WESTERN ENERGY IMBALANCE MARKET BENEFITS REPORT

Fourth Quarter 2023

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January 31, 2024

CONTENTS

EXECUTIVE SUMMARY

Gross benefits from WEIM since November 2014

$5.05 billion

This report presents the benefits associated with participation in the Western Energy Imbalance Market (WEIM).

The measured benefits of participation in the WEIM include cost savings, increased integration of renewable energy, and improved operational efficiencies including the reduction of the need for real-time flexible reserves. The WEIM also provides significant reliability benefits by enhancing situational awareness and supporting access to surplus renewable energy across a broader western footprint.

Q4 2023 Gross Benefits by Participant (entry year)

	($ millions)
Arizona Public Service (2016)	$11.13
AVANGRID (2023)	$6.64
Avista (2022)	$4.30
Balancing Authority of Northern California (2019)	$73.12
Bonneville Power Administration (2022)	$9.68
California ISO (2014)	$25.40
El Paso Electric (2023)	$4.00
Idaho Power Company (2018)	$9.47
Los Angeles Dept. of Water & Power (2021)	$39.10
NV Energy (2015)	$22.46
NorthWestern Energy (2021)	$7.57
PacifiCorp (2014)	$50.46
Portland General Electric (2017)	$11.58
Public Service Company New Mexico (2021)	$6.17
Puget Sound Energy (2016)	$15.17
Powerex (2018)	$43.96
Seattle City Light (2020)	$3.65
Salt River Project (2020)	$22.03
Tacoma Power (2022)	$2.80
Tucson Electric Power (2022)	$5.90
Turlock Irrigation District (2021)	$1.06
WAPA Desert Southwest Region (2023)	$16.17
Total	$391.82

2023 Q4 BENEFITS

ECONOMICAL

$391.82 M

Gross benefits realized due to more efficient inter-and intra-regional dispatch in the Fifteen-Minute Market (FMM) and Real-Time Dispatch (RTD)*

ENVIRONMENTAL

21,349

Metric tons of CO_2** avoided curtailments

OPERATIONAL

58%

Average reduction in flexibility reserves across the footprint

This analysis demonstrates the benefit of economic dispatch in the real time market across a larger WEIM footprint with diverse resources and geography.

*WEIM Quarterly Benefit Report Methodology: https://www.westerneim.com/Documents/EIM-BenefitMethodology.pdf.

**The GHG emission reduction reported is associated with the avoided curtailment only. The current market process and counterfactual methodology cannot differentiate the GHG emissions resulting from serving ISO load via the WEIM versus dispatch that would have occurred external to the ISO without the WEIM. For more details, see http://www.caiso.com/Documents/GreenhouseGasEmissionsTrackingReport-FrequentlyAskedQuestions.pdf

BACKGROUND

The WEIM began financially binding operation on November 1, 2014, by optimizing resources across the ISO and PacifiCorp Balancing Authority Areas (BAAs). Since then, the WEIM has continued to grow and now includes 22 market participants and represents nearly 80% of the demand for electricity in the Western interconnection. Today, the WEIM footprint includes portions of Arizona, California, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming, Texas and extends to the border with Canada.

WEIM ECONOMIC BENEFITS IN Q4 2023

Table 2 shows the estimated WEIM gross benefits by each region per month[1]. The monthly savings presented show $133.36 million for October, $149.85 million for November and $108.61 million for December with a total estimated benefit of $391.82 million for this quarter[2]. This level of WEIM benefits accrued from having additional WEIM areas participating in the market and economical transfers displacing more expensive generation.

[1] The WEIM benefits reported here are calculated based on available data. Intervals without complete data are excluded in the calculation. The intervals excluded due to unavailable data are normally within a few percent points of the total intervals.

[2] For several quarterly estimates, CAISO benefits were calculated on a variation of the counterfactual methodology. For CAISO only the logic had considered offline resources as part of the bid stack in the counterfactual. In Q4 2021, CAISO identified some questionable results that drove persistent negative benefits for CAISO when considering offline resources. Since Q4 2021, the benefit calculation for CAISO area follows the same methodology applicable to all WEIM entities in which only online resources are used.

Region	October	November	December	Total
APS	$5.06	$3.92	$2.15	$11.13
AVRN	$2.96	$1.75	$1.93	$6.64
AVA	$2.37	$1.17	$0.76	$4.30
BANC	$9.09	$42.44	$21.59	$73.12
BPA	$6.01	$2.25	$1.42	$9.68
CISO	$10.69	$9.86	$4.85	$25.40
EPE	$2.54	$0.74	$0.72	$4.00
IPCO	$4.27	$3.40	$1.80	$9.47
LADWP	$11.99	$15.98	$11.13	$39.10
NVE	$9.40	$6.29	$6.77	$22.46
NWMT	$2.76	$3.07	$1.74	$7.57
PAC	$15.74	$14.97	$19.75	$50.46
PGE	$4.99	$3.08	$3.51	$11.58
PNM	$1.74	$2.61	$1.82	$6.17
PSE	$2.82	$4.75	$7.60	$15.17
PWRX	$20.87	$16.50	$6.59	$43.96
SCL	$1.20	$1.12	$1.33	$3.65
SRP	$7.76	$7.58	$6.69	$22.03
TPWR	$1.10	$0.90	$0.80	$2.80
TEP	$2.08	$2.58	$1.24	$5.90
TID	$0.34	$0.45	$0.27	$1.06
WALC	$7.58	$4.44	$4.15	$16.17
Total	$133.36	$149.85	$108.61	$391.82

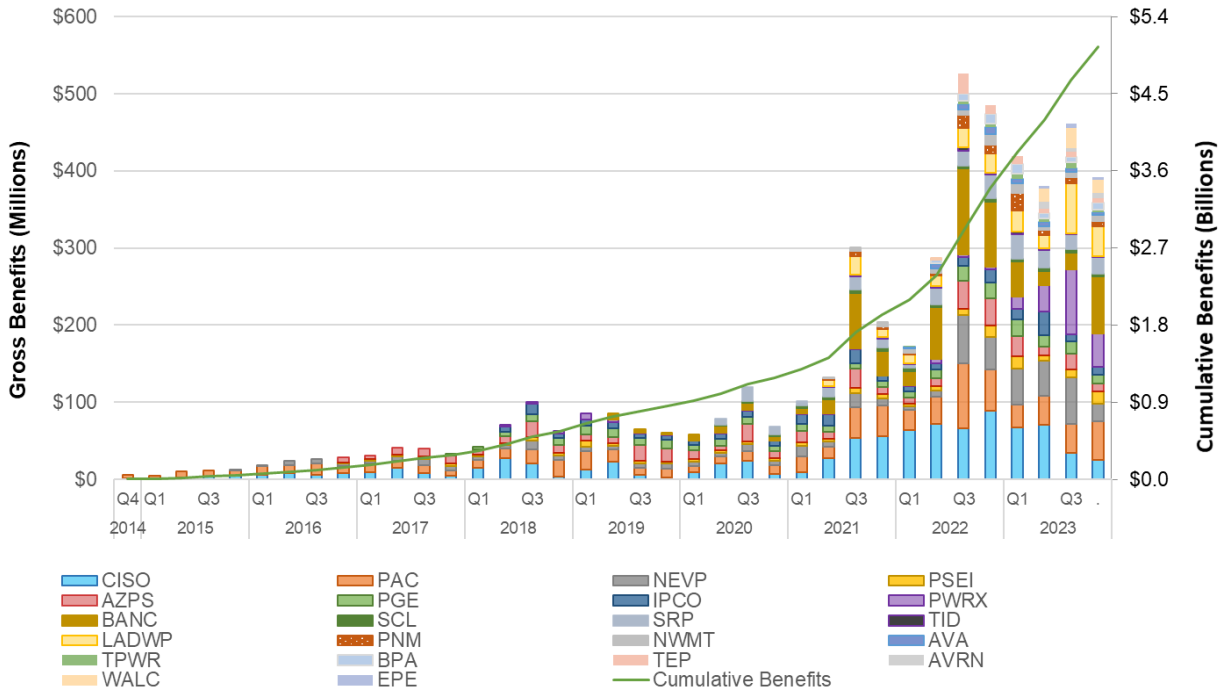
TABLE 1: Q4 2023 benefits in millions USD

CUMULATIVE ECONOMIC BENEFITS SINCE INCEPTION

Since the start of the WEIM in November 2014, the cumulative economic benefits of the market have totaled $5.05 billion. The quarterly benefits have grown over time as a result of the participation of new BAAs, which results in benefits for both the individual BAA but also compounds the benefits to adjacent BAAs through additional transfers. The ISO began publishing quarterly WEIM benefit reports in April 2015.[3]

Graph 1 illustrates the gross economic benefits of the WEIM by quarter for each participating BAA.

