

# WAPA Exploration of Energy Imbalance Market

Sierra Nevada Region  
July 16, 2019

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# Agenda Topics

- Risks of Non Participation in EIM
- EIM Costs
- Current CVP Programs and EIM
- EIM Resource Valuation
- WAPA Transmission in EIM
- LSEs' Deviation Bandwidth
- Open Access Transmission Tariff Revisions

# Statement of Principles

- Participation is consistent with statutory, regulatory, and contractual obligations.
- Maintain reliable delivery of power and transmission to our customers.
- CVP Resource participation in the EIM is and always will be voluntary and based on the ability of Reclamations authorities to participate.
- WAPA's decision to participate in the EIM will be based on a sound business rationale.

# Risks of Non Participation in EIM

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# Risks of Non Participation

- Prior to EIM, much of the Western Interconnection, including WAPA, could rely on bilateral markets to help firm their resources and meet both short and long term demand.
- WAPA, like many other utilities in the West, could acquire needed energy resources up to twenty (20) minutes before the active hour (i.e., “T-20”)
- Prior to the BANC member SMUD’s participation in EIM, WAPA could rely on these “T-20” trades with SMUD for economic energy purchases. However, SMUD’s decision to join EIM has significantly limited WAPA’s option to engage economic energy trades with SMUD up to T-20.
- While the BANC EIM footprint currently only includes SMUD, other BANC members, including the City of Redding, the City of Roseville and the Modesto Irrigation District, are likely to join EIM in the Spring of 2021.
- Additionally, the expansion of EIM throughout the WECC is leaving fewer and fewer counter-parties in general. While this loss of access to these resources through EIM has some impact on WAPA, WAPA is more concerned about the longer term and broader impact of this loss should the EIM expand into the day ahead market timeframe, as is currently being discussed.

# Risks of Non Participation

- The CAISO and EIM Entities are currently studying what is being referred to as the “Extended Day Ahead Market,” or “EDAM.” EDAM will build on the same concepts as the EIM, however, it will move the timeline from the real time market to the day ahead market.
- The practical impact will be that short term bilateral markets currently being eroded by the expansion of EIM will be eroded even further, if not virtually eliminated, should EDAM be implemented by the CAISO which is expected in the 2022 timeframe.
- WAPA has great concerns about its ability to operate economically in a future environment, which may include both EIM and EDAM. And unless WAPA is an EIM participant, it cannot participate in EDAM. This poses a great risk to WAPA and its customers, particularly if WAPA severely limits or loses its ability to procure and sell resources in the bilateral market.
- While WAPA is currently considering the costs and benefits of participating in EIM, it is important to consider its participation in EIM within the broader context of a likely EDAM and the potential risks such a market poses should WAPA be outside of these markets.

# EIM Costs

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# BANC EIM Implementation Costs

• Gap Analysis (May – August, 2019)	\$60,200
• EIM Implementation ( <b>Estimate</b> ) (Sept. 2019 – March 2021)	\$1,581,000
• SMUD Support	\$385,000
• PM Support @0.4 FTE	
• OATI Software Upgrade	
• Settlement Software Upgrade	
• Miscellaneous labor support @ 3.0 FTE	
• Utilicast Project Oversight	\$500,000
• CAISO Fees	\$60,000
• Legal Support (BBSW)	\$21,000
• <u>Phase 1 Reimbursement</u>	<u>\$471,000</u>
• <b>TOTAL</b>	<b>\$1,437,000</b>
• <u>10% Contingency</u>	<u>\$144,000</u>



# Ongoing BANC EIM Costs (Estimate)

• EIM Operations	\$271,365
• Legal Support (BBSW)	\$3,270
• CAISO Fees	<u>\$81,750</u>
Total	\$356,385

# CAISO EIM Settlement Charges

CC#	CC Name	WAPA PR	BANC ENTITY	Charge Description	Estimate Process
491	Green House Gas Emission Cost Revenue	x		The CAISO will compensate EIM Participating Resources for the portion of the resources output that is deemed to have been delivered to the CAISO Balancing Authority Area. Exports to CAISO only. Participating Resources only.	Does not apply to Entity inside the state of California
701	Forecasting Service Fee	x	x	BA's are charged a FERC approved Forecasting Service Fee Rate per MWh based on actual metered Energy for resources defined as Eligible Intermittent Resources (VER Resources). Forecasting Service Fee charges are calculated monthly.  Currently, the Charge Code 701 Forecasting Service Fee Rate is \$ 0.1000 per MWh. (Rate effective 1/1/2016)	Only applies to EIM Entities that own Solar Gen resources and utilize ISO VER forecast.
2999	Default Invoice Interest Payment	x	x	Very rare charge associated with unpaid invoice balances. Distribute the amount of interest received in CC 3999 – Default Invoice Interest Charge to the creditors that were not paid (in part or in full) in the Bill Period of the original defaulting Invoice.	Estimate at \$0.00
3999	Default Invoice Interest Charge	x	x	Very rare charge associated with unpaid invoice balances. Default Interest Charge Settlement Amount is applied retroactively for unpaid market charges such that the assessment is reflected on the current monthly Settlements Statement.	Estimate at \$0.00

