



# WESTERN ENERGY IMBALANCE MARKET BENEFITS REPORT

**Third Quarter 2024** ■ ■ ■

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## EXECUTIVE SUMMARY

Gross benefits from WEIM since November 2014

**\$6.25 billion**

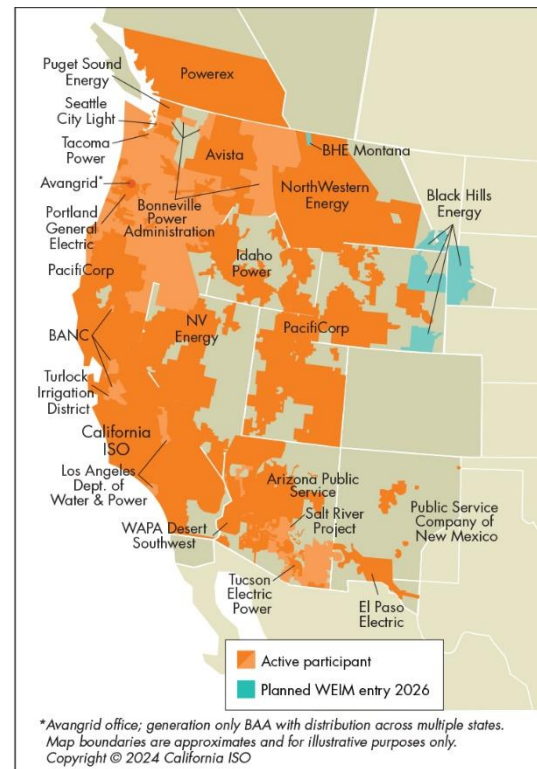
This report presents the benefits associated with participation in the Western Energy Imbalance Market (WEIM).

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.

## Q3 2024 Gross Benefits by Participant (entry year)

(\$ millions)

Arizona Public Service (2016)	\$14.68
AVANGRID (2023)	\$10.02
Avista (2022)	\$3.16
Balancing Authority of Northern California (2019)	\$48.78
Bonneville Power Administration (2022)	\$8.90
California ISO (2014)	\$10.65
El Paso Electric (2023)	\$5.48
Idaho Power Company (2018)	\$7.89
Los Angeles Dept. of Water & Power (2021)	\$29.25
NV Energy (2015)	\$67.57
NorthWestern Energy (2021)	\$18.51
PacifiCorp (2014)	\$44.66
Portland General Electric (2017)	\$10.14
Public Service Company New Mexico (2021)	\$14.97
Puget Sound Energy (2016)	\$15.14
Powerex (2018)	\$5.97
Seattle City Light (2020)	\$16.32
Salt River Project (2020)	\$13.25
Tacoma Power (2022)	\$10.33
Tucson Electric Power (2022)	\$9.46
Turlock Irrigation District (2021)	\$1.93
WAPA Desert Southwest Region (2023)	\$27.82
<b>Total</b>	<b>\$394.88</b>



## 2024 Q3 BENEFITS

## ECONOMICAL

**\$394.88 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

**22,705**

Metric tons of CO<sub>2</sub>\*\* avoided curtailments

## OPERATIONAL

**61%**

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.westemeim.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>

\*\*\* In this report, California ISO is the balancing area and not a market participant. The benefits estimated for the California ISO balancing area in this report are realized to its market participants instead of the California ISO Corporation.

## ■ 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 Q3 2024

Table 2 shows the estimated WEIM gross benefits by each region per month<sup>1</sup>. The monthly savings presented show \$143.79 million for July, \$123.60 million for August and \$127.49 million for September with a total estimated benefit of \$394.88 million for this quarter<sup>2</sup>. This level of WEIM benefits accrued from having additional WEIM areas participating in the market and economical transfers displacing more expensive generation.

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<sup>1</sup> 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.

<sup>2</sup> 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.