[3] Prior reports are available at https://www.westerneim.com/Pages/About/QuarterlyBenefits.aspx



GRAPH 1: Cumulative economic benefits for each quarter by BAA

INTER-REGIONAL TRANSFERS

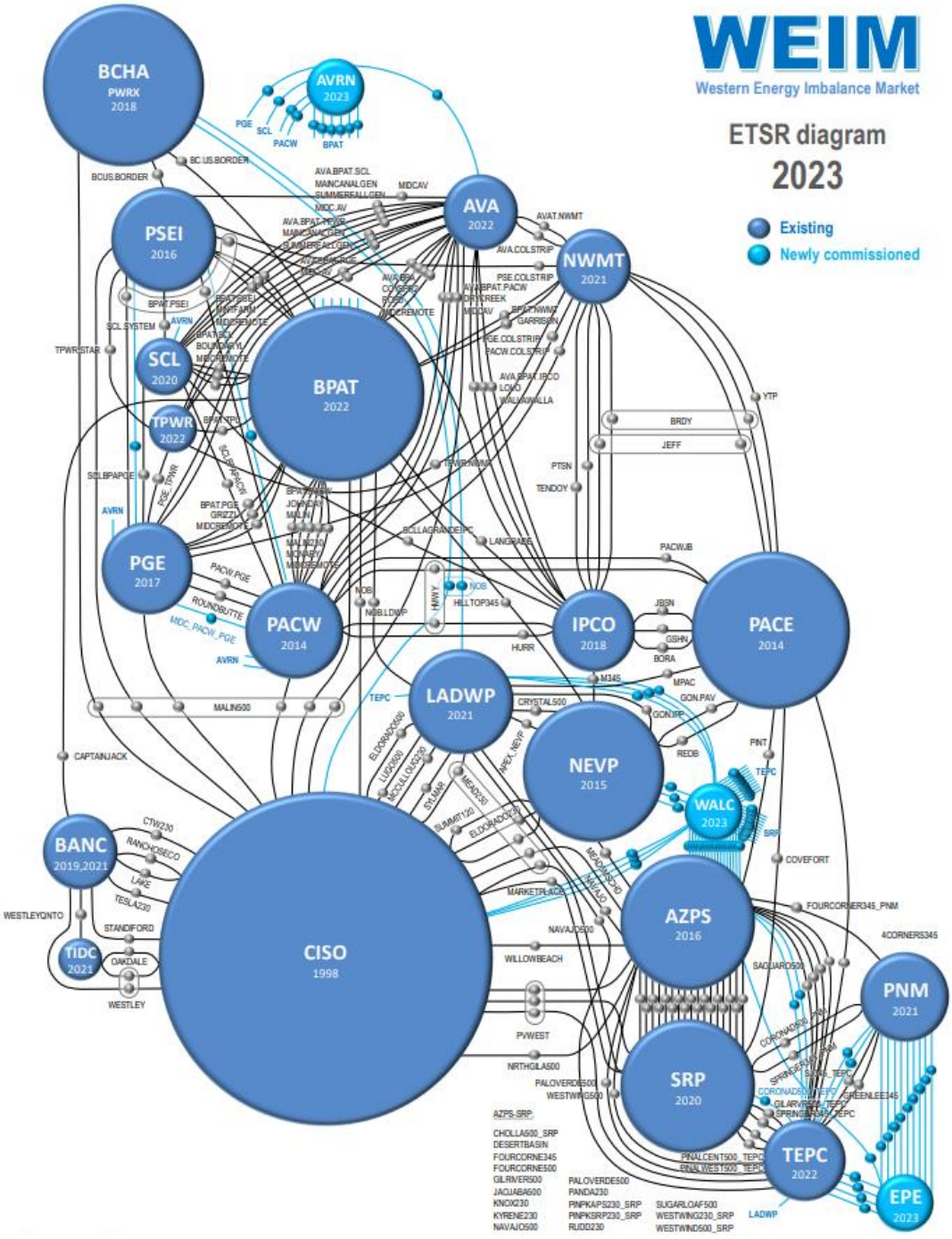
A significant contributor to WEIM benefits is transfers across balancing areas, providing access to lower cost supply, while factoring in the cost of compliance with greenhouse gas (GHG) emissions regulations when energy is transferred into the ISO. As such, the transfer volumes are a good indicator of a portion of the benefits attributed to the WEIM. Transfers can take place in both the 15-Minute Market and Real-Time Dispatch (RTD).

Generally, transfer limits are based on transmission and interchange rights that participating balancing authority areas make available to the WEIM, with the exception of the PacifiCorp West (PACW) -ISO transfer limit and the Portland General Electric (PGE) -ISO transfer limit in RTD. These RTD transfer capacities between PACW/PGE and the ISO are determined based on the allocated dynamic transfer capability driven by system operating conditions. This report does not quantify a BAA's opportunity cost that the utility considered when using its transfer rights for the WEIM.

Appendix 2 provides the 15-minute and 5-minute WEIM transfer volumes with base schedule transfers excluded. The WEIM entities submit inter-BAA transfers in their base schedules. The benefits quantified in this report are only attributable to the transfers that occurred through the WEIM. The benefits do not include any transfers attributed to transfers submitted in the base schedules that are scheduled prior to the start of the WEIM.

The transfer from BAA_x to BAA_y and the transfer from BAA_y to BAA_x are separately reported. For example, if there is a 100 Megawatt-Hour (MWh) transfer during a 5-minute interval, in addition to a base transfer from ISO to NVE, it will be reported as 100 MWh from_BAA ISO to_BAA NEVP, and 0 MWh from_BAA NEVP to_BAA ISO in the opposite

direction. The 15-minute transfer volume is the result of optimization in the 15-minute market using all bids and base schedules submitted into the WEIM. The 5-minute transfer volume is the result of optimization using all bids and base schedules submitted into WEIM, based on unit commitments determined in the 15-minute market optimization.



GRAPH 2: WEIM transfer

WHEEL-THROUGH TRANSFERS

As the footprint of the WEIM grows, wheel-through transfers may become more common. In order to derive the wheel-through transfers for each WEIM BAA, the ISO uses the following calculation for every real-time interval dispatch:

- *Total import*: summation of transfers above base transfers coming into the WEIM BAA under analysis
- *Total export*: summation of all transfers above base transfers going out of the WEIM BAA under analysis
- *Net import*: the maximum of zero or the difference between total imports and total exports
- *Net export*: the maximum of zero or the difference between total exports and total imports
- *Wheel-through*: the minimum of the WEIM transfers into (total import) or WEIM transfer out (total export) of a BAA for a given interval

All wheel-through transfers are summed over both the month and the quarter.