# CAISO EIM Settlement Charges

CC#	CC Name	WAPA PR	BANC ENTITY	Charge Description	Estimate Process
4515	GMC Bid Transaction Fee	x		Apply a \$0.005 (1/2 cent) fee per bid segment to each SC resource's final Clean Bids.  Only applies to Participating Resources.	Estimate is so low \$ per day that this charge can be ignored.
4564	GMC-EIM Transaction Charge	x	x	EIM Market Service Charge - Product of the EIM Market Services Charge Rate and the sum of:  Gross FMM Instructed Imbalance Energy (excluding FMM Manual Dispatch Energy). Gross RTD Instructed Imbalance Energy (excluding RTD Manual Dispatch Energy Standard Ramping Deviation, Ramping Energy Deviation, Residual Imbalance Energy, and Operational Adjustments). EIM Market Service Charge Rate: \$0.0841/MWh (2019 Rate)  EIM System Operations Charge - Product of the EIM System Operations Charge Rate and the absolute difference between metered energy and the EIM Base Schedules. EIM System Operations Charge Rate: \$0.1091/MWh (2019 Rate)	For BANC EIM Entity: Estimated Imbalance MWhs Load and Interchange times sum of two rates (\$0.1932).  For PR Entity: Estimated Imbalance MWhs Generation times sum of two rates (\$0.1932).
4575	SMCR -Settlements, Metering, and Client Relations	x	x	The Scheduling Coordinator ID Charge is a flat per-month charge on any Business Associate that accrues any settlement charges/credits during a trade month.  The charge is a flat fee currently set to \$1,000 per month.	Flat \$1,000 per month divided by 30 days
5024	Invoice Late Payment Penalty	x	x	Very rare charge associated with unpaid invoice balances.  Invoice Late Payment Penalty will be assessed to Market Participants who are late in paying their invoices. This penalty is calculated as the greater of 2% of the invoiced amount or \$1,000; not to exceed \$20,000 per occurrence beginning with the third and subsequent occurrences in a rolling 12 month period.	Estimate at \$0.00

# CAISO EIM Settlement Charges

CC#	CC Name	WAPA PR	BANC ENTITY	Charge Description	Estimate Process
5025	Financial Security Posting (Collateral) Late Payment Penalty	x	x	<p>Very rare charge associated with unpaid invoice balances.</p> <p>Collateral Late Payment Penalty will be assessed to Market Participants who fail to post collateral within the prescribed timeframe. This penalty is calculated as the greater of 2% of the additional financial security amount or \$1,000; not to exceed \$20,000 per occurrence beginning with the third and subsequent occurrences in a rolling 12 month period.</p>	Estimate at \$0.00
5900	Shortfall Receipt Distribution	x	x	<p>Very rare charge associated with unpaid invoice balances.</p> <p>Shortfall Receipt Distribution of collections made on default amounts. Determines the amount to be paid to each SC creditor in CC 5910 (above) prior to the execution of fund transfers through the CAISO Clearing Account.</p>	Estimate at \$0.00
5901	Shortfall Allocation Reversal	x	x	<p>Very rare charge associated with unpaid invoice balances.</p> <p>Reverses out each payment default amount that is allocated to ISO creditors through Charge Code 5910 Shortfall Allocation that remains unpaid by the defaulting Scheduling Coordinator.</p>	Estimate at \$0.00
5910	Shortfall Allocation	x	x	<p>Very rare charge associated with unpaid invoice balances.</p> <p>When a Scheduling Coordinator does not pay its full amount due, all other SC's are short paid a pro-rata amount of the short pay amount. Shortfall Allocation processing will occur against the Invoice balance against which the default occurred.</p>	Estimate at \$0.00

