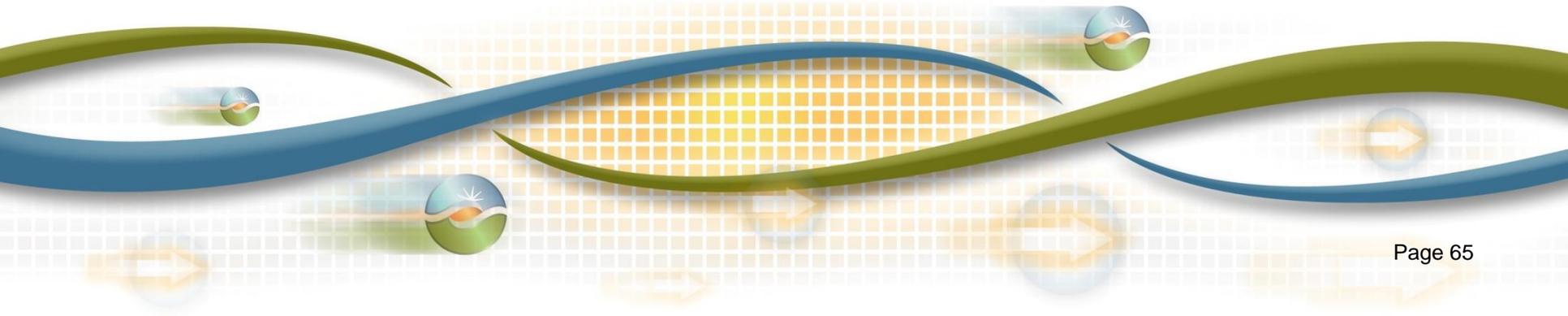
Energy Forecast						
Undo	Update	Create				
<input type="checkbox"/> delete	Resource	Energy Type	Time Start	MW	Status	Submitted
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 14:35	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 14:40	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 14:45	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 14:55	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 15:15	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 15:25	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 15:40	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 15:45	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 15:55	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 16:05	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 16:10	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 16:20	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 16:30	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 16:35	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 17:05	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 17:10	2.000	Valid	01/21/14 14:10
<input type="checkbox"/>	SUNNY_2_SOLAR	VER	01/21/14 17:25	2.000	Valid	01/21/14 14:10

# New hourly bid components

Component	Comment
Intertie minimum hourly block	For non-dynamic system resources, specifies the number of hours that an intertie bid must be awarded in the DA market, if economic. Default is 1
Dispatch option	Determines the participation of an intertie resource or an intertie generating resource. There are six options
Capacity Limit	<p>Specifies the upward limit on the total energy and AS awards for a given hour. Limit must be no lower than the maximum of the highest energy or the RA obligation amount.</p> <p>Used for partial and non-RA resources that what to limit the total award when bidding multiple services. Can also apply to NGRs.</p>
VER Forecast	If VER chooses to submit an energy forecast, it will be submitted through SIBR. Submitted for a configurable rolling time horizon as often as every 5 minutes.

# Market Results Interface - CMRI

New and updated reports



# CMRI reports

Title	Content
DA RUC Capacity	New for interties – the total RUC schedule is displayed as the RUC award product.
RTUG FMM MPM results	Changed to accommodate FMM MPM
HASP schedule prices	Displays HASP advisory resource-specific prices for the next trading hour
RTUG FMM schedules	Changed to accommodate FMM results for the next 15 minute interval. Covers RT energy and AS awards
RTUG FMM schedule prices	Changed to accommodate FMM results for the next 15 minute interval. Covers prices for energy and AS awards

# CMRI reports

Title	Content
Expected Energy Allocation Details	Now includes FMM and RTD market awards. Report expanded to provide an option for EE calculations based on default energy bid price.
Expected Energy	Now includes FMM and RTD expected energy. Report expanded to provide an option for EE calculations based on default energy bid price
<del>RTPD</del> FMM Flexible Ramping Constraint	Changed to accommodate FMM
Resource-Specific VER Forecast Usage	New report – posts the actual 5-minute and 15-minute load forecast used by the RTM. Depending on option chosen by the SC and forecast availability forecast may come from either the values submitted by the SC or the forecast generated by the ISO systems. Posts for all intervals (binding and advisory) in the FMM and RTD run time horizon.

