WAPA Exploration of Energy Imbalance Market

Sierra Nevada Region
July 30, 2019

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Western Area Power Administration

Agenda

- EIM Construct
- EIM Cost Factors
- EIM Cost Estimates
- CVP Spin Sales and EIM
- CVP Resource Valuation
- Transmission in EIM
- Questions Received via E-Mail

EIM Construct

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CAISO EIM

- It is a real-time energy market
- Allows members to buy/sell power close to the time electricity is consumed

- Result: Balance supply and demand at a lower cost for EIM participants

WAPA-SNR EIM Participation

- BANC is the EIM Entity with CAISO
- SNR will join EIM as a participating resource within BANC
- SNR will submit its own base load schedules to CAISO
- SNR in coordination with Reclamation will bid resource schedules to CAISO

EIM Costs Factors

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SNR EIM Implementation Cost Factors

- SMUD Support: SMUD manages EIM Entity for BANC
- OATI Software Upgrade: To integrate SNR in BANC EIM Entity scope
- Settlement Software Upgrade: To integrate SNR in BANC EIM Entity scope
- Utilicast Project Oversight: PM on-site to provide project support & coordination for SNR
- CAISO Fees: Uplift and load related charges
- Legal Support (BBSW): Legal support provided to BANC
- Phase I Reimbursement: SNR Share of costs incurred during Phase I for creation of EIM Entity

SNR Share of BANC EIM Implementation Costs (Estimate)

• Phase II Decision & Gap Analysis		$ 60,000
• Phase II Implementation Costs		$1,308,750
SMUD Support	$439,550	
PM Support @0.4 FTE		
OATI Software Upgrade		
Settlement Software Upgrade		
Miscellaneous labor support @ 3.0 FTE		
Utilicast Project Oversight	$750,000	
CAISO Fees	$59,600	
Legal Support (BBSW)	$59,600	
• Security and Collateral		$ 163,500
• Phase 1 Reimbursement		$ 446,900
TOTAL		**$1,979,150**

SNR EIM On-going Cost Factors

- EIM Operation: Staffing & software support for EIM Entity operations
- Stakeholder Support: Engagement in CAISO EIM stakeholder process
- CAISO Fees: Uplift and Load Related Charges
- Legal Support (BBSW): Legal support provided to BANC

SNR Share of Ongoing BANC EIM Costs (Estimate)

• EIM Operation	$305,642
• Stakeholder Support	$ 16,350
• CAISO Fees	$ 81,750
• Legal Support (BBSW)	$ 3,270
Total	$407,012

CVP Spin Sales and EIM

Charles Faust

Real Time Merchant Manager

CVP Resources for EIM Bidding

Intent is not to affect the DA allocation process

Use of Spin sales as a proxy provides two options

- Option 1: Use of Available Spin not awarded in DAM
- Option 2: Reduction of Spin to meet the 50 MW submittal for EIM bid
- Rule to follow: Bidding is based on a maximum of 300MWH net submittal for any one day

Spin Bid into CAISO DAM

Background: CAISO Spin Awards

2019	Bid (MW's)	Cleared (MW's)	Percentage of Accepted Spin Bids
January	13,019	3,370	26%
February	11,590	10,307	89%
March	18,139	16,337	90%
April	30,295	27,891	92%
May	30,551	28,075	92%
June	34,537	30,421	88%
Average			**80%**

Spin Sales vs. 50MW of EIM

Based on The analysis provided in the scenario for Case #3 TD 6/23/2019 (Sunday)

- Spin sales available to bid into CAISO's DAM was 1,470 MWs
  - CAISO DAM Awarded 1,227 MWs, leaving 243 MWs not awarded

Two Options for bidding Energy based off of Spin capacity available to bid into the market

- **Option 1.** ➔ Allocate un-awarded spin into the market
  - Note: This would have resulted in only 50 MWs bid in for HE15 on 6/23 (**EIM Sales < $100**)