<i>Region</i>	July	August	September	Total
<i>APS</i>	\$7.79	\$3.80	\$3.09	\$14.68
<i>AVRN</i>	\$4.45	\$3.31	\$2.26	\$10.02
<i>AVA</i>	\$1.27	\$0.97	\$0.92	\$3.16
<i>BANC</i>	\$21.37	\$13.11	\$14.30	\$48.78
<i>BPA</i>	\$3.81	\$1.93	\$3.16	\$8.90
<i>CISO</i>	\$0.02	\$4.42	\$6.21	\$10.65
<i>EPE</i>	\$2.34	\$1.55	\$1.59	\$5.48
<i>IPCO</i>	\$3.53	\$2.11	\$2.25	\$7.89
<i>LADWP</i>	\$6.01	\$10.16	\$13.08	\$29.25
<i>NVE</i>	\$15.54	\$24.62	\$27.41	\$67.57
<i>NWMT</i>	\$7.58	\$6.10	\$4.83	\$18.51
<i>PAC</i>	\$18.09	\$14.00	\$12.57	\$44.66
<i>PGE</i>	\$3.22	\$3.34	\$3.58	\$10.14
<i>PNM</i>	\$4.59	\$4.99	\$5.39	\$14.97
<i>PSE</i>	\$5.71	\$4.73	\$4.70	\$15.14
<i>PWRX</i>	\$3.94	\$1.12	\$0.91	\$5.97
<i>SCL</i>	\$5.42	\$3.96	\$6.94	\$16.32
<i>SRP</i>	\$5.43	\$3.51	\$4.31	\$13.25
<i>TPWR</i>	\$5.89	\$3.46	\$0.98	\$10.33
<i>TEP</i>	\$4.11	\$3.04	\$2.31	\$9.46
<i>TID</i>	\$0.71	\$1.01	\$0.21	\$1.93
<i>WALC</i>	\$12.97	\$8.36	\$6.49	\$27.82
<b>Total</b>	\$143.79	\$123.60	\$127.49	\$394.88

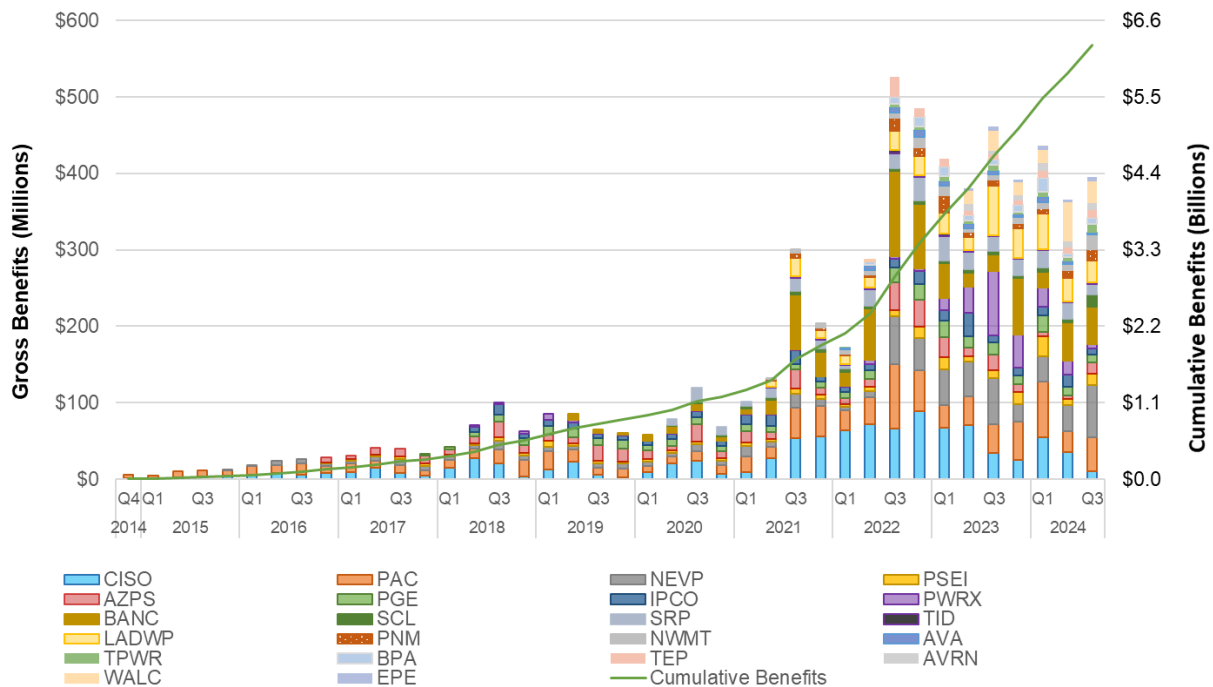
TABLE 1: Q3 2024 benefits in millions USD