Currently, a WEIM entity facilitating a wheel through receives no direct financial benefit for facilitating the wheel; only the sink and source directly benefit. As part of the WEIM Consolidated Initiatives stakeholder process, the ISO committed to monitoring the wheel through volumes to assess whether, after the addition of new WEIM entities, there is a potential future need to pursue a market solution to address the equitable sharing of wheeling benefits.

The ISO will continue to track the volume of wheel-through transfers in the WEIM market in the quarterly reports.

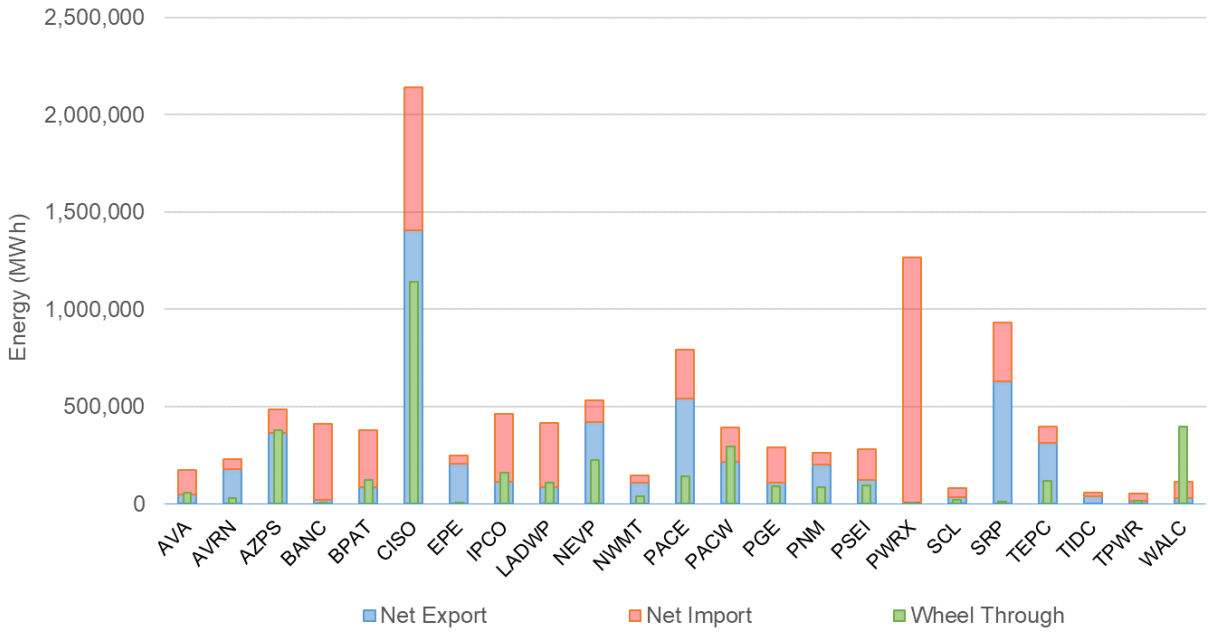
This volume reflects the total wheel-through transfers for each WEIM BAA, regardless of the potential paths used to wheel through. The net imports and exports estimated in this section reflect the overall volume of net imports and exports; in contrast, the imports and exports provided in Table 2 reflect the gross transfers between two WEIM BAAs.

The metric is measured as energy in MWh for each month and the corresponding calendar quarter, as shown in Tables 3 through 6 and Graphs 3 through 6.

BAA	Net Export	Net Import	Wheel Through
AVA	45,865	126,051	58,800
AVRN	179,807	47,755	29,443
AZPS	361,407	121,086	379,452
BANC	19,787	389,790	1,234
BPAT	84,096	294,891	119,752
CISO	1,403,521	735,579	1,140,739
EPE	205,328	43,308	316
IPCO	110,234	352,011	160,259
LADWP	86,025	327,256	109,421

NEVP	417,152	114,315	224,859
NWMT	109,402	33,466	39,210
PACE	538,108	254,440	139,877
PACW	212,850	178,698	292,674
PGE	107,557	179,717	90,363
PNM	200,096	59,280	84,317
PSEI	120,469	158,052	92,020
PWRX	685	1,266,745	7,287
SCL	31,965	48,310	19,771
SRP	629,470	299,820	9,697
TEPC	310,665	86,209	115,989
TIDC	36,755	21,642	-
TPWR	16,563	37,120	15,277
WALC	31,029	83,293	397,957

TABLE 2: Estimated wheel-through transfers in Q4 2023

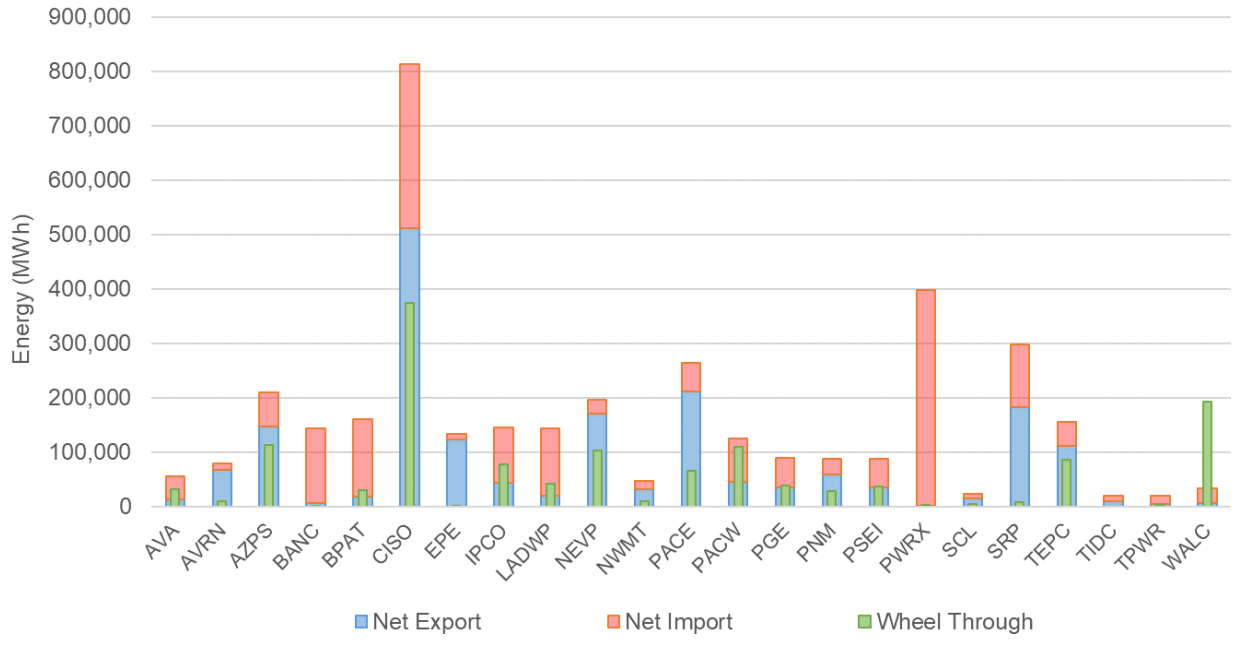


GRAPH 3: Estimated wheel-through transfers in Q4 2023

BAA	Net Export	Net Import	Wheel Through
AVA	12,796	41,650	32,312
AVRN	66,863	11,734	9,369
AZPS	146,351	62,703	112,429
BANC	6,752	137,028	0
BPAT	18,063	142,310	30,546
CISO	511,291	301,685	373,505

EPE	123,837	9,865	1
IPCO	43,614	101,205	76,948
LADWP	19,872	124,216	41,524
NEVP	170,495	25,077	101,918
NWMT	31,331	14,891	10,198
PACE	210,941	52,534	65,706
PACW	44,626	80,531	109,804
PGE	34,153	55,496	38,155
PNM	58,112	30,004	28,274
PSEI	35,680	51,355	36,028
PWRX	496	396,345	3,478
SCL	13,914	9,619	4,816
SRP	181,905	116,273	7,433
TEPC	110,840	44,063	86,232
TIDC	9,631	10,565	-
TPWR	4,445	15,732	2,733
WALC	6,306	27,435	193,047