# CMRI reports

Title	Content
ISO Commitment Costs	New data value “Adjusted Transition Notification Period” indicates the notification period for transitions. Used for validating settlements
Non-Dispatchable Time Range	Will allow users to determine the non-dispatchable time ranges, which have a settlements impact
Real-time Unit Commitment (RTUC) Advisory Schedules	Provides advisory schedules used in validating settlements

# FERC 764 – CMRI Mockup FMM Binding MW

## Fifteen-Minute Market (FMM) Schedules

Trade Date	SC ID	Resource	Configuration	Product	Schedule Type	Binding	Hour Ending	Interval IE:15 [MW]	Interval IE:30 [MW]	Interval IE:45 [MW]	Interval IE:00 [MW]
01/07/2014	SC01	Resource1		Energy	Market	Yes	1	9.99	9.99	9.99	9.99
01/07/2014	SC01	Resource1		Energy	Self	Yes	1	0.00	0.00	0.00	0.00
01/07/2014	SC01	Resource1		Energy	Market	Yes	2	9.99	9.99	9.99	9.99
01/07/2014	SC01	Resource1		Energy	Self	Yes	2	0.00	0.00	0.00	0.00
01/07/2014	SC01	Resource1		Energy	Market	Yes	3	9.99	9.99	9.99	9.99
01/07/2014	SC01	Resource1		Energy	Self	Yes	3	0.00	0.00	0.00	0.00

# FERC 764 – CMRI Mockup FMM Binding \$'s

## Fifteen-Minute Market (FMM) Schedule Prices

Trade Date	SC ID	Resource	Product	Price Type	Binding	Hour Ending	Interval IE:15 [\$]	Interval IE:30 [\$]	Interval IE:45 [\$]	Interval IE:00 [\$]
01/07/2014	SC01	Resource1	Energy	LMP	Yes	1	9.99	9.99	9.99	9.99
01/07/2014	SC01	Resource1	Energy	Energy	Yes	1	9.99	9.99	9.99	9.99
01/07/2014	SC01	Resource1	Energy	Congestion	Yes	1	0.00	0.00	0.00	0.00
01/07/2014	SC01	Resource1	Energy	Loss	Yes	1	9.99	0.00	0.00	0.00
01/07/2014	SC01	Resource1	Energy	LMP	Yes	2	9.99	9.99	9.99	9.99
01/07/2014	SC01	Resource1	Energy	Energy	Yes	2	9.99	9.99	9.99	9.99
01/07/2014	SC01	Resource1	Energy	Congestion	Yes	2	0.00	0.00	0.00	0.00
01/07/2014	SC01	Resource1	Energy	Loss	Yes	2	0.00	0.00	0.00	0.00
01/07/2014	SC01	Resource1	Energy	LMP	Yes	3	9.99	9.99	9.99	9.99
01/07/2014	SC01	Resource1	Energy	Energy	Yes	3	9.99	9.99	9.99	9.99
01/07/2014	SC01	Resource1	Energy	Congestion	Yes	3	0.00	0.00	0.00	0.00
01/07/2014	SC01	Resource1	Energy	Loss	Yes	3	0.00	0.00	0.00	0.00

# Enhanced Report – Expected Energy Allocation Details



Market Results



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

Trade Date: 09/30/2013 SC: [ALL] Resource: [ALL] Market Service Type: [ALL] Apply Reset  
 Hour: [ALL] Interval: [ALL] Energy Bid Type: Final

## Expected Energy Allocation Details

Trade Date	SC ID	Resource	Configuration	Hour Ending	Interval	Market Service Type	Energy Type	Real-Time Market Type	Bid Price [\$]	Expected Energy [MWH]	OeOverlapMss [Yes/No]	Energy Bid Type
09/29/2013	ABCD	ORCHID_MALIN_I_UC_01		13	1	Day-Ahead Energy Capacity	RTSSE			0.00000000	NO	Final
09/29/2013	ABCD	ORCHID_MALIN_I_UC_01		13	1	Day-Ahead Energy Capacity	DASE			4.16666667	NO	Final
09/29/2013	ABCD	ORCHID_MALIN_I_UC_01		13	2	Day-Ahead Energy Capacity	RTSSE			0.00000000	NO	Final
09/29/2013	ABCD	ORCHID_MALIN_I_UC_01		13	2	Day-Ahead Energy Capacity	DASE			4.16666667	NO	Final
09/29/2013	ABCD	ORCHID_MALIN_I_UC_01		13	3	Day-Ahead Energy Capacity	DASE			4.16666667	NO	Final
09/29/2013	ABCD	ORCHID_MALIN_I_UC_01		13	3	Day-Ahead Energy Capacity	RTSSE			0.00000000	NO	Final
09/29/2013	ABCD	ORCHID_MALIN_I_UC_01		13	4	Day-Ahead Energy Capacity	OE	FMM		4.16666667	NO	Final
09/29/2013	ABCD	ORCHID_MALIN_I_UC_01		13	4	Day-Ahead Energy Capacity	RTSSE			0.00000000	NO	Final