## CUMULATIVE ECONOMIC BENEFITS SINCE INCEPTION

Since the start of the WEIM in November 2014, the cumulative economic benefits of the market have totaled \$6.25 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.<sup>3</sup>

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

<sup>3</sup> 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).

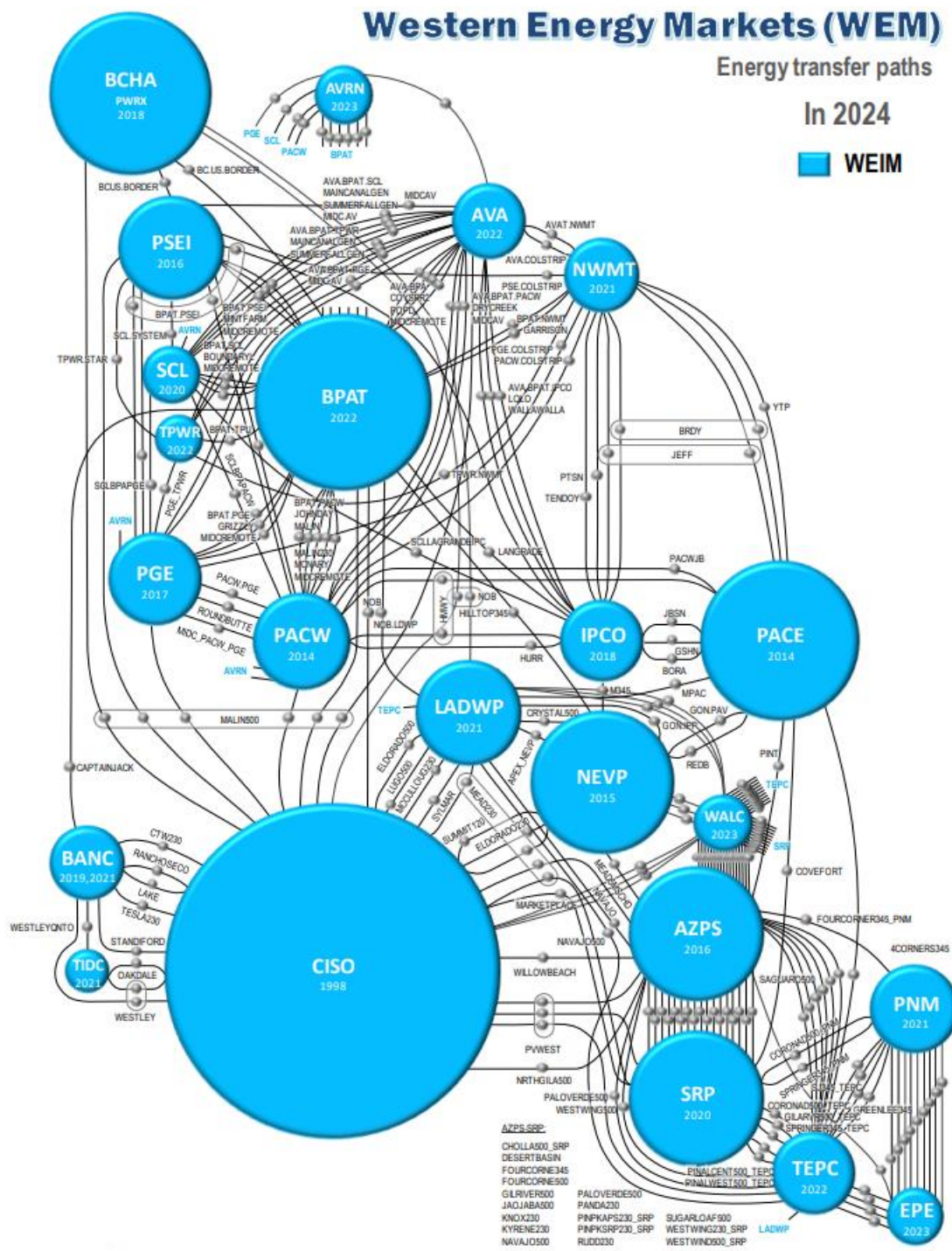
Generally, transfer limits are based on transmission and interchange rights that participating balancing authority areas make available to the WEIM, with the exception of the PacifiCorp West (PACW) -ISO transfer limit and the Portland General Electric (PGE) -ISO transfer limit in RTD. These RTD transfer 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. Graph 2 illustrates the WEIM ETSR (Energy Transfer System Resource).