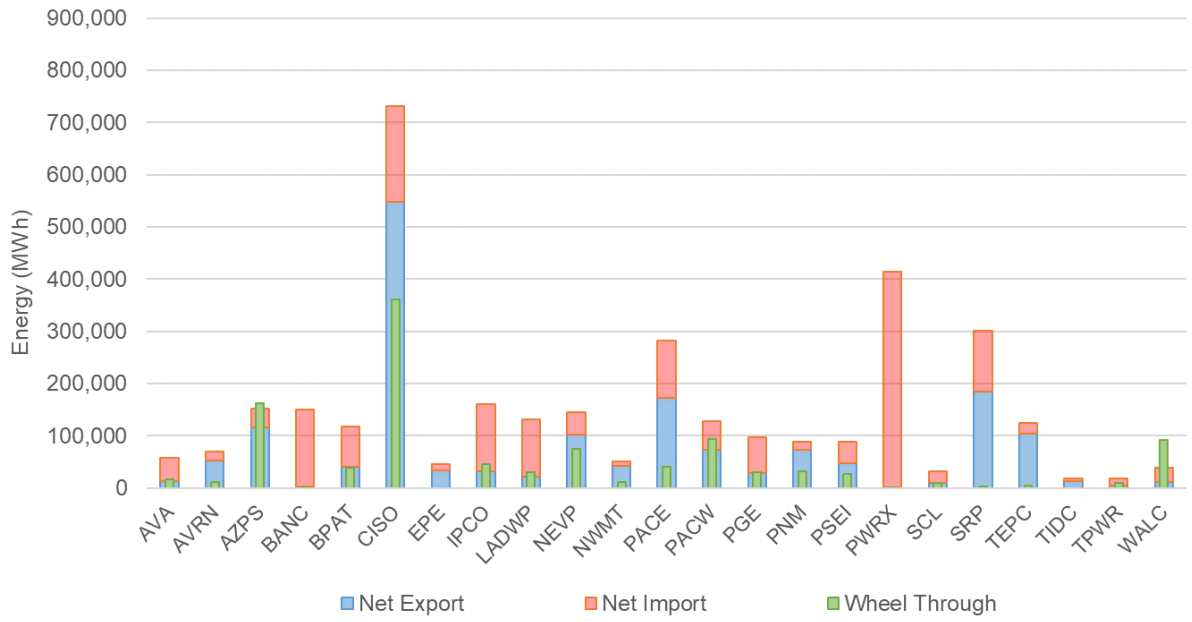
TABLE 3: Estimated wheel-through transfers in October 2023



GRAPH 4: Estimated wheel-through transfers in October 2023

BAA	Net Export	Net Import	Wheel Through
AVA	12,098	45,751	17,122
AVRN	51,857	18,006	11,350
AZPS	115,500	35,453	162,505
BANC	1,775	148,213	1,234
BPAT	40,222	77,964	38,252
CISO	548,124	182,564	360,665
EPE	33,586	12,481	-
IPCO	31,743	128,173	45,183
LADWP	22,033	108,662	30,452
NEVP	102,862	41,635	74,896
NWMT	42,333	8,557	12,040
PACE	172,272	109,568	39,979
PACW	73,663	53,556	93,058
PGE	27,815	69,287	29,725
PNM	72,212	16,005	31,916
PSEI	46,929	41,354	27,368
PWRX	107	414,765	1,196
SCL	8,641	22,611	8,924
SRP	184,270	117,339	2,034
TEPC	103,980	21,050	4,962
TIDC	12,133	6,525	-
TPWR	3,868	13,353	9,360
WALC	11,384	26,535	91,663

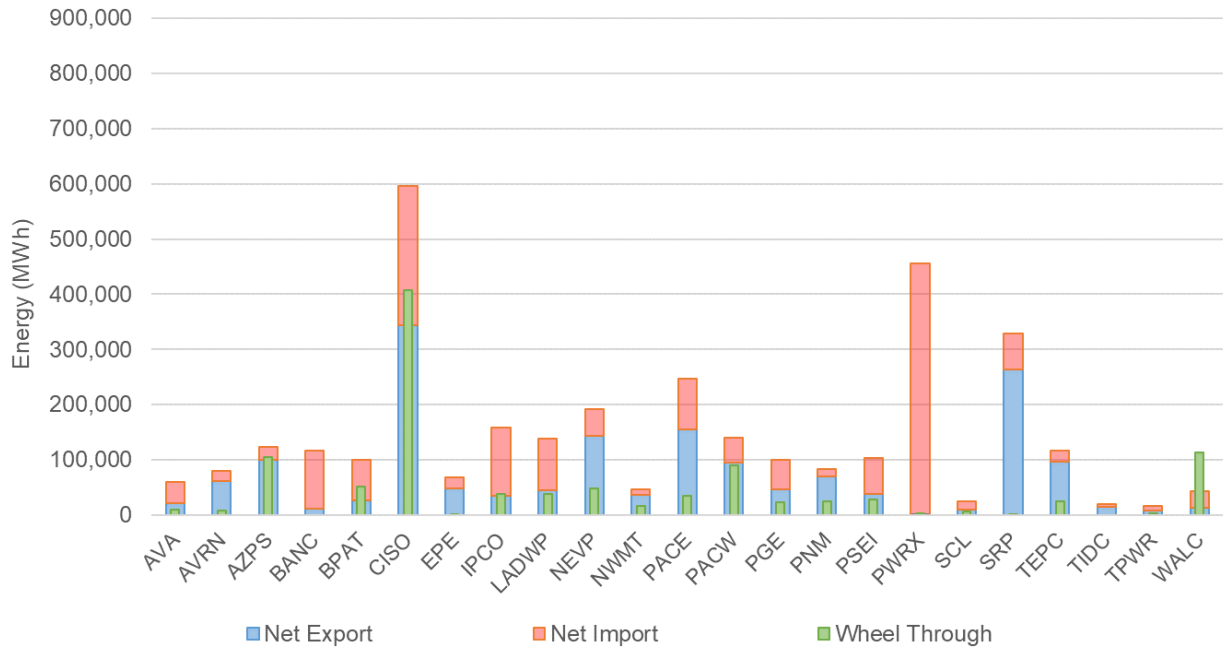
TABLE 4: Estimated wheel-through transfers in November 2023



GRAPH 5: Estimated wheel-through transfers in November 2023

BAA	Net Export	Net Import	Wheel Through
AVA	20,971	38,649	9,366
AVRN	61,087	18,015	8,723
AZPS	99,556	22,930	104,518
BANC	11,260	104,550	-
BPAT	25,811	74,617	50,953
CISO	344,106	251,329	406,569
EPE	47,905	20,962	315
IPCO	34,878	122,633	38,128
LADWP	44,121	94,377	37,445
NEVP	143,795	47,602	48,044
NWMT	35,737	10,018	16,972
PACE	154,896	92,338	34,193
PACW	94,561	44,611	89,812
PGE	45,589	54,935	22,483
PNM	69,771	13,271	24,127
PSEI	37,859	65,343	28,624
PWRX	82	455,634	2,613
SCL	9,409	16,081	6,031
SRP	263,295	66,208	230
TEPC	95,845	21,097	24,795
TIDC	14,991	4,552	-
TPWR	8,249	8,036	3,184
WALC	13,338	29,323	113,247

TABLE 5: Estimated wheel-through transfers in December 2023



GRAPH 6: Estimated wheel-through transfers in December 2023

REDUCED RENEWABLE CURTAILMENT AND GHG REDUCTIONS

The WEIM benefit calculation includes the economic benefits that can be attributed to avoided renewable curtailment within the ISO footprint. If not for energy transfers facilitated by the WEIM, some renewable generation located within the ISO would have been curtailed via either economic or exceptional dispatch. The total avoided renewable curtailment volume in MWh for Q4 2023 was calculated to be 22,593 MWh (October) + 19,573 MWh (November) + 7,714 MWh (December) = 49,880 MWh total.