# Enhanced Report – Expected Energy



## Market Results



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

Trade Date:  SC:  Resource:     
 Hour:  Interval:

### Expected Energy

1 - 20 of 7161

Trade Date	SC ID	Resource	Configuration	Hour Ending	Interval	Energy Type	Real-Time Market Type	Expected Energy [MWH]	OeOverlapMss [Yes/No]
07/21/2013	ABCD	DAHLIA_6_PL1X4		24	1	TEE		0.00000000	NO
07/21/2013	ABCD	DAHLIA_6_PL1X4		24	2	TEE		0.00000000	NO
07/21/2013	ABCD	DAHLIA_6_PL1X4		24	3	TEE		0.00000000	NO
07/21/2013	ABCD	DAHLIA_6_PL1X4		24	4	TEE		0.00000000	NO
07/21/2013	ABCD	DAHLIA_6_PL1X4		24	5	TEE		0.00000000	NO
07/21/2013	ABCD	DAHLIA_6_PL1X4		24	6	TEE		0.00000000	NO
07/21/2013	ABCD	DAHLIA_6_PL1X4		24	7	TEE		0.00000000	NO
07/21/2013	ABCD	DAHLIA_6_PL1X4		24	8	TEE		0.00000000	NO
07/21/2013	ABCD	DAHLIA_6_PL1X4		24	9	TEE		0.00000000	NO
07/21/2013	ABCD	DAHLIA_6_PL1X4		24	10	TEE		0.00000000	NO
07/21/2013	ABCD	DAHLIA_6_PL1X4		24	11	TEE		0.00000000	NO
07/21/2013	ABCD	DAHLIA_6_PL1X4		24	12	OE	FMM (orRTD)	0.00000000	NO

# FERC 764 – CMRI Mockup 15 Minute Forecast

Resource-Specific VER Forecast Usage						
Execution Type	Market Run DateTime	Interval Start DateTime	SCID	Resource	Forecast Type	Forecast [MW]
RTUC	01/08/2014 00:00:00	01/08/2014 00:00:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:00:00	01/08/2014 00:15:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:00:00	01/08/2014 00:30:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:00:00	01/08/2014 00:45:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:15:00	01/08/2014 00:15:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:15:00	01/08/2014 00:30:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:15:00	01/08/2014 00:45:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:15:00	01/08/2014 01:00:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:15:00	01/08/2014 01:15:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:15:00	01/08/2014 01:30:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:15:00	01/08/2014 01:45:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:30:00	01/08/2014 00:30:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:30:00	01/08/2014 00:45:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:30:00	01/08/2014 01:00:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:30:00	01/08/2014 01:15:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:30:00	01/08/2014 01:30:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:30:00	01/08/2014 01:45:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:45:00	01/08/2014 00:45:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:45:00	01/08/2014 01:00:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:45:00	01/08/2014 01:15:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:45:00	01/08/2014 01:30:00	SC01	Resource1	EPF	99.99
RTUC	01/08/2014 00:45:00	01/08/2014 01:45:00	SC01	Resource1	EPF	99.99

# FERC 764 – CMRI Mockup 5 Minute Forecast

Resource-Specific VER Forecast Usage						
Execution Type	Market Run DateTime	Interval Start DateTime	SCID	Resource	Forecast Type	Forecast [MW]
RTD	01/08/2014 00:00:00	01/08/2014 00:00:00	SC01	Resource1	EPF	99.99
RTD	01/08/2014 00:00:00	01/08/2014 00:05:00	SC01	Resource1	EPF	99.99
RTD	01/08/2014 00:00:00	01/08/2014 00:10:00	SC01	Resource1	EPF	99.99
RTD	01/08/2014 00:00:00	01/08/2014 00:15:00	SC01	Resource1	EPF	99.99
RTD	01/08/2014 00:00:00	01/08/2014 00:20:00	SC01	Resource1	EPF	99.99
RTD	01/08/2014 00:00:00	01/08/2014 00:25:00	SC01	Resource1	EPF	99.99
RTD	01/08/2014 00:00:00	01/08/2014 00:30:00	SC01	Resource1	EPF	99.99
RTD	01/08/2014 00:00:00	01/08/2014 00:35:00	SC01	Resource1	EPF	99.99
RTD	01/08/2014 00:00:00	01/08/2014 00:40:00	SC01	Resource1	EPF	99.99
RTD	01/08/2014 00:00:00	01/08/2014 00:45:00	SC01	Resource1	EPF	99.99