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.

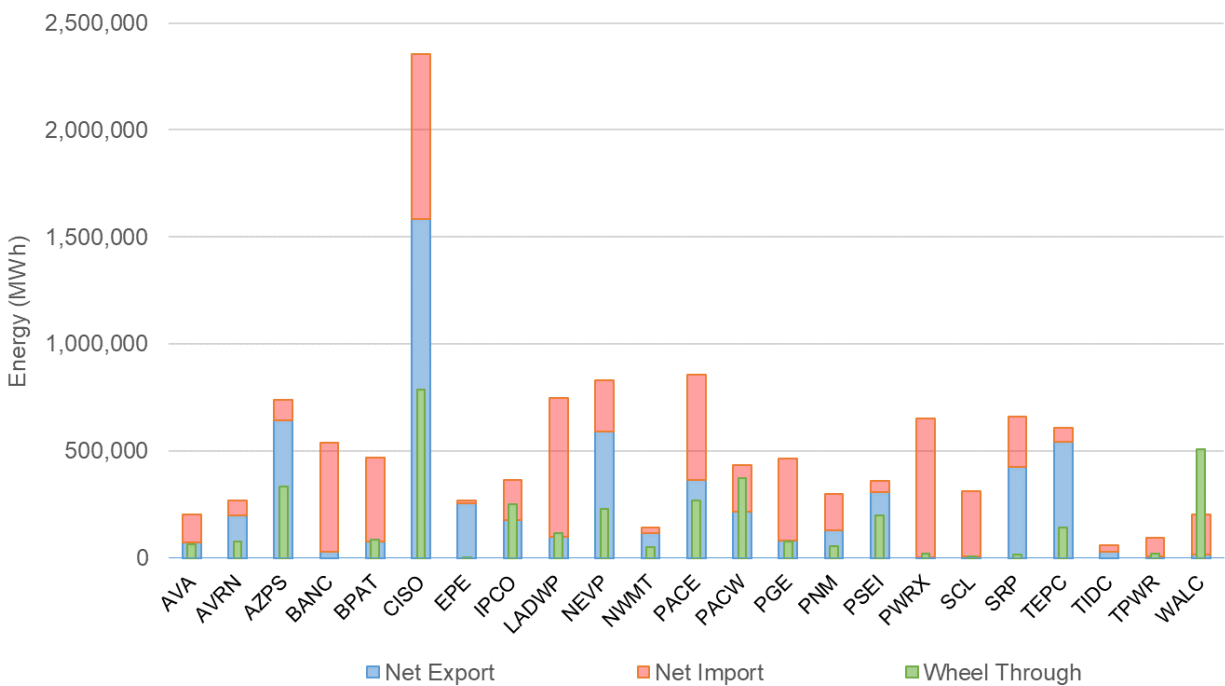
The metric is measured as energy in MWh for each month and the corresponding calendar quarter, as shown in Tables 3 through 6 and Graphs 3 through 6.