- **Option 2** ➔ Prioritize EIM allocation above Spin Sales & allocate 50MW/Hr.
  - Reduces available Spin Capacity by 50 MW/hr., and a loss of ~ **$3,460** in spin capacity sales.
  - Allows EIM transactions to occur each hour regardless of Spin awards.
  - Based on Case 3 pricing structure, this would provide **~ $5,943** in net EIM Energy revenues.
  - Net benefits of allocating 50 MWs to EIM sales (vs. lost Spin Capacity Sales) **= $2,483.**

- Based on this one day: Option 2 provides a significant advantage.
  - Combined with RT allocations from excess capacity, this may be a worthwhile strategy to follow.

EIM Resource Valuation

Cary Fox, Operations, Bureau of Reclamation
Robert Delizo, Resources and Scheduling Manager, WAPA
Charles Faust, Real-time Merchant 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
- 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 Bidding Strategies

- 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

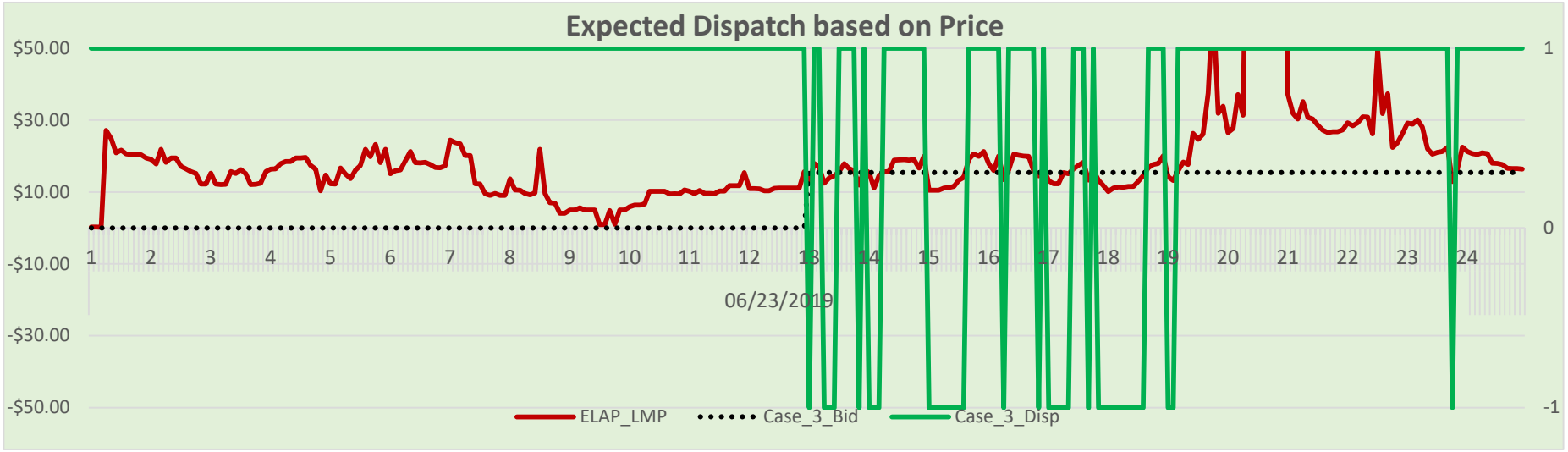
Scenarios to achieve low-cost purchases and high-value sales while ensuring adequate water management in the operating day