# Enhanced Report – ISO Commitment Cost Details

California ISO | Market Results

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

Trade Date: 10/27/2013 SC: [ALL] Resource: [ALL] Apply Reset

Hour: [ALL] Interval: [ALL]

### ISO Commitment Cost Details

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Trade Date	SC ID	Resource	Configuration	Hour Ending	Interval	Market Type	Start Up Cost [\$]	Start Up Flag [Y/N]	Start Up Period [mins]	Shut Down Cost [\$]	Shut Down Flag [Y/N]	Minimum Load Cost [\$]	Minimum Load Flag [Y/N]	Pump Cost [\$]	Pump Flag [Y/N]	Transition Cost [\$]	Transition Flag [Y/N]	Transition Period [mins]	RMR Flag [Y/N]
10/26/2013	ABCD	PEONY_7_UNIT 4			1	1 RTM	0.00	YES			NO	514.67	YES		NO		NO		NO
10/26/2013	ABCD	PEONY_7_UNIT 4			1	2 RTM	0.00	YES	60		NO	514.67	YES		NO		NO		NO
10/26/2013	ABCD	PEONY_7_UNIT 4			1	3 RTM	0.00	YES			NO	514.67	YES		NO		NO		NO
10/26/2013	ABCD	PEONY_7_UNIT 4			1	4 RTM	0.00	YES			NO	514.67	YES		NO		NO		NO
10/26/2013	ABCD	PEONY_7_UNIT 4			1	5 RTM	0.00	YES			NO	514.67	YES		NO		NO		NO
10/26/2013	ABCD	PEONY_7_UNIT 4			1	6 RTM	0.00	YES			NO	514.67	YES		NO		NO		NO
10/26/2013	ABCD	PEONY_7_UNIT 4			2	1 RTM	0.00	YES			NO	514.67	YES		NO		NO		NO
10/26/2013	ABCD	PEONY_7_UNIT 4	1X4		2	2 RTM	0.00	NO			NO	514.67	YES		NO	9.99	YES	60	NO
10/26/2013	ABCD	PEONY_7_UNIT 4			6	4 RTM	0.00	YES			NO	0.00	YES		NO		NO		NO
10/26/2013	ABCD	PEONY_7_UNIT 4			6	5 RTM	0.00	YES			NO	0.00	YES		NO		NO		NO

# New Report – Non-Dispatchable Time Ranges



Market Results



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

Start Date: 08/02/2013  SC: [ALL]  Resource: [ALL]

End Date: 08/02/2013

## Non-Dispatchable Time Ranges



SC ID <sup>1</sup>	Resource <sup>2</sup>	Configuration From	Configuration To	Non-Dispatchable Type <sup>3</sup>	Start Time <sup>4</sup>	End Time <sup>5</sup>
ABCD	ROSES_6_UNIT1			DOP	08/02/2013 09:45	08/02/2013 10:45
ABCD	ROSES_6_UNIT1			FOR	08/02/2013 09:45	08/02/2013 10:45
ABCD	ROSES_6_UNIT1			SU	08/02/2013 09:45	08/02/2013 10:45
EFGH	PANSY_7_UNITS			DOP	08/02/2013 09:45	08/02/2013 10:45
EFGH	PANSY_7_UNITS			SU	08/02/2013 09:45	08/02/2013 10:45
EFGH	PANSY_7_UNITS	XXXX	XXXX	TRANS	08/02/2013 09:45	08/02/2013 10:45

Report Generated: 01/21/2014 09:19:20

# New Report – RTUC Advisory Schedules



## Market Results



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

Trade Date:  SC:  Resource:  Binding:     
 Product:  Schedule Type:

### Real-Time Unit Commitment (RTUC) Advisory Schedules

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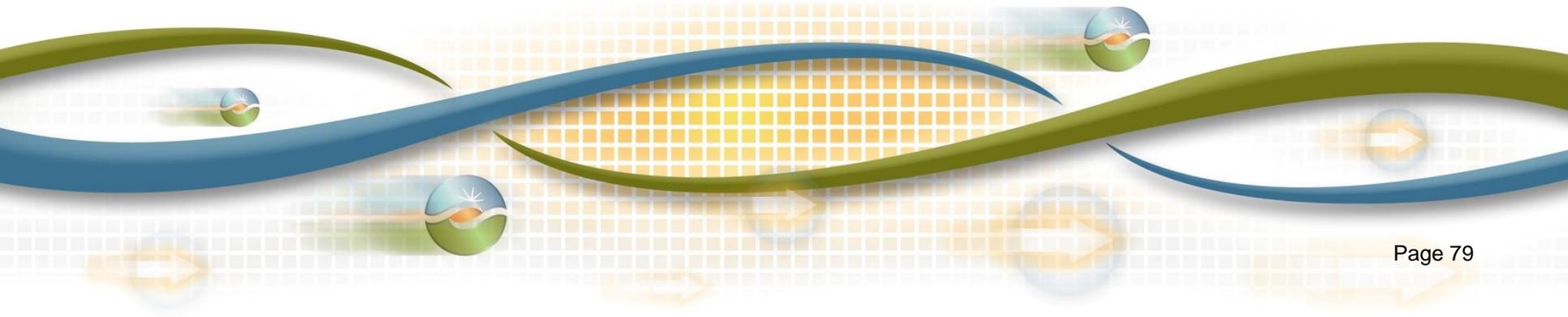
Market Run Date Time	Interval Start Date Time	SC ID	Resource	Configuration	Product	Schedule Type	Binding	Schedule [MW]
08/02/2013 12:45	08/02/2013 12:45	ABCD	TULIP_1_UNITA		Energy	Market	No	0.00
08/02/2013 12:45	08/02/2013 12:45	ABCD	TULIP_1_UNITA		Energy	Self	No	0.00
08/02/2013 12:45	08/02/2013 12:45	ABCD	LILAC_7_UNIT		Energy	Market	No	0.00
08/02/2013 12:45	08/02/2013 12:45	ABCD	LILAC_7_UNIT		Energy	Self	No	0.00
08/02/2013 12:45	08/02/2013 12:45	EFGH	ROSES_7_PL1X4		Energy	Market	No	2.81
08/02/2013 12:45	08/02/2013 12:45	EFGH	ROSES_7_PL1X4		Energy	Self	No	40.00

# OASIS

Report	Comment
HASP LMP	Prices are now advisory
FMM LMP	New – Posts hourly, the 4 15-minute financially binding LMPs in \$/MWh for the FMM market process. Posts the LMP, plus congestion, loss and energy components.
Transmission report	New information – includes Market Transfer Capability. Market Transfer Capability = Seasonal TTC-TRM-Constraint.
CAISO Demand Forecast	New information includes – a RTUC 15-minute forecast (including operator adjustments), a RTD 5-minute forecast (including operator adjustments). Posted by TAC area and total system level.
Wind and Solar Forecast	Hour ahead forecast is posted in advance of each HASP market run of the RTM, by hourly intervals. FMM forecast is posted in advance of each FMM market run by 15-minute intervals. RTD forecast is posted in advance of each RTED run by 5-minute intervals.

# ADS

FERC Order 764, Dynamic Transfers...



# ADS

Clear All Alarms	RT DOT	Hourly DOT	Exceptional	Commitment	RT AS	Hourly AS
Current Interval	17:00-17:05	17:00-18:00		17:00-17:15	17:00-17:15	17:00-18:00
Dispatch Interval					17:15-17:30	
Received/Status	Idle	Idle	Idle	Idle	16:43:18	Idle
Filter Resources	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5:05:01 PM : System Ready.  
 5:05:00 PM : Received new Real Time AS batch DISP-1298F800-652C-W31-FFF3-AC18

**New optional field added:  
Hourly MW Threshold**

Selected instructions may not be responded for or response period has ended.