# CAISO EIM Settlement Charges

CC#	CC Name	WAPA PR	BANC ENTITY	Charge Description	Estimate Process
5912	Default Loss Allocation	x	x	<p>Very rare charge associated with unpaid invoice balances.</p> <p>Allocates the payment default amount that was reversed through Charge Code 5901 Shortfall Allocation Reversal based on the allocation methodology described in the Tariff for each Default-Invoiced SCID over the applicable Default Look-Back Periods.</p>	Estimate at \$0.00
6045	Overscheduling and Underscheduling Charge		x	<p>This charge seeks to financially inspire balanced scheduling practices:</p> <p>Limits the payment a EIM Entity receives when they schedule significantly more supply than they actually consume.</p> <p>Raises the cost an EIM Entity is charged when the schedule significantly too little supply compared to what they actually consume.</p>	<p>Estimated Load MW times 5% = Estimated Imbalance MWs.</p> <p>Then Assume about 5% the MWs is Over/Under Scheduled.</p> <p>Use ~50% of estimated RT LMP as price.</p>
6046	UnderScheduling and Over Scheduling Allocation		x	<p>Distribute the penalties collected for Over/Under Scheduling to EIM Entities that had no penalties for the entire day.</p> <p>Always results in a payment to Entity or \$0.</p>	Assume no payments to Entity.
6478	Real Time Imbalance Energy Offset - System			<p>Distributes non-nuetral Energy Charge \$.</p> <p>This charge should vary somewhat randomly around \$0 over time.</p>	Estimate at net \$0 per day. Mostly random outcome that should net to \$0 over time.
7989	Invoice Deviation Interest Distribution	x	x	<p>An OVERLY complex approach to applying interest rates to changes in Settlement Statements between the t+3 Invoice, and the t+12 invoice due to Meter Data estimates. (And t+12 to t+55; and t+55 to t+9 months....).</p> <p>Charge Code 7989 - If the interest calculated results in a payment to a Scheduling Coordinator.</p>	Estimate at Net \$0.00 when combined with it's sister charge code #7999.

# CAISO EIM Settlement Charges

CC#	CC Name	WAPA PR	BANC ENTITY	Charge Description	Estimate Process
7999	Invoice Deviation Interest Allocation	x	x	<p>An OVERLY complex approach to applying interest rates to changes in Settlement Statements between the t+3 Invoice, and the t+12 invoice due to Meter Data estimates. (And t+12 to t+55; and t+55 to t+9 months....).</p> <p>Charge Code 7999 - If the interest calculated results in payment to the CAISO by the Scheduling Coordinator.</p>	Estimate at Net \$0.00 when combined with it's sister charge code #7989.
64600	FMM Instructed Imbalance Energy EIM Settlement	x		<p>FMM LMP times the FMM Imblance MWs.</p> <p>FMM Imbalance MWs = Difference between a resource's Base Schedule and FMM Market Award.</p>	<p>For BANC EIM Entity: Estimated FMM Imbalance MWs for Interchange times FMM LMP Estimate.</p> <p>For PR Entity: Estimated FMM Imbalance MWs Generation times FMM LMP Estimate.</p> <p>Recall that not all FMM Imbalance results in a charge. There are credits here also.</p>
64700	Real Time Instructed Imbalance Energy EIM Settlement	x		<p>RTD LMP times the RTD Instructed Imblance MWs.</p> <p>RTD Imbalance MWs = Difference between a resource's FMM Market Award and RT Dispatch.</p>	<p>For BANC EIM Entity: Estimated RTD Imbalance MWs for Interchange times RTD LMP Estimate.</p> <p>For PR Entity: Estimated RTD Imbalance MWs Generation times RTD LMP Estimate.</p> <p>Recall that not all RTD Imbalance results in a charge. There are credits here also.</p>

# CAISO EIM Settlement Charges

CC#	CC Name	WAPA PR	BANC ENTITY	Charge Description	Estimate Process
64740	Real Time Unaccounted for Energy EIM Settlement		x	Charges the EIM Entity for Unaccounted for Energy (UFE) MWhs at the EIM Load LAP Price	Can assume UFE is included in Load Imbalance charges elsewhere in this document.
64750	Real Time Uninstructed Imbalance Energy EIM Settlement	x	x	<p>RTD LMP times the RT Uninstructed Imbalance MWhs.</p> <p>RT Uninstructed Imbalance MWhs = Difference between a resources RT Dispatch and Meter Data.</p>	<p>For BANC EIM Entity: Estimate RTD Uninstructed Imbalance MWhs Load and Interchange times RTD LMP Estimate.</p> <p>For PR Entity: Estimated RTD Uninstructed Imbalance MWhs Generation times RTD LMP Estimate.</p> <p>Recall that not all RTD Uninstructed Imbalance results in a charge. There are credits here also.</p>
64770	Real Time Imbalance Energy Offset EIM		x	<p>Distributes non-neutral Imbalance Energy \$.</p> <p>This charge should vary somewhat randomly around \$0 over time.</p>	Estimate at net \$0 per day. Mostly random outcome that should net to \$0 over time.
66200	Bid Cost Recovery EIM Settlement	x		Payment to Gen Resources for Bid Cost Recovery	Estimate Bid Cost Recovery Amount. This is somewhat rare, so \$0 would be a good conservative estimate?