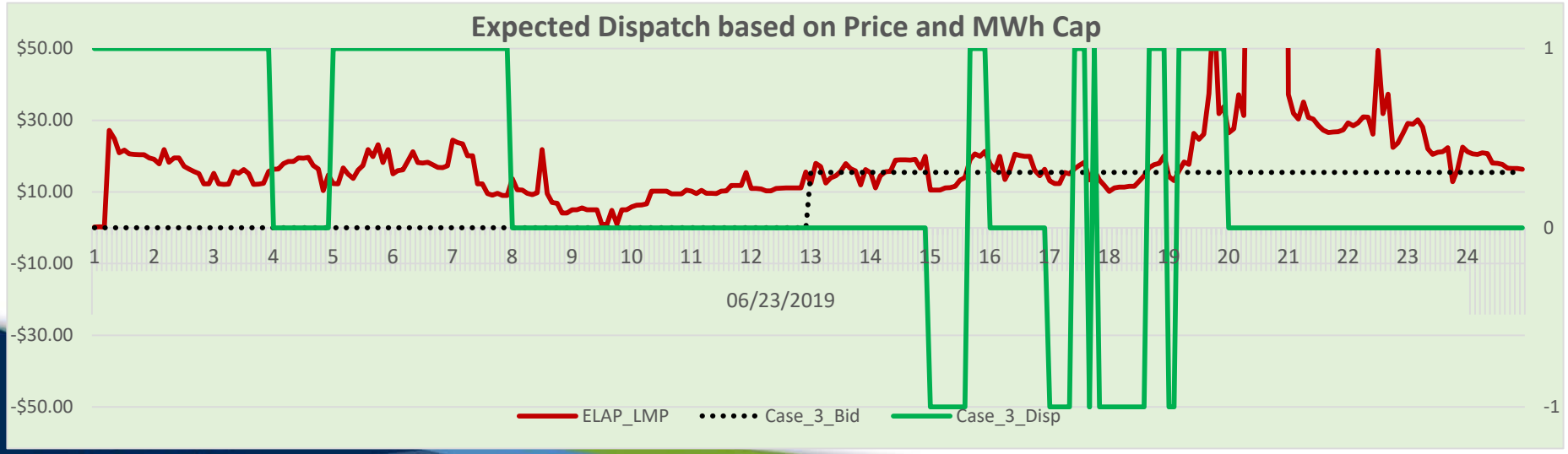
Case 1: HE 1-24 at CVP breakeven cost
Case 2: HE 1-24 at $0/MW
Case 3: HE 1-12 at $0/MW, HE 13-24 at 0.5 CVP breakeven cost
Case 4: HE 1-12 at $0/MW, HE 13-24 at CVP breakeven cost

CVP breakeven cost = Weighted Average Effective Rate (2006-2019)
= $30.92/MWh

ELAP LMP and Dispatch – Case 3

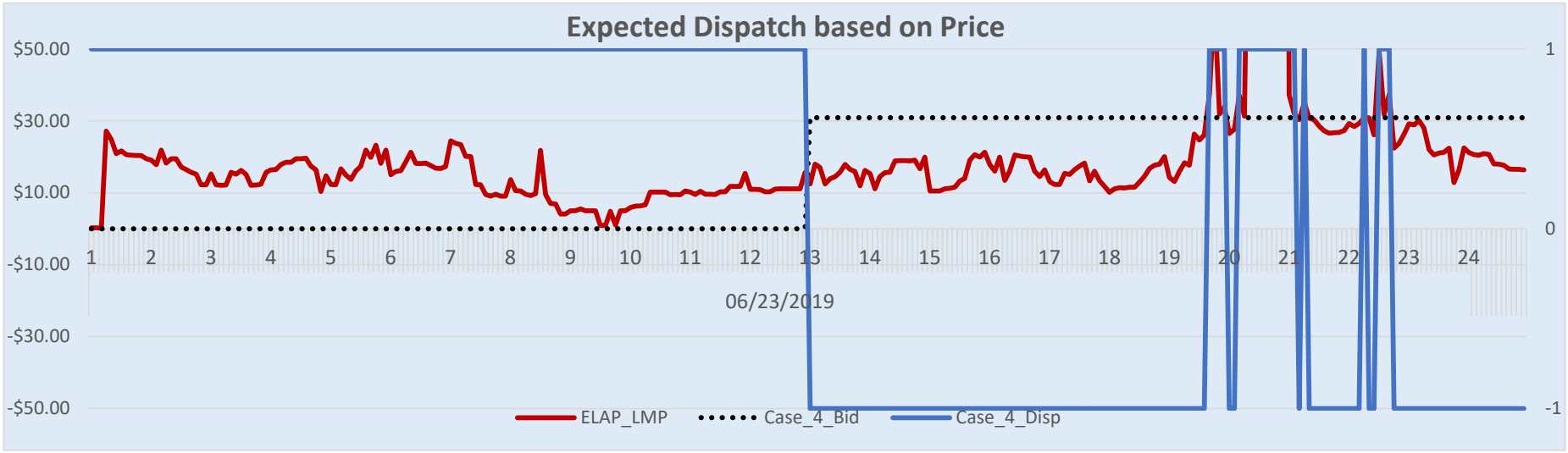
Inc (1) when LMP > bid price, Dec (-1) when LMP < bid price