Valid	Res Type	Resource ID	SC ID	Hourly Prev DOT	Hourly Delta DOT	Hourly DOT	Hourly DOT Start Time	Accept Status	Hourly MW Threshold	Reason	Dispatch AS Total	Current AS Total
<input checked="" type="checkbox"/>											4	0
<input checked="" type="checkbox"/>											2	0
<input checked="" type="checkbox"/>											24	0
<input checked="" type="checkbox"/>											1	0

# ADS Instruction Cycle

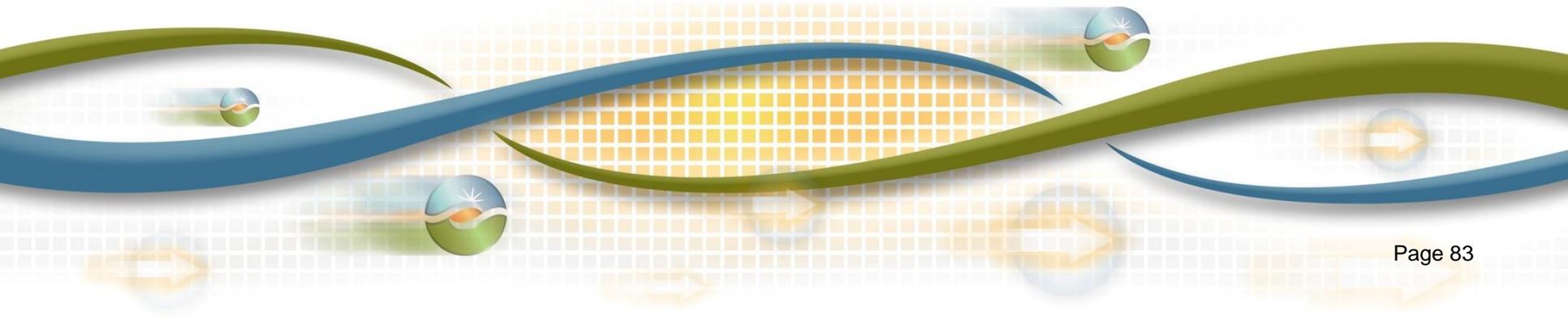
- Operation in HASP
  - For intertie resources except dynamics resources and VERs the user has the option to accept, partially accept or decline the instruction.
    - User is allowed to provide a response or undo a response at anytime within a 5 minute window.
    - Else ADS automatically responds – “timed out” and the supplemental portion will be forcibly accepted.
    - All other resources, dispatch is sent as an advisory. Acknowledgement is automatic.

# ADS Instruction Cycle

- Operation in FMM
  - For intertie resources except dynamics resources and VERs and hourly block the user has the option to accept, partially accept or decline the instruction.
    - User is allowed to provide a response or undo a response at anytime within a 2 ½ minute window.
    - Else ADS automatically defaults to “accepted”.
    - All other resources, ADS will send AS awards, start up and shut down instructions and dispatches. Acknowledgement is automatic.
  - Dispatch instructions are financially binding but should be considered advisory as they may be modified by RTD.

# e-Tagging

FERC Order 764, Dynamic Transfers...



## e-Tagging timeline and rules

- e-Tags must be submitted 20 minutes before the operating hour for intertie bids
  - All bids except FMM economic bids – transmission profile must be greater than or equal to the energy profile
  - FMM economic bids – transmission profile must be greater than or equal to the maximum bid-in capacity for the operating hour and the energy profile must equal the MWs awarded for the first FMM interval of the operating hour.

## e-Tagging timeline and rules

- For bid types that may vary by 15-minute interval, including FMM economic bids and economic hourly block bids with intra-hour option, the energy profile must be updated to reflect any schedule changes by 20 minutes before the start of the FMM interval to which the schedule change applies.
  - Where feasible, the ISO will automatically update energy profiles on these e-Tags
  - It is still the SC's responsibility to make sure the e-tag energy profile reflects the delivered quantity.

## e-Tagging timeline and rules

- For FMM Economic Bids, if the Scheduling Coordinator intends to limit its participation in the FMM to the quantity in the HASP advisory energy schedule (including zero), the Scheduling Coordinator may update its transmission profile to the maximum amount it wants to make available to the FMM prior to the start of the binding FMM optimization, which is no earlier than thirty-seven and a half minutes before the applicable Trading Hour.
- If the Scheduling Coordinator does not have a transmission profile greater than or equal to its advisory Energy schedule, the resource cannot be scheduled for Energy in the FMM for amounts greater than what is listed in the transmission profile.