BAA	Net Export	Net Import	Wheel Through
AVA	72,941	131,902	61,934
AVRN	200,225	67,546	75,571
AZPS	641,517	97,614	335,313
BANC	27,530	510,424	-
BPAT	77,357	389,345	86,237
CISO	1,583,522	769,893	788,815
EPE	255,817	14,645	318
IPCO	174,951	190,167	251,225
LADWP	96,761	649,509	118,184



NEVP	592,148	237,427	229,444
NWMT	117,248	22,767	52,755
PACE	364,437	491,922	269,192
PACW	215,643	220,365	371,253
PGE	79,110	383,785	76,983
PNM	127,403	171,466	56,110
PSEI	308,369	49,580	200,448
PWRX	1,746	651,754	18,879
SCL	5,991	306,837	6,905
SRP	426,175	234,820	14,623
TEPC	543,516	65,843	143,024
TIDC	29,296	31,347	-
TPWR	7,618	88,247	20,773
WALC	14,870	187,036	509,067

TABLE 2: Estimated wheel-through transfers in Q3 2024

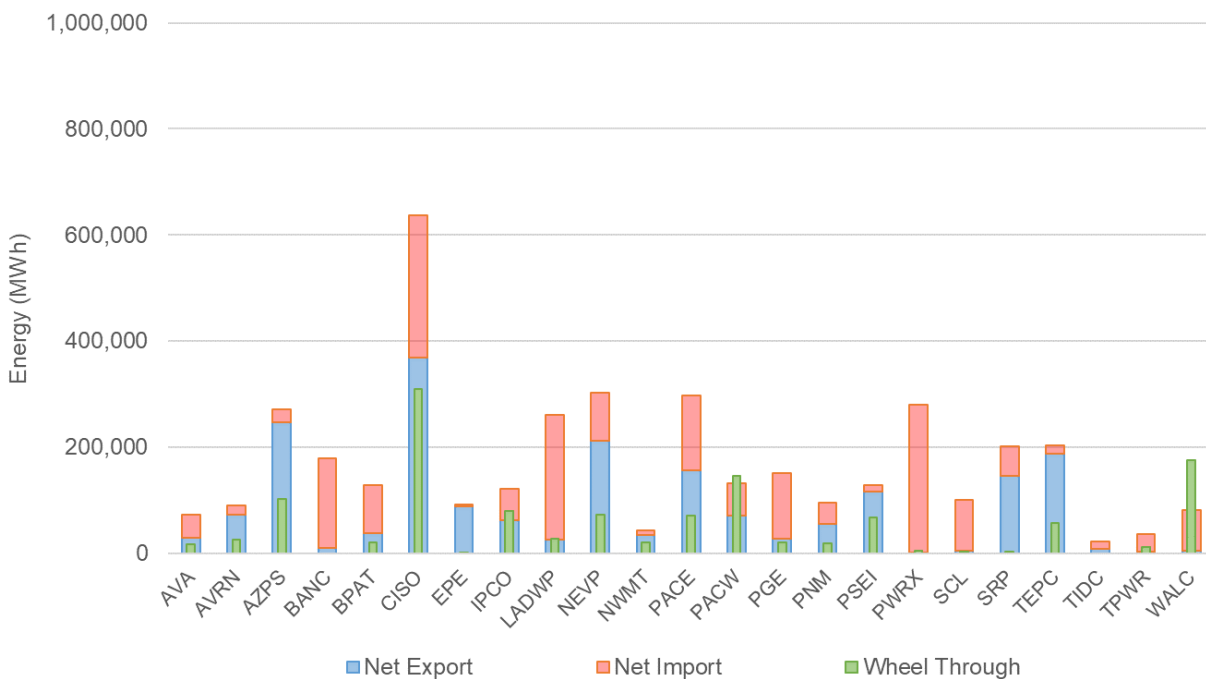


GRAPH 3: Estimated wheel-through transfers in Q3 2024

BAA	Net Export	Net Import	Wheel Through
AVA	29,463	42,595	17,382
AVRN	72,042	18,166	25,851
AZPS	247,102	24,078	101,962
BANC	10,458	168,363	-
BPAT	37,497	91,406	19,454