# CAISO EIM Settlement Charges

CC#	CC Name	WAPA PR	BANC ENTITY	Charge Description	Estimate Process
66780	Real Time Bid Cost Recovery Allocation EIM		x	Charge to Load equal to Bid Cost Recovery Payment to Generators.	Estimate at \$1,000 per day.
67740	Real Time Congestion Offset EIM		x	Distributes non-neutral Congestion Charge \$. This charge should vary somewhat randomly around \$0 over time.	Estimate at net \$0 per day. Mostly random outcome that should net to \$0 over time.
69850	Real Time Marginal Losses Offset EIM		x	Distributes non-neutral Marginal Loss Charge \$. This charge should vary somewhat randomly around \$0 over time.	Estimate at net \$0 per day. Mostly random outcome that should net to \$0 over time.
7070	Flexible Ramp Forecast Movement Settlement	x	x	Analysis has not been performed for this charge.	
7071	Daily Flexible Ramp Up Uncertainty Capacity Settlement	x		Analysis has not been performed for this charge.	
7076	Flexible Ramp Forecast Movement Allocation		x	Analysis has not been performed for this charge.	
7077	Daily Flexible Ramp Up Uncertainty Award Allocation	x	x	Analysis has not been performed for this charge.	
7078	Monthly Flexible Ramp Up Uncertainty Award Allocation	x	x	Analysis has not been performed for this charge.	
7081	Daily Flexible Ramp Down Uncertainty Capacity Settlement	x		Analysis has not been performed for this charge.	
7087	Daily Flexible Ramp Down Uncertainty Award Allocation	x	x	Analysis has not been performed for this charge.	
7088	Monthly Flexible Ramp Down Uncertainty Award Allocation	x	x	Analysis has not been performed for this charge.	



# Current CVP Programs and EIM

Charles Faust

Real Time Merchant Manager

# CVP Program Goals and EIM

- Implemented to obtain the best use of our resources
- No change to Project Use, First Preference, Base Resource and any Custom Product deliveries
- EIM starts at T-55 for the R-T Bids
- Resources to bid into EIM
  - Real-Time Generation Changes

# Current CVP Programs

	Program	Affected by EIM
1	Hourly Exchange	No
2	Displacement	No
3	Max Peaking	Still Evaluating
4	Spin Sales	Covered Today
5	Regulation-UP	No
6	Regulation-Down (in progress)	No
7	MEEA	Still Evaluating
8	Excess Transmission Sales	No

# EIM Resource Valuation

Cary Fox, Operations, Bureau of Reclamation

Robert Delizo, Resources and Scheduling Manager, WAPA

# EIM Resource Valuation Assumptions

- Use historical Spinning Reserve hourly capacity available as proxy resource for EIM
- Apply 50MW cap
- Use +/-50MW flexibility from base schedules
- Use bid pricing strategy to balance dec dispatch (SBA to import energy) with inc dispatch (SBA to sell energy) in one operating day
  - Dec when LMP < bid price
  - Inc when LMP > bid price
- Apply 300MWh cap for cumulative dec bids and 300MWh for cumulative inc bids in one operating day
- **Apply +/-600MWh cap for cumulative daily MWh in one operating week (starting on Mondays)**

# EIM Resource Valuation Cases

- Scenarios to achieve low-cost purchases and high-value sales while ensuring adequate water management in the operating day
  - Case 1: HE 1-24 at CVP breakeven cost
  - Case 2: HE 1-24 at \$0/MW
  - Case 3: HE 1-12 at \$0/MW, HE 13-24 at 0.5 CVP breakeven cost
  - Case 4: HE 1-12 at \$0/MW, HE 13-24 at CVP breakeven cost