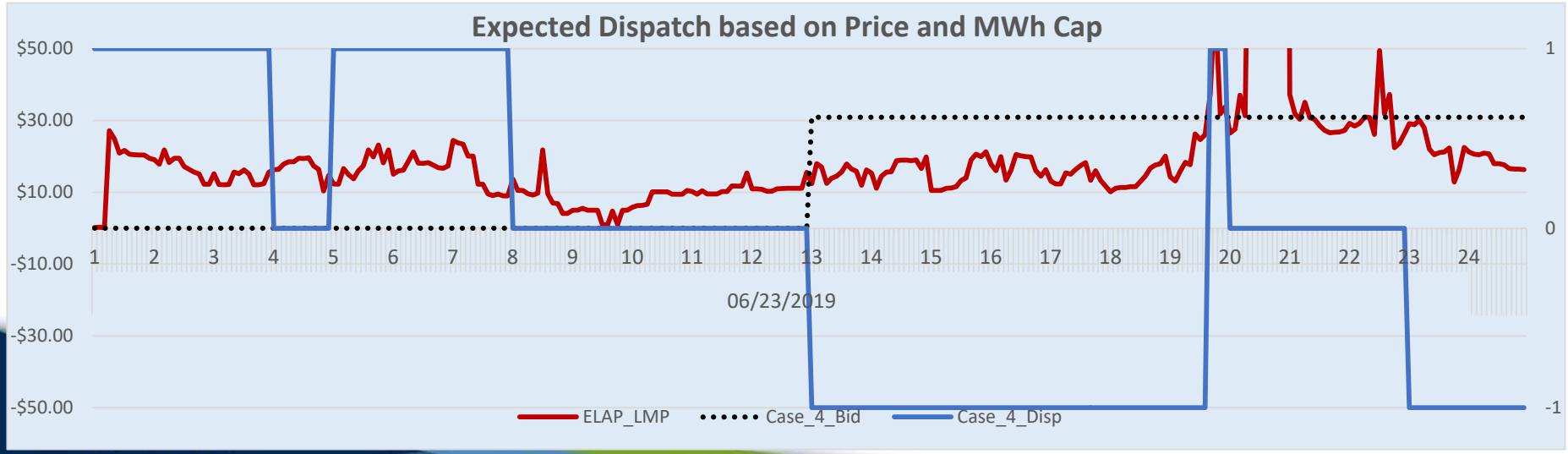




ELAP LMP and Dispatch – Case 4

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





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

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)**