# 1. Self-scheduled hourly block

- T-20 Tag
  - Transmission profile = hour ahead process schedule
  - Energy profile = hour ahead process schedule
- No changes to tag made from 15-minute market
- Energy profile can be updated intra-hour due to reliability curtailments

## 2. Self-scheduled variable energy resource forecast

- T-20 tag,
  - Transmission profile  $\geq$  maximum 15-minute interval from hour ahead process
  - Energy profile = 15-minute market schedule
- Energy profile updated every 15 minutes

### 3. Economic bid hourly block

- T-20 Tag
  - Transmission profile = hour ahead process schedule
  - Energy profile = hour ahead process schedule
- No economic changes to tag made from 15-minute market
- Energy profile can be updated intra-hour due to reliability curtailments

## 4. Economic bid hourly block with single intra-hour economic schedule change

- T-20 Tag
  - Transmission profile  $\geq$  hour ahead process energy schedule
  - Energy profile = hour ahead process schedule unless updated in first 15-minute market
- 15-minute market can increment energy profile up to transmission profile tagged by prior to start of optimization
- 15-minute market can decrement
- Energy profile updated once within the hour 20 minutes prior to flow and remains unchanged for balance of hour
  - If economic for the remainder of the hour, not only the financially binding 15-minute interval

## 4. Economic bid with participation in 15-minute market

- T-20 Tag
  - Transmission profile  $\geq$  maximum MW bid submitted
  - Energy profile = 15-minute market schedule
- Energy profile is updated every 15 minutes based upon 15-minute market results
- If no hourly advisory energy schedule, no obligation to participate in 15-minute market.
  - 15-minute market awards up to minimum transmission profile

## 5. Economic bid with participation in 15-minute market

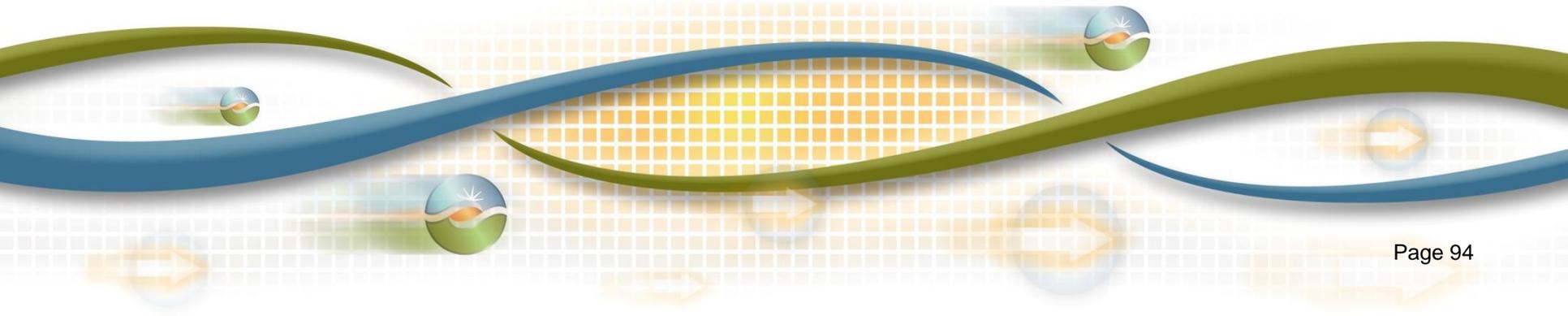
- T-20 Tag
  - Transmission profile  $\geq$  maximum MW bid submitted
  - Energy profile = 15-minute market schedule
- Energy profile is updated every 15 minutes based upon 15-minute market results
- If no hourly advisory energy schedule, no obligation to participate in 15-minute market.
  - 15-minute market awards up to minimum transmission profile

## 6. Dynamic Transfer

- T-20 Tag
  - Transmission profile  $\geq$  maximum MW bid submitted
- Final energy profile in dynamic tag will be updated in the hour after schedule hour

# Metering

FERC Order 764, Dynamic Transfers...



## Submitting meter data to OMAR will change for SC submitted generation.

- SC submitted generation - on April 30, 2014 – transition from 10 minute to 5 minute meter data submission:

Time	Meter data
Through 23:00	Submit 10 minute data
From 23:05	Submit 5 minute data

- SC submitted load – continue to submit hourly
- SC submitted for QF – continue to submit hourly

# Spring 2014 Release Training

If you have any questions or would like additional information, send an email to:

[CustomerTraining@caiso.com](mailto:CustomerTraining@caiso.com)