CISO	369,386	267,907	308,518
EPE	88,023	4,310	215
IPCO	61,717	59,749	79,808
LADWP	25,596	234,731	27,232
NEVP	212,243	90,061	71,957
NWMT	33,498	9,599	20,969
PACE	155,457	142,233	71,159
PACW	70,856	60,948	145,573
PGE	26,253	123,880	19,499
PNM	54,301	41,204	18,576
PSEI	115,191	12,289	67,604
PWRX	702	279,302	4,471
SCL	3,716	96,446	2,122
SRP	146,152	55,086	2,823
TEPC	187,290	15,777	55,906
TIDC	8,026	14,086	-
TPWR	1,904	33,437	10,565
WALC	4,687	75,906	175,774

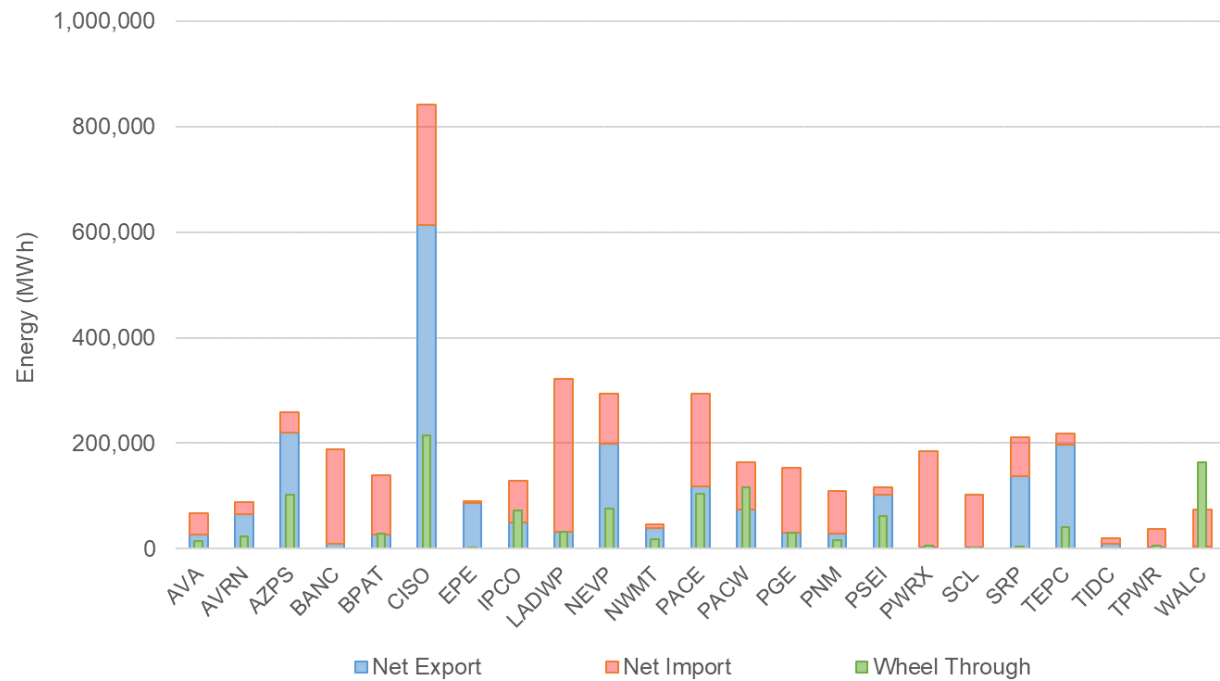
TABLE 3: Estimated wheel-through transfers in July 2024