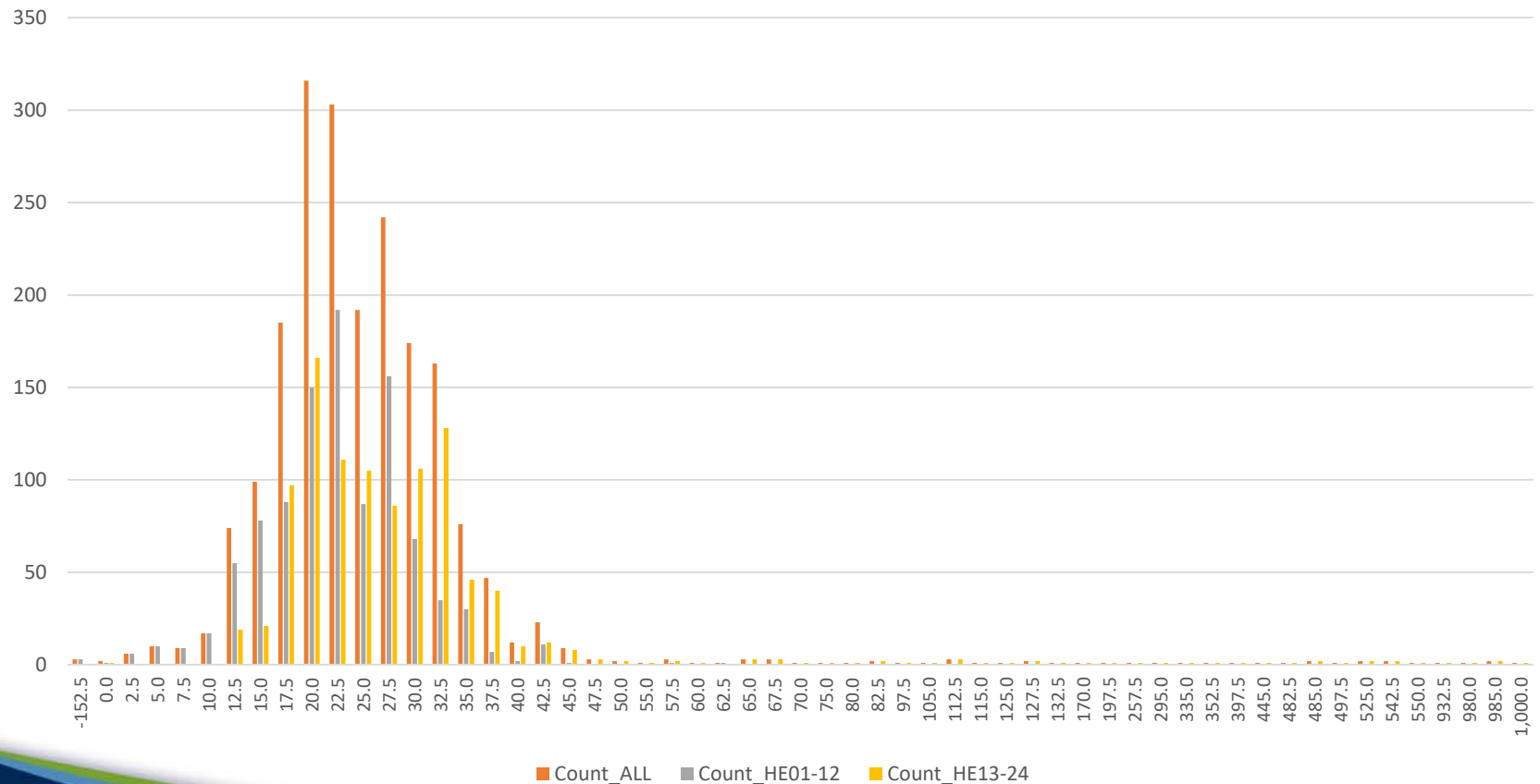
*CVP breakeven cost = \$30.92/MWh*

*(Weighted Average Effective Rate 2006-2019)*

# ELAP LMP Histogram

## ELAP\_BANCSMUD-APND

ELAP LMP Histogram  
June 23 - 29, 2019



# ELAP LMP Histogram

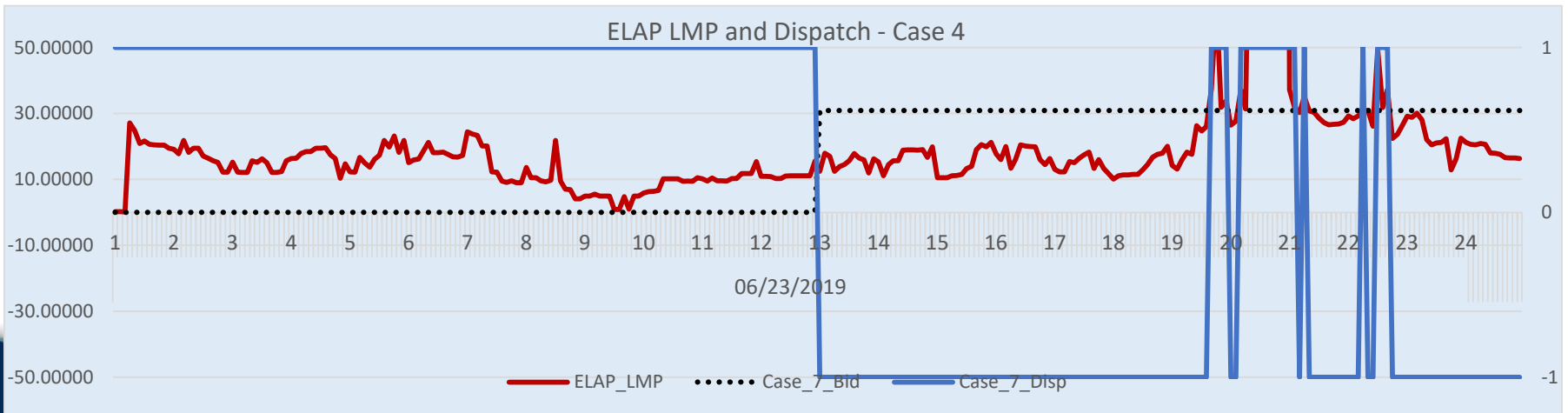
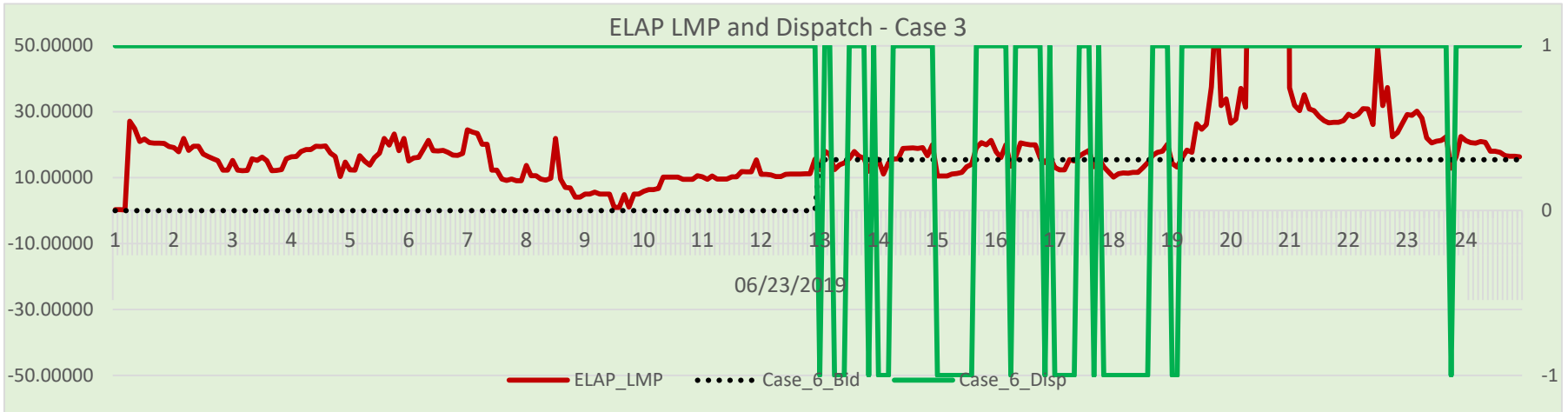
## ELAP\_BANCSMUD-APND