There are environmental benefits of avoided renewable curtailment as well. Under the assumption that avoided renewable curtailments displace production from other resources at a default emission rate of 0.428 metric tons CO_2/MWh, avoided curtailments displaced an estimated 21,349 metric tons of CO_2 for Q4 2023. Avoided renewable curtailments also may have contributed to an increased volume of renewable credits that would otherwise have been unavailable. This report does not quantify the additional value in dollars associated with this benefit. Total estimated reductions in the curtailment of renewable energy in the ISO footprint, along with the associated reductions in CO_2, are shown in Table 7.

Year	Quarter	MWh	Eq. Tons CO_2
2015	1	8,860	3,792
	2	3,629	1,553

	3	828	354
	4	17,765	7,521
2016	1	112,948	48,342
	2	158,806	67,969
	3	33,094	14,164
	4	23,390	10,011
2017	1	52,651	22,535
	2	67,055	28,700
	3	23,331	9,986
	4	18,060	7,730
2018	1	65,860	28,188
	2	129,128	55,267
	3	19,032	8,146
	4	23,425	10,026
2019	1	52,254	22,365
	2	132,937	56,897
	3	33,843	14,485
	4	35,254	15,089
2020	1	86,740	37,125
	2	147,514	63,136
	3	37,548	16,071
	4	39,956	17,101
2021	1	76,147	32,591
	2	109,059	46,677
	3	23,042	9,862
	4	38,044	16,283
2022	1	94,168	40,304
	2	118,352	50,655
	3	42,468	18,176
	4	25,609	10,960
2023	1	53,002	22,685
	2	148,938	63,745
	3	60,113	25,728
	4	49,880	21,349
Total		2,162,730	925,568

TABLE 6: Total reduction in curtailment of renewable energy and associated reductions in CO_2

FLEXIBLE RAMPING PROCUREMENT DIVERSITY SAVINGS

The WEIM facilitates procurement of flexible ramping capacity in the FMM to address variability that may occur in the RTD. Because variability across different BAAs may happen in opposite directions, the flexible ramping requirement for the entire WEIM footprint can be less than the sum of individual BAA's requirements. This difference is known as flexible ramping procurement diversity savings.

Starting in 2016, the ISO replaced the flexible ramping constraint with flexible ramping products that provide both upward and downward ramping. The minimum and maximum flexible ramping requirements for each BAA and for each direction are listed in Appendix 3: Minimum & Maximum Ramping Requirements.

The flexible ramping procurement diversity savings for all the intervals averaged over the month are shown in Table 7. The percentage savings is the average MW savings divided by the sum of the individual BAA requirements.

	October		November		December	
Direction	Up	Down	Up	Down	Up	Down
Average MW saving	1,746	1,924	1,705	1,848	1,668	1,824
Sum of BAA requirements	3,196	3,160	3,128	2,995	3,082	3,026
Percentage savings	55%	61%	55%	62%	54%	60%

Table 7: Flexible ramping procurement diversity savings in Q4 2023

Flexible ramping capacity may be used in RTD to handle uncertainties in the future interval. The RTD flexible ramping capacity is prorated to each BAA. Flexible ramping surplus MW is defined as the awarded flexible ramping capacity in RTD minus its share, and the flexible ramping surplus cost is defined as the flexible ramping surplus MW multiplied by the flexible ramping WEIM-wide marginal price. A positive flexible ramping surplus MW is the capacity that a BAA provided to help other BAAs, and a negative flexible ramping surplus MW is the capacity that a BAA received from other BAAs.

The WEIM dispatch cost for a BAA with positive flexible ramping surplus MW is increased because some capacities are used to help other BAAs. The flexible ramping surplus cost is subtracted from the BAA's WEIM dispatch cost to reflect the true dispatch cost of a BAA. Please see the Benefit Report Methodology for more details.

CONCLUSION

Using state-of-the-art technology to find and deliver low-cost energy to meet real-time demand, the WEIM demonstrates that utilities can realize financial and operational benefits through increased coordination and optimization. The WEIM provides significant reliability benefits by enhancing situational awareness and supporting access to surplus energy across a broader western footprint. In addition to these benefits, the WEIM provides significant environmental benefits through the reduction of renewable curtailments during periods of oversupply.

Sharing resources across a larger geographic area reduces greenhouse gas emissions by using renewable generation that otherwise would have been turned off. The quantified environmental benefits from avoided curtailments of renewable generation from 2015 to-date reached 925,568 metric tons of CO_2, roughly the equivalent of avoiding the emissions from 194,597 passenger cars driven for one year.

APPENDIX 1: GLOSSARY OF ABBREVIATIONS

Abbreviation	Description
APS	Arizona Public Service
AVA	Avista Utilities
AVRN	Avangrid
BAA	Balancing Authority Area
BANC	Balancing Authority of Northern California
BPA	Bonneville Power Administration
CISO, ISO	California ISO
EIM	Energy Imbalance Market
EPE	El Paso Electric
FMM	Fifteen Minute Market
GHG	Greenhouse Gas
IPCO	Idaho Power
LADWP	Los Angeles Department of Water and Power
MW	Megawatt
MWh	Megawatt-Hour
NVE	NV Energy
NWMT	NorthWestern Energy
PAC	PacifiCorp
PACE	PacifiCorp East
PACW	PacifiCorp West
PGE	Portland General Electric
PNM	Public Service Company of New Mexico
PSE	Puget Sound Energy
PWRX	Powerex
RTD	Real Time Dispatch
SCL	Seattle City Light
SRP	Salt River Project
TEP	Tucson Electric Power
TID	Turlock Irrigation District
TPWR	Tacoma Power
WALC	Western Area Power Administration Desert Southwest
WEIM	Western Energy Imbalance Market

APPENDIX 2: WEIM Transfer Volume (MWh)

Month	From BAA	To BAA	15min WEIM transfer (15m – base)	5min WEIM transfer (5m – base)
	AVA	AVRN	1,720	1,911
October	AVA	BPAT	35,646	31,576
	AVA	CISO	0	0
	AVA	IPCO	3,482	4,620
	AVA	NWMT	2,747	4,004
	AVA	PACW	4,526	2,997
	AVA	PGE	0	0
	AVA	PSEI	38	0
	AVA	SCL	0	0
	AVA	TPWR	0	0
	AVRN	AVA	2,618	2,304
	AVRN	BPAT	34,793	31,186
	AVRN	PACW	25,663	28,546
	AVRN	PGE	13,669	10,487
	AVRN	SCL	5,812	3,710
	AZPS	CISO	163,231	179,952
	AZPS	EPE	840	0
	AZPS	LADWP	42,232	19,515
	AZPS	NEVP	0	0
	AZPS	PACE	42,329	30,249
	AZPS	PNM	22,745	21,887
	AZPS	SRP	6,632	4,211
	AZPS	TEPC	1,311	8
October	AZPS	WALC	6,649	2,958
	BANC	BPAT	0	0
	BANC	CISO	5,129	6,669
	BANC	TIDC	402	83
	BPAT	AVA	3,395	2,351