GRAPH 4: Estimated wheel-through transfers in July 2024

BAA	Net Export	Net Import	Wheel Through
AVA	27,854	40,337	14,195
AVRN	65,732	23,003	23,184
AZPS	219,500	39,373	102,969
BANC	8,999	179,437	-
BPAT	27,828	110,748	28,426
CISO	612,517	228,518	215,261
EPE	87,249	3,025	98
IPCO	49,910	78,463	72,070
LADWP	32,474	288,670	32,945
NEVP	198,269	95,385	76,877
NWMT	39,325	7,243	17,894
PACE	118,324	174,815	104,477
PACW	74,038	89,144	117,254
PGE	30,423	123,148	30,056
PNM	28,347	81,207	17,322
PSEI	102,396	14,869	61,581
PWRX	477	184,301	5,469
SCL	1,186	101,857	1,881
SRP	136,838	73,810	4,138
TEPC	198,054	20,639	40,658
TIDC	10,134	10,499	-
TPWR	1,563	36,782	5,690
WALC	4,110	70,325	164,511

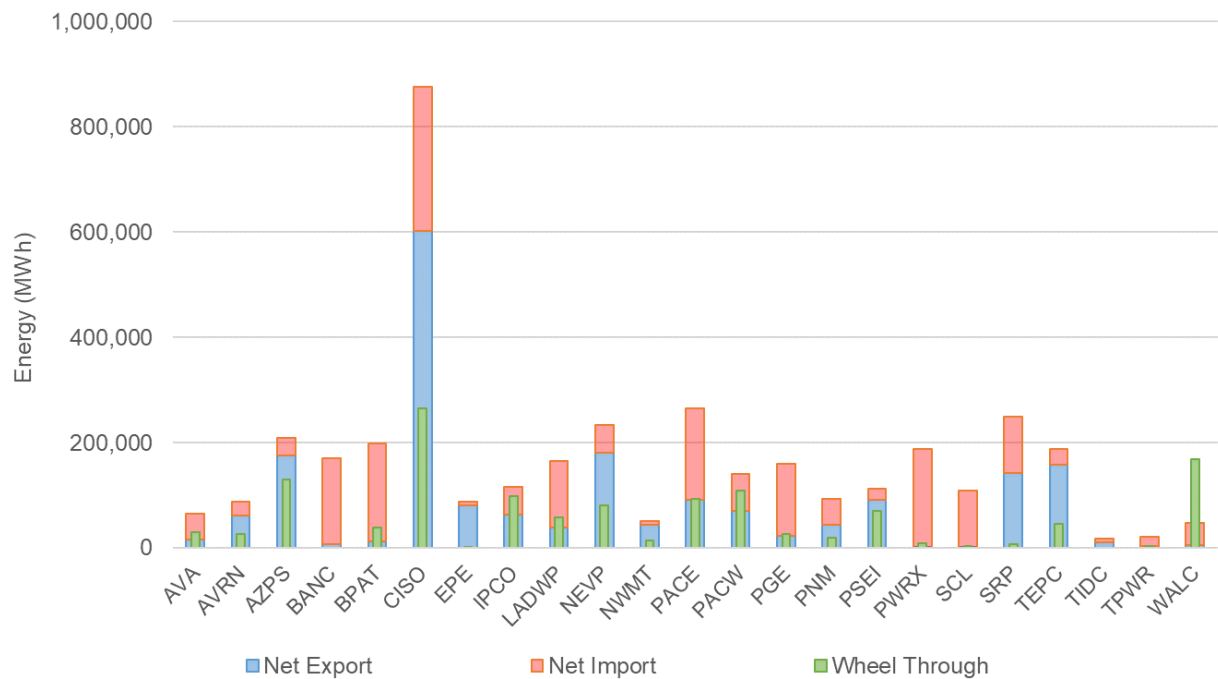
TABLE 4: Estimated wheel-through transfers in August 2024