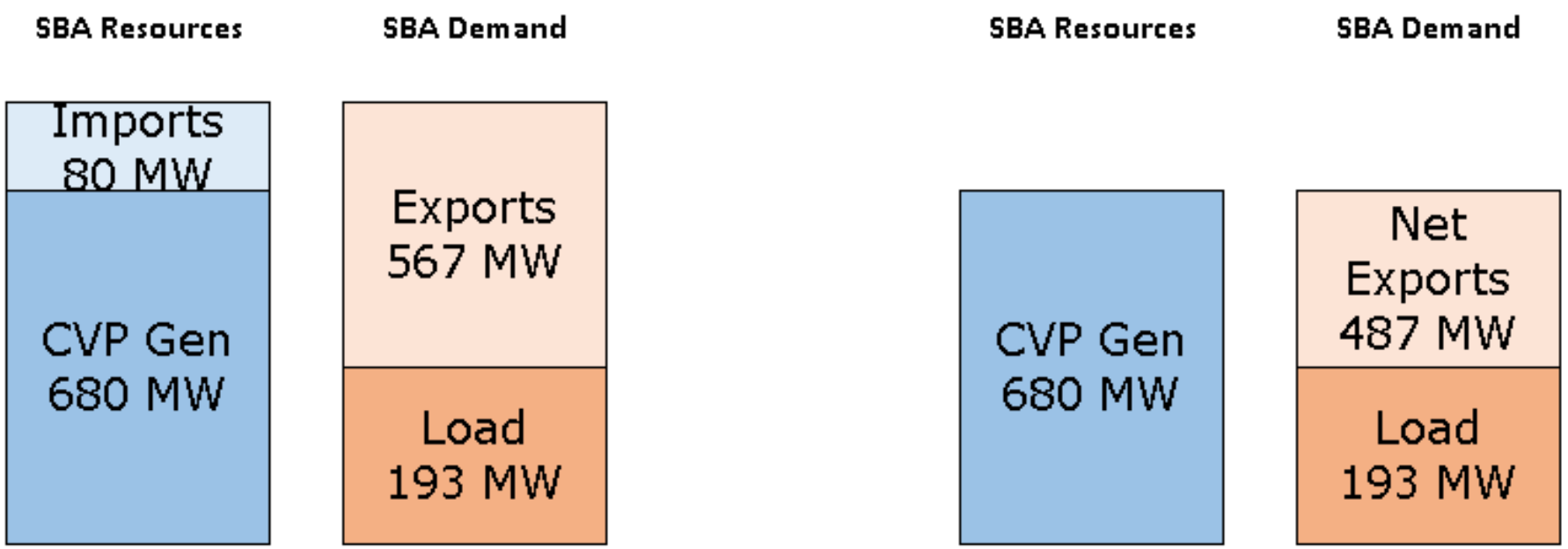
Benefits, $

	Purchase Benefits, $				Sale Benefits, $			
Period	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

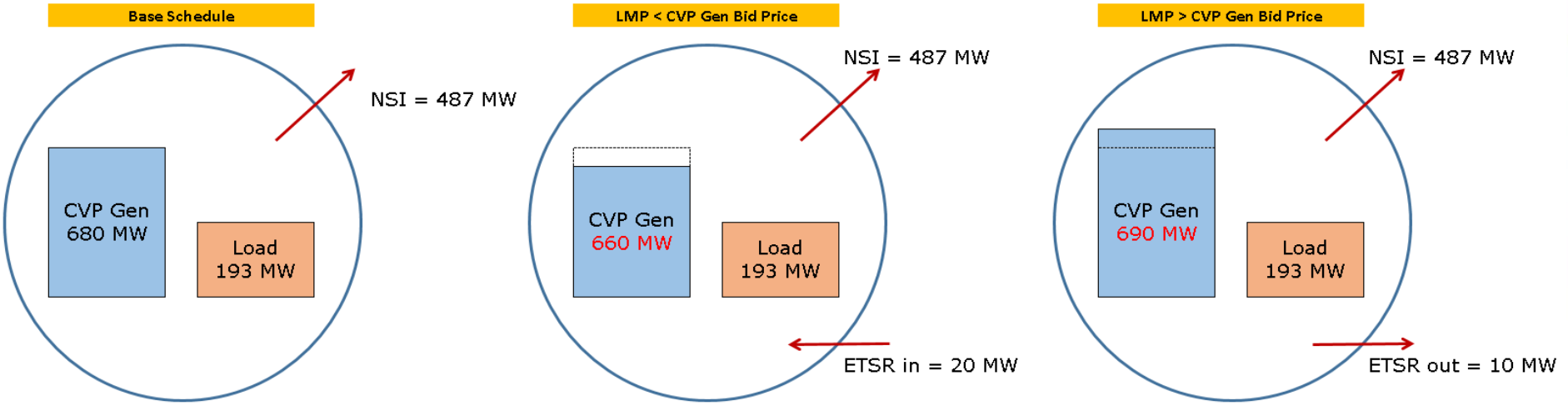
Total Benefits = Purchase Benefits + Sale Benefits, $