	BPAT	AVRN	2,209	2,569
October	BPAT	BANC	0	0
	BPAT	CISO	3,358	6,852
	BPAT	IPCO	3,407	477
	BPAT	LADWP	0	0
	BPAT	NEVP	0	0
	BPAT	NWMT	6,073	1,564
	BPAT	PACW	4,756	943
	BPAT	PGE	9,793	8,517
	BPAT	PSEI	13,267	15,324
	BPAT	PWRX	7,930	0
	BPAT	SCL	1,121	665
	BPAT	TPWR	9,712	9,348
	CISO	AVA	0	0
	CISO	AZPS	56,655	60,545
	CISO	BANC	125,088	133,190
	CISO	BPAT	9,157	18,410
	CISO	LADWP	51,419	54,698
	CISO	NEVP	41,245	44,260
	CISO	PACW	0	15,917
	CISO	PGE	26,154	40,355
	CISO	PWRX	354,740	371,022
	CISO	SRP	103,308	106,482
	CISO	TEPC	59	237
	CISO	TIDC	9,083	10,482
	CISO	WALC	23,622	25,512
October	EPE	AZPS	1,240	0
	EPE	PNM	33,428	32,767
	EPE	TEPC	92,369	91,071
	IPCO	AVA	48,664	39,792
	IPCO	BPAT	13,179	13,077
	IPCO	NEVP	8,759	9,075

	IPCO	NWMT	1,460	2,603
	IPCO	PACE	8,414	2,146
October	IPCO	PACW	55,525	46,498
	IPCO	PSEI	1,687	2,062
	IPCO	SCL	6,528	5,309
	LADWP	AZPS	1,495	1,570
	LADWP	BPAT	0	0
	LADWP	CISO	21,229	31,459
	LADWP	NEVP	19,432	13,093
	LADWP	PACE	23,764	14,819
	LADWP	TEPC	0	0
	LADWP	WALC	4,793	456
	NEVP	AZPS	0	0
	NEVP	BPAT	0	0
	NEVP	CISO	84,646	85,686
	NEVP	IPCO	99,581	75,737
	NEVP	LADWP	29,840	28,572
	NEVP	PACE	81,101	67,906
	NEVP	WALC	20,254	14,512
	NWMT	AVA	28,410	24,037
	NWMT	BPAT	8,730	6,543
	NWMT	IPCO	6,905	7,842
	NWMT	PACE	8,292	3,107
	NWMT	PACW	3	0
	NWMT	PGE	13	0
October	NWMT	PSEI	137	0
	NWMT	TPWR	0	0
	PACE	AZPS	19,086	24,751
	PACE	IPCO	90,926	78,687
	PACE	LADWP	37,211	47,651
	PACE	NEVP	38,657	34,314
	PACE	NWMT	17,468	16,918

	PACE	PACW	85,911	74,325
	PACE	SRP	0	0
October	PACE	TEPC	0	0
	PACW	AVA	5,609	5,478
	PACW	AVRN	7,080	10,217
	PACW	BPAT	13,154	14,268
	PACW	CISO	18,496	31,264
	PACW	IPCO	12,807	8,598
	PACW	NWMT	2	0
	PACW	PGE	42,053	33,487
	PACW	PSEI	51,382	50,493
	PACW	SCL	885	624
	PGE	AVA	0	0
	PGE	AVRN	2,866	4,174
	PGE	BPAT	30,763	31,192
	PGE	CISO	25,924	20,523
	PGE	NWMT	56	0
	PGE	PACW	13,347	15,720
October	PGE	PSEI	0	0
	PGE	SCL	841	699
	PGE	TPWR	0	0
	PNM	AZPS	77,084	77,200
	PNM	EPE	4,648	5,266
	PNM	SRP	1,653	1,134
	PNM	TEPC	4,010	2,786
	PSEI	AVA	59	0
	PSEI	BPAT	21,951	18,129
	PSEI	IPCO	0	0
	PSEI	NWMT	22	0
	PSEI	PACW	4,135	5,028
	PSEI	PGE	0	0
	PSEI	PWRX	29,420	28,801

	PSEI	SCL	5,245	3,428
	PSEI	TPWR	10,017	9,117
October	PWRX	BPAT	4,459	0
	PWRX	CISO	0	0
	PWRX	PSEI	2,789	3,975
	SCL	AVA	4	0
	SCL	AVRN	926	2,233
	SCL	BPAT	2,202	4,295
	SCL	IPCO	1,098	2,193
	SCL	PACW	155	359
	SCL	PGE	616	804
	SCL	PSEI	4,762	8,846
	SRP	AZPS	14,375	8,034
	SRP	CISO	150,508	168,446
	SRP	PACE	0	0
	SRP	PNM	52	37
	SRP	TEPC	9,128	7,470
	SRP	WALC	20,748	5,352
	TEPC	AZPS	1,257	48
	TEPC	CISO	8,242	7,594
	TEPC	EPE	4,832	4,600
	TEPC	LADWP	55	0
	TEPC	PACE	40	13
	TEPC	PNM	7,070	3,587
	TEPC	SRP	11,842	9,537
October	TEPC	WALC	177,723	171,692
	TIDC	BANC	5,522	3,839
	TIDC	CISO	4,460	5,792
	TPWR	AVA	0	0
	TPWR	BPAT	4,067	4,180
	TPWR	NWMT	0	0
	TPWR	PGE	0	0

	TPWR	PSEI	2,869	2,998
	WALC	AZPS	5,045	2,983
	WALC	CISO	114,870	123,746
	WALC	LADWP	23,921	15,304
	WALC	NEVP	50,826	26,254
	WALC	SRP	3,247	2,342
	WALC	TEPC	28,821	28,724
November	AVA	AVRN	3,054	3,050
	AVA	BPAT	11,659	9,854
	AVA	CISO	0	0
	AVA	IPCO	8,635	9,886
	AVA	NWMT	3,092	3,306
	AVA	PACW	3,289	3,124
	AVA	PGE	0	0
	AVA	PSEI	0	0
	AVA	SCL	0	0
	AVA	TPWR	0	0
	AVRN	AVA	3,926	4,032
	AVRN	BPAT	24,555	21,434
	AVRN	PACW	21,435	22,495
	AVRN	PGE	10,176	9,557
	AVRN	SCL	6,993	5,688
	AZPS	CISO	160,424	151,513
	AZPS	EPE	1,350	0
	AZPS	LADWP	24,849	22,609
	AZPS	NEVP	0	0
	AZPS	PACE	82,820	72,142
November	AZPS	PNM	16,421	11,951
	AZPS	SRP	20,596	17,817
	AZPS	TEPC	430	3
	AZPS	WALC	2,960	1,970
	BANC	BPAT	0	0

	BANC	CISO	1,652	1,657
	BANC	TIDC	1,352	1,352
November	BPAT	AVA	8,728	8,685
	BPAT	AVRN	4,651	4,616
	BPAT	BANC	0	0
	BPAT	CISO	5,518	14,948
	BPAT	IPCO	6,182	4,966
	BPAT	LADWP	0	0
	BPAT	NEVP	0	0
	BPAT	NWMT	8,188	3,329
	BPAT	PACW	4,227	2,744
	BPAT	PGE	14,002	11,239
	BPAT	PSEI	13,757	13,923
	BPAT	PWRX	7,256	0
	BPAT	SCL	6,669	2,989
	BPAT	TPWR	11,856	11,035
	CISO	AVA	0	0
	CISO	AZPS	58,530	59,080
	CISO	BANC	136,095	138,197
	CISO	BPAT	11,841	29,807
	CISO	LADWP	44,092	39,841
	CISO	NEVP	57,613	49,580
	CISO	PACW	16,154	49,803
	CISO	PGE	38,649	54,708
	CISO	PWRX	363,579	384,967
	CISO	SRP	77,368	80,011
November	CISO	TEPC	0	0
	CISO	TIDC	4,871	5,173
	CISO	WALC	15,880	16,642
	EPE	AZPS	1,442	0
	EPE	PNM	32,209	30,923
	EPE	TEPC	3,186	2,662