### June 23-29, 2019

LMP_Bin	Count_ALL	Count_HE0	Count_HE1	HE01	HE02	HE03	HE04	HE05	HE06	HE07	HE08	HE09	HE10	HE11	HE12	HE13	HE14	HE15	HE16	HE17	HE18	HE19	HE20	HE21	HE22	HE23	HE24	
-152.50000	3	3	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	
0.00000	2	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
2.50000	6	6	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5.00000	10	10	0	0	0	0	0	0	0	0	0	2	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7.50000	9	9	0	0	0	0	0	0	0	0	0	4	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	
10.00000	17	17	0	0	0	0	0	0	0	0	5	5	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	
12.50000	74	55	19	5	5	8	1	2	0	2	5	4	5	7	11	3	1	6	0	3	6	0	0	0	0	0	0	
15.00000	99	78	21	3	7	5	1	3	0	0	11	22	15	11	0	7	2	2	2	3	2	2	0	0	0	1	0	
17.50000	185	88	97	2	6	11	4	3	6	2	6	6	5	16	21	27	25	7	6	16	4	2	0	0	0	1	9	
20.00000	316	150	166	8	10	9	12	6	5	4	19	15	22	19	21	13	24	22	32	22	21	19	1	0	0	1	11	
22.50000	303	192	111	12	24	23	18	12	15	16	15	21	20	10	6	2	9	19	16	7	14	13	3	0	2	15	11	
25.00000	192	87	105	11	9	9	10	12	2	14	0	2	3	5	10	11	4	9	15	7	9	11	9	2	1	15	12	
27.50000	242	156	86	26	7	15	22	23	35	16	6	1	4	1	0	5	0	9	8	3	5	6	15	10	9	8	8	
30.00000	174	68	106	2	6	2	12	14	11	10	3	1	3	4	0	1	8	6	1	9	4	3	12	9	25	16	12	
32.50000	163	35	128	4	5	2	4	4	4	8	4	0	0	0	7	7	3	1	3	2	12	10	32	26	15	10	0	
35.00000	76	30	46	4	0	0	0	2	0	2	3	0	0	0	7	12	8	3	0	1	0	1	4	2	7	9	5	6
37.50000	47	7	40	1	1	0	0	2	1	1	1	0	0	0	0	0	1	0	0	1	0	7	10	11	3	3	4	
40.00000	12	2	10	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	3	2	2	1	0	
42.50000	23	11	12	3	1	0	0	0	5	2	0	0	0	0	0	0	0	0	0	0	4	4	1	1	1	2	0	
45.00000	9	1	8	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3	3	0	0	
47.50000	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	
50.00000	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
55.00000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
57.50000	3	1	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	
60.00000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
62.50000	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
65.00000	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	
67.50000	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	
70.00000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
75.00000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
80.00000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
82.50000	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	
97.50000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
105.00000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
112.50000	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	
115.00000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
125.00000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
127.50000	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	
132.50000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
170.00000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
197.50000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
257.50000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
295.00000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
335.00000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
352.50000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
397.50000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
445.00000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
482.50000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
485.00000	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	
497.50000	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
525.00000	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	