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

SBA Resources and Demand



SBA Resources and Demand in EIM



WAPA Transmission in EIM

Charles Fresquez

Supervisory Power System Dispatcher (AGC)

CVP Transmission Usage for EIM Transfers

- A declared amount of unused Available Transmission Capacity (ATC) can be used to move energy from the WAPA Transmission system area into the CAISO BA and that dynamic e-tags will be created to capture the use of this transmission.
- Transmission used to bring energy from the CAISO BA into the WAPA Transmission System area must be tagged by T-75 on a dynamic e-tag on transmission declared available by the transmission rights holder, who is also responsible for creating the e-tag.
- SBA EIM Participants will need to designate the amount of CVP transmission they are making available to the EIM for serving the load in their areas.
- WASN transmission operator will designate the amount of transmission available for moving generation out of the SBA.

CVP Transmission Usage for EIM Transfers

- Since EIM energy transfers hold the lowest priority (0) for transmission usage, any firm energy schedule implemented after a participant has submitted their available transmission capacity to EIM for the hour will take priority for the transmission usage. That participant's transmission submittal to EIM will be decreased by the amount of the firm energy schedule.
- If the use exceeds its transmission rights (outside of EIM Dispatch instructions), the transmission rights holder would incur a charge under unreserved transmission use penalty.

Questions Received via E-Mail

Arun K. Sethi

Questions

- The schedule shows two days between the final EIM meeting (August 14) and the WAPA's decision point (August 16). Is this the comment period?

- WAPA is evaluating EIM participation through BANC/SMUD, rather than becoming an EIM entity. What are the differences/benefits?

Questions

- On July 16, WAPA shared BANC EIM Implementation Costs. Can you provide additional detail/explanation on the following items:
  1. SMUD Support $385,000: What type of support will you receive from SMUD?
  2. Phase 1 Reimbursement $471,000: What percentage does this cost represent as total Phase 1 costs and how was it allocated?
  3. Utilicast Project Oversight $500,000: Please provide more detail (who is Utilicast, what is its role, how long will Utilicast provide oversight?
  4. Legal support (BBSW) $21,000: Is BBSW BANC's legal counsel and what is its role?

Questions

- Other costs (OATI upgrade, miscellaneous labor @ 3.0 FTE)
  1.Are the OATI upgrade costs to schedule with BANC or the CAISO?

  1.Misc. Labor 3.0 FTE are these new WAPA costs and positions?

- If CVP energy is sold in the RT EIM, is base resource reduced at a later date?

Questions

- Can you review the factors that change the availability of the energy resources – DA Spinning Reserves (capacity) that is bid into the market to RT energy product available to EIM?

- Can all CVP generators participate?

- Do CVP generators participate through SMUD?

- Will WAPA forecast net EIM benefits as a reduction to the PRR?

Questions/Comments

EIM Meeting Schedule

Activity	Dates/Time
1st EIM Meeting	Thursday, June 27, 2019
2nd EIM Meeting	Tuesday, July 16, 2019
3rd EIM Meeting	Tuesday, July 30, 2019
4th 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

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Folsom Dam