	IPCO	AVA	21,369	17,401
	IPCO	BPAT	18,290	13,155
November	IPCO	NEVP	13,992	13,325
	IPCO	NWMT	615	1,037
	IPCO	PACE	10,694	7,606
	IPCO	PACW	18,468	13,297
	IPCO	PSEI	4,592	3,550
	IPCO	SCL	9,935	7,555
	LADWP	AZPS	825	971
	LADWP	BPAT	0	0
	LADWP	CISO	25,722	27,211
	LADWP	NEVP	10,588	8,221
	LADWP	PACE	18,332	15,784
	LADWP	TEPC	0	0
	LADWP	WALC	2,269	297
	NEVP	AZPS	0	0
	NEVP	BPAT	0	0
	NEVP	CISO	48,688	45,280
	NEVP	IPCO	64,145	54,840
	NEVP	LADWP	30,104	29,510
	NEVP	PACE	49,667	40,865
	NEVP	WALC	7,385	7,265
	NWMT	AVA	29,190	25,460
	NWMT	BPAT	8,263	4,272
	NWMT	IPCO	10,958	11,493
	NWMT	PACE	16,574	13,148
November	NWMT	PACW	39	0
	NWMT	PGE	3	0
	NWMT	PSEI	85	0
	NWMT	TPWR	0	0
	PACE	AZPS	42,146	45,273
	PACE	IPCO	75,460	66,315

	PACE	LADWP	32,536	37,106
	PACE	NEVP	20,278	24,230
November	PACE	NWMT	15,283	12,925
	PACE	PACW	34,367	26,401
	PACE	SRP	0	0
	PACE	TEPC	0	0
	PACW	AVA	5,750	7,295
	PACW	AVRN	11,368	15,709
	PACW	BPAT	7,679	4,768
	PACW	CISO	41,534	59,373
	PACW	IPCO	15,275	20,561
	PACW	NWMT	12	0
	PACW	PGE	26,556	22,865
	PACW	PSEI	32,399	35,208
	PACW	SCL	1,149	941
	PGE	AVA	0	0
	PGE	AVRN	2,799	3,958
	PGE	BPAT	19,808	18,185
	PGE	CISO	17,577	15,959
	PGE	NWMT	24	0
	PGE	PACW	16,127	18,358
	PGE	PSEI	0	0
	PGE	SCL	1,178	1,081
	PGE	TPWR	0	0
	PNM	AZPS	81,109	83,856
	PNM	EPE	14,965	10,283
November	PNM	SRP	5,492	4,584
	PNM	TEPC	5,556	5,406
	PSEI	AVA	0	0
	PSEI	BPAT	7,855	6,041
	PSEI	IPCO	0	0
	PSEI	NWMT	74	0

	PSEI	PACW	9,302	10,016
	PSEI	PGE	3	2
November	PSEI	PWRX	31,805	30,994
	PSEI	SCL	14,189	13,281
	PSEI	TPWR	11,012	11,677
	PWRX	BPAT	5,793	0
	PWRX	CISO	0	0
	PWRX	PSEI	1,027	1,302
	SCL	AVA	0	0
	SCL	AVRN	1,150	2,022
	SCL	BPAT	1,906	1,943
	SCL	IPCO	3,797	5,296
	SCL	PACW	263	376
	SCL	PGE	439	641
	SCL	PSEI	4,299	7,288
	SRP	AZPS	6,675	7,296
	SRP	CISO	173,236	169,786
	SRP	PACE	0	0
	SRP	PNM	755	393
	SRP	TEPC	5,447	2,842
	SRP	WALC	9,306	5,988
	TEPC	AZPS	657	0
November	TEPC	CISO	1,172	1,237
	TEPC	EPE	3,811	2,198
	TEPC	LADWP	0	0
	TEPC	PACE	29	2
	TEPC	PNM	9,696	4,654
	TEPC	SRP	16,724	14,816
	TEPC	WALC	87,141	86,036
	TIDC	BANC	11,679	11,250
	TIDC	CISO	883	884
	TPWR	AVA	0	0

	TPWR	BPAT	6,448	6,758
	TPWR	NWMT	0	0
	TPWR	PGE	0	0
	TPWR	PSEI	6,780	6,471
	WALC	AZPS	6,198	1,484
	WALC	CISO	50,439	53,095
	WALC	LADWP	11,960	10,048
	WALC	NEVP	24,198	21,177
	WALC	SRP	2,754	2,145
	WALC	TEPC	14,796	15,098
December	AVA	AVRN	2,443	2,749
	AVA	BPAT	9,652	8,367
	AVA	CISO	0	0
	AVA	IPCO	10,211	11,365
	AVA	NWMT	4,544	5,783
	AVA	PACW	1,655	2,074
	AVA	PGE	0	0
	AVA	PSEI	4	0
	AVA	SCL	0	0
	AVA	TPWR	0	0
	AVRN	AVA	3,490	3,014
	AVRN	BPAT	25,281	23,418
	AVRN	PACW	26,067	29,860
	AVRN	PGE	11,239	8,981
	AVRN	SCL	6,475	4,538
	AZPS	CISO	132,047	113,569
December	AZPS	EPE	503	0
	AZPS	LADWP	23,841	25,646
	AZPS	NEVP	0	0
	AZPS	PACE	41,150	41,958
	AZPS	PNM	10,183	6,197
	AZPS	SRP	10,029	10,621

	AZPS	TEPC	346	63
	AZPS	WALC	6,210	6,020
December	BANC	BPAT	0	0
	BANC	CISO	11,099	11,016
	BANC	TIDC	308	244
	BPAT	AVA	5,740	4,442
	BPAT	AVRN	3,964	3,709
	BPAT	BANC	0	0
	BPAT	CISO	5,681	14,425
	BPAT	IPCO	5,828	3,164
	BPAT	LADWP	0	0
	BPAT	NEVP	0	0
	BPAT	NWMT	6,355	2,449
	BPAT	PACW	2,783	1,105
	BPAT	PGE	9,672	9,287
	BPAT	PSEI	27,752	28,730
	BPAT	PWRX	3,784	0
	BPAT	SCL	3,283	2,436
	BPAT	TPWR	6,915	7,017
	CISO	AVA	0	0
	CISO	AZPS	11,795	11,722
	CISO	BANC	90,180	94,319
	CISO	BPAT	14,897	33,313
	CISO	LADWP	27,943	29,742
	CISO	NEVP	14,208	12,841
	CISO	PACW	25,083	46,359
December	CISO	PGE	26,984	36,344
	CISO	PWRX	394,392	425,776
	CISO	SRP	47,414	45,507
	CISO	TEPC	0	0
	CISO	TIDC	3,480	4,309
	CISO	WALC	10,225	9,614

	EPE	AZPS	529	0
	EPE	PNM	22,715	24,465
December	EPE	TEPC	21,832	23,756
	IPCO	AVA	19,458	14,955
	IPCO	BPAT	8,390	7,364
	IPCO	NEVP	20,423	17,778
	IPCO	NWMT	1,180	1,391
	IPCO	PACE	16,764	12,638
	IPCO	PACW	16,650	11,517
	IPCO	PSEI	175	212
	IPCO	SCL	8,458	7,150
	LADWP	AZPS	1,065	887
	LADWP	BPAT	0	0
	LADWP	CISO	55,604	50,242
	LADWP	NEVP	8,570	10,494
	LADWP	PACE	20,394	19,297
	LADWP	TEPC	0	0
	LADWP	WALC	3,294	645
	NEVP	AZPS	0	0
	NEVP	BPAT	0	0
	NEVP	CISO	77,644	67,694
	NEVP	IPCO	53,463	46,524
	NEVP	LADWP	28,792	26,584
	NEVP	PACE	45,130	35,513
	NEVP	WALC	18,527	15,524
	NWMT	AVA	21,924	20,262
December	NWMT	BPAT	9,717	7,215
	NWMT	IPCO	7,692	8,118
	NWMT	PACE	18,138	17,115
	NWMT	PACW	24	0
	NWMT	PGE	7	0
	NWMT	PSEI	34	0