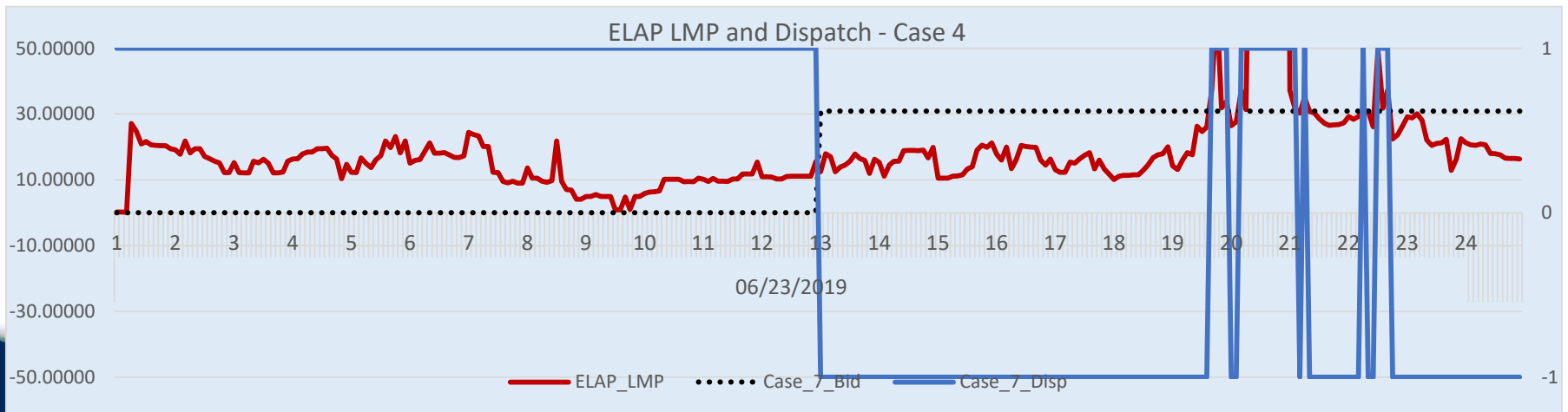
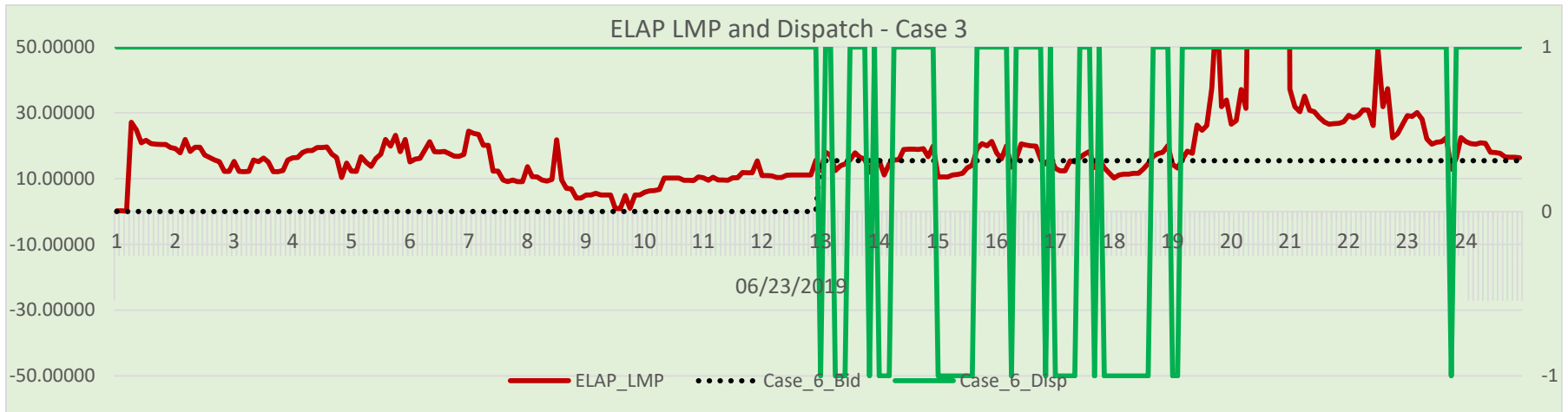