	NWMT	TPWR	0	0
	PACE	AZPS	24,542	27,212
December	PACE	IPCO	68,885	59,686
	PACE	LADWP	38,155	34,778
	PACE	NEVP	24,613	27,771
	PACE	NWMT	16,291	17,367
	PACE	PACW	27,249	22,274
	PACE	SRP	0	0
	PACE	TEPC	0	0
	PACW	AVA	4,649	5,342
	PACW	AVRN	10,539	14,653
	PACW	BPAT	8,303	5,089
	PACW	CISO	37,699	62,804
	PACW	IPCO	31,406	27,723
	PACW	NWMT	2	0
	PACW	PGE	26,635	22,083
	PACW	PSEI	47,832	45,760
	PACW	SCL	1,226	918
	PGE	AVA	0	0
	PGE	AVRN	2,832	3,719
	PGE	BPAT	21,113	22,162
	PGE	CISO	28,416	28,111
	PGE	NWMT	9	0
	PGE	PACW	10,654	12,966
	PGE	PSEI	3	0
	PGE	SCL	1,244	1,114
December	PGE	TPWR	0	0
	PNM	AZPS	65,028	74,743
	PNM	EPE	17,835	12,783
	PNM	SRP	0	0
	PNM	TEPC	4,621	6,372
	PSEI	AVA	0	0

	PSEI	BPAT	12,149	14,628
	PSEI	IPCO	0	0
December	PSEI	NWMT	30	0
	PSEI	PACW	5,718	7,964
	PSEI	PGE	0	0
	PSEI	PWRX	34,262	32,472
	PSEI	SCL	7,085	5,956
	PSEI	TPWR	3,965	4,203
	PWRX	BPAT	6,371	0
	PWRX	CISO	0	0
	PWRX	PSEI	1,003	2,695
	SCL	AVA	0	0
	SCL	AVRN	1,008	1,908
	SCL	BPAT	1,088	1,257
	SCL	IPCO	3,208	4,182
	SCL	PACW	185	304
	SCL	PGE	544	723
	SCL	PSEI	4,598	7,067
	SRP	AZPS	6,728	10,509
	SRP	CISO	246,623	235,618
	SRP	PACE	0	0
	SRP	PNM	994	774
	SRP	TEPC	5,266	4,209
	SRP	WALC	9,025	12,415
	TEPC	AZPS	571	0
	TEPC	CISO	1,163	905
December	TEPC	EPE	12,615	8,494
	TEPC	LADWP	0	0
	TEPC	PACE	44	9
	TEPC	PNM	8,168	5,962
	TEPC	SRP	9,025	6,917
	TEPC	WALC	104,056	98,352

December	TIDC	BANC	10,617	10,231
	TIDC	CISO	5,012	4,760
	TPWR	AVA	0	0
	TPWR	BPAT	2,114	2,758
	TPWR	NWMT	0	0
	TPWR	PGE	0	0
	TPWR	PSEI	9,458	8,675
	WALC	AZPS	4,263	2,374
	WALC	CISO	70,714	67,492
	WALC	LADWP	14,513	15,071
	WALC	NEVP	21,076	26,763
	WALC	SRP	3,941	3,393
	WALC	TEPC	11,910	11,492

APPENDIX 3: Minimum & Maximum Flexible Ramping Requirements

Month	BAA	Direction	Minimum requirement	Maximum requirement
October	*AVA*	up	0	100
	AVRN	up	0	378
	AZPS	up	0	392
	BANC	up	0	107
	BPAT	up	9	445
	CISO	up	0	2,409
	EPE	up	0	111
	IPCO	up	0	225
	LADWP	up	0	428
	NEVP	up	0	860
	NWMT	up	0	114
	PACE	up	18	661
	PACW	up	0	131
	PGE	up	0	219
	PNM	up	0	219
	PSEI	up	0	238
	PWRX	up	0	281
	SCL	up	0	279
	SRP	up	0	233
	TEPC	up	0	186
	TIDC	up	2	16
	TPWR	up	0	15
	WALC	up	0	50
	ALL EIM	**up**	**0**	**3,659**
	AVA	down	0	132
	AVRN	down	0	332
	AZPS	down	23	395
	BANC	down	0	158
October	*BPAT*	down	0	539
	CISO	down	0	1,983
	EPE	down	0	112
	IPCO	down	0	237

	LADWP	down	0	391
	NEVP	down	0	643
	NWMT	down	0	156
	PACE	down	0	855
	PACW	down	0	200
	PGE	down	0	278
	PNM	down	0	282
	PSEI	down	0	290
	PWRX	down	32	263
	SCL	down	1	28
	SRP	down	0	220
	TEPC	down	0	179
	TIDC	down	1	21
	TPWR	down	0	218
	WALC	down	0	54
	ALL EIM	**down**	**0**	**3,300**
November	*AVA*	up	0	100
	AVRN	up	0	378
	AZPS	up	0	392
	BANC	up	0	101
	BPAT	up	0	371
	CISO	up	0	2,875
	EPE	up	0	111
	IPCO	up	0	206
	LADWP	up	0	428
	NEVP	up	0	817
	NWMT	up	0	111
	PACE	up	0	690
	PACW	up	0	140
	PGE	up	0	219
	PNM	up	0	204
	PSEI	up	0	281
	PWRX	up	0	244
	SCL	up	0	29
	SRP	up	0	218
	TEPC	up	0	181

	TIDC	up	2	16
	TPWR	up	0	14
November	*WALC*	up	0	50
	ALL WEIM	**up**	**0**	**4,314**
	AVA	down	0	132
	AVRN	down	0	332
	AZPS	down	0	376
	BANC	down	0	122
	BPAT	down	0	515
	CISO	down	0	1,635
	EPE	down	0	112
	IPCO	down	0	219
	LADWP	down	0	338
	NEVP	down	0	610
	NWMT	down	0	146
	PACE	down	0	855
	PACW	down	0	214
	PGE	down	0	261
	PNM	down	0	282
	PSEI	down	0	290
	PWRX	down	0	256
	SCL	down	0	27
November	*SRP*	down	0	210
	TEPC	down	0	179
	TIDC	down	0	17
	TPWR	down	0	17
	WALC	down	0	59
	ALL EIM	**down**	**0**	**2,353**
	AVA	up	0	100
December	*AVRN*	up	0	378
	AZPS	up	0	392
	BANC	up	0	96
	BPAT	up	0	474
	CISO	up	48	2,720
	EPE	up	1	91

December	*IPCO*	up	0	192
	LADWP	up	0	336
	NEVP	up	15	669
	NWMT	up	0	111
	PACE	up	0	706
	PACW	up	0	146
	PGE	up	7	219
	PNM	up	16	201
	PSEI	up	34	264
	PWRX	up	0	329
	SCL	up	0	34
	SRP	up	0	242
	TEPC	up	1	171
	TIDC	up	0	17
	TPWR	up	0	22
	WALC	up	5	53
	ALL WEIM	**up**	**302**	**3,584**
	AVA	down	0	132
	AVRN	down	0	349
	AZPS	down	0	395
	BANC	down	6	117
	BPAT	down	0	484
	CISO	down	0	2,403
	EPE	down	0	79
	IPCO	down	0	219
	LADWP	down	0	338
	NEVP	down	0	565
	NWMT	down	0	148
	PACE	down	0	812
	PACW	down	0	214
December	*PGE*	down	3	297
	PNM	down	0	241
	PSEI	down	0	282
	PWRX	down	0	274
	SCL	down	0	39
	SRP	down	0	258

	TEPC	down	0	179
	TIDC	down	0	15
	TPWR	down	0	25
	WALC	down	0	59
	ALL WEIM	**down**	**0**	**2,844**