# ELAP LMP and Dispatch based on Price Inc (1) when LMP > bid price, Dec (-1) when LMP < bid price



# ELAP LMP and Dispatch based on Price and MWh Cap

Inc (1) when LMP > bid price, Dec (-1) when LMP < bid price



# EIM Resource Valuation Results

- 300MWh cap for cumulative dec bids and 300MWh for cumulative inc bids in one operating day
- **+/-600MWh cap for cumulative daily MWh in one operating week (starting on Mondays)**

## Cumulative Energy Imported or Exported, MWh

Period	Case 1	Case 2	Case 3	Case 4
Jan - Dec 2017	-20,637	22,947	20,550	3,133
Jan - Dec 2018	-22,944	37,043	35,453	9,297
Jan - Jun 2019	-10,654	16,367	14,555	3,464

## Counts of Days with Energy Imported or Exported, days

### Net import days (SBA to import energy)

Level of MWh Imported	Case 1	Case 2	Case 3	Case 4
Up to 300 MWh	189	1	10	47
Up to 200 MWh	69	7	13	72
Up to 100 MWh	58	9	21	125

### Net export days (SBA to sell energy)

Level of MWh Exported	Case 1	Case 2	Case 3	Case 4
Up to 300 MWh	30	250	232	92
Up to 200 MWh	18	31	53	97
Up to 100 MWh	35	25	24	127

# EIM Resource Valuation Results

- 300MWh cap for cumulative dec bids and 300MWh for cumulative inc bids in one operating day
- **+/-600MWh cap for cumulative daily MWh in one operating week (starting on Mondays)**

## Benefits, \$

Period	Purchase Benefits, \$				Sale Benefits, \$			
	Case 1	Case 2	Case 3	Case 4	Case 1	Case 2	Case 3	Case 4
Jan - Dec 2017	392,975	51,625	91,548	365,625	781,377	727,087	577,195	956,232
Jan - Dec 2018	545,237	74,888	159,936	864,861	1,512,351	1,143,034	1,152,392	2,397,023
Jan - Jun 2019	432,190	114,677	256,564	703,799	697,669	655,866	859,550	1,404,328

## Total Benefits = Purchase Benefits + Sale Benefits, \$

Period	Case 1	Case 2	Case 3	Case 4
Jan - Dec 2017	1,174,352	778,712	668,743	1,321,857
Jan - Dec 2018	2,057,588	1,217,922	1,312,329	3,261,884
Jan - Jun 2019	1,129,858	770,542	1,116,114	2,108,127

# WAPA Transmission in EIM

Charles Fresquez

Supervisory Power System Dispatcher (AGC)

# CVP Transmission Usage for EIM Transfers

- Transmission charges are levied by BA/TSP whose load the energy serves.
- EIM Exports from the SBA to the CAISO will not incur transmission charges.
- EIM participants agree to make transmission available for EIM energy transfers to Load.
  - WASN Real Time Merchant and LSEs will identify how much of their current CVP transmission rights can be used by the EIM for energy transfers to Load.
- Participants may be subject to Unreserved Use penalties if they exceed their transmission rights.
- All transmission submitted to EIM is available to be utilized by any participant.

# LSEs' Deviation Bandwidth

- WASN and BANC agree that, for SBA reliability, maintaining this process as is should continue.
- SBA regulation balances generation to load every 4 seconds.
- EIM dispatches participating generators to cover the forecasted load every 5 minutes.
  - EIM lacks the granularity to provide real time load balancing.

# LSEs' Deviation Bandwidth

- Regulation is necessary to:
  - Supplement the potentially numerous ramps throughout the hour.
  - Make up for load forecasting errors.
  - Aid in contingency recovery.
- The CAISO is implementing a change to their EIM that will recognize and account for regulation. Current rules penalize regulating units for being off schedule.



# OATT Revisions for EIM

- WAPA OATT is currently being reviewed for changes needed for EIM participation.
- If WAPA decides to participate, the changes are projected to be completed by early 2020 and available for the public review period.

# Questions/Comments

# EIM Meeting Schedule

Activity	Dates/Time
1 <sup>st</sup> EIM Meeting	Thursday, June 27, 2019
2 <sup>nd</sup> EIM Meeting	Tuesday, July 16, 2019
3 <sup>rd</sup> EIM Meeting	Tuesday, July 30, 2019
4 <sup>th</sup> EIM Meeting	Wednesday, August 14, 2019
EIM Decision	Friday, August 16, 2019

## Please Note:

- All meetings will be held at WAPA offices (114 Parkshore Drive, Folsom, CA 95630), from 9:00 am – 12:00 pm
- WebEx will be available for all EIM meetings

# EIM Information

- SNR EIM related information is posted on WAPA website at:

<https://www.wapa.gov/regions/SN/PowerMarketing/Pages/western-eim.aspx>

# Send comments or concerns to:

SNREIM@WAPA.GOV

or

Arun K. Sethi  
VP of Power Marketing

[asethi@wapa.gov](mailto:asethi@wapa.gov)

(916) 353-4452



*Folsom Dam*