**GRAPH 5: Estimated wheel-through transfers in August 2024**

BAA	Net Export	Net Import	Wheel Through
AVA	15,624	48,970	30,358
AVRN	62,452	26,377	26,536
AZPS	174,914	34,163	130,382
BANC	8,073	162,625	-
BPAT	12,031	187,191	38,356
CISO	601,620	273,468	265,036
EPE	80,545	7,310	5
IPCO	63,324	51,954	99,347
LADWP	38,691	126,108	58,008
NEVP	181,637	51,981	80,609
NWMT	44,424	5,925	13,891
PACE	90,656	174,874	93,557
PACW	70,749	70,273	108,426
PGE	22,434	136,757	27,428
PNM	44,755	49,055	20,212
PSEI	90,781	22,422	71,262
PWRX	568	188,151	8,940
SCL	1,089	108,534	2,901
SRP	143,186	105,924	7,663
TEPC	158,172	29,428	46,460
TIDC	11,136	6,762	-
TPWR	4,151	18,028	4,518
WALC	6,074	40,806	168,782

TABLE 5: Estimated wheel-through transfers in September 2024



GRAPH 6: Estimated wheel-through transfers in September 2024

■ 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 Q3 2024 was calculated to be 13,805 MWh (July) + 21,387 MWh (August) + 17,857 MWh (September) = 53,049 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<sub>2</sub>/MWh, avoided curtailments displaced an estimated 22,705 metric tons of CO<sub>2</sub> for Q3 2024. 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<sub>2</sub>, are shown in Table 6.

Year	Quarter	MWh	Eq. Tons CO <sub>2</sub>
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<b>2015</b>	1	8,860	3,792
	2	3,629	1,553
	3	828	354
	4	17,765	7,521
<b>2016</b>	1	112,948	48,342
	2	158,806	67,969
	3	33,094	14,164
	4	23,390	10,011
<b>2017</b>	1	52,651	22,535
	2	67,055	28,700
	3	23,331	9,986
	4	18,060	7,730
<b>2018</b>	1	65,860	28,188
	2	129,128	55,267
	3	19,032	8,146
	4	23,425	10,026
<b>2019</b>	1	52,254	22,365
	2	132,937	56,897
	3	33,843	14,485
	4	35,254	15,089
<b>2020</b>	1	86,740	37,125
	2	147,514	63,136
	3	37,548	16,071
	4	39,956	17,101
<b>2021</b>	1	76,147	32,591
	2	109,059	46,677
	3	23,042	9,862
	4	38,044	16,283
<b>2022</b>	1	94,168	40,304
	2	118,352	50,655
	3	42,468	18,176
	4	25,609	10,960
<b>2023</b>	1	53,002	22,685
	2	148,938	63,745
	3	60,113	25,728
	4	49,880	21,349



<b>2024</b>	<b>1</b>	60,285	25,802
	<b>2</b>	130,656	55,921
	<b>3</b>	53,049	22,705
<b>Total</b>		2,406,720	1,029,996

**TABLE 6: Total reduction in curtailment of renewable energy and associated reductions in CO<sub>2</sub>**

## ■ 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.

	<b>July</b>		<b>August</b>		<b>September</b>	
<i>Direction</i>	Up	Down	Up	Down	Up	Down
<i>Average MW saving</i>	2,076	2,352	2,040	2,287	2,047	2,098
<i>Sum of BAA requirements</i>	3,661	3,661	3,666	3,532	3,626	3,140
<i>Percentage savings</i>	57%	64%	56%	65%	56%	67%

**Table 7: Flexible ramping procurement diversity savings in Q3 2024**

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 1,029,996 metric tons of CO<sub>2</sub>, roughly the equivalent of avoiding the emissions from 216,552 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)
July	AVA	AVRN	4,993	6,140
	AVA	BPAT	10,248	7,773
	AVA	CISO	0	0
	AVA	IPCO	15,960	19,241
	AVA	NWMT	6,701	9,518
	AVA	PACW	3,961	4,172
	AVA	PGE	0	0
	AVA	PSEI	40	0
	AVA	SCL	7	0
	AVA	TPWR	0	0
	AVRN	AVA	4,198	3,510
	AVRN	BPAT	44,539	43,566
	AVRN	PACW	33,895	30,668
	AVRN	PGE	16,208	13,241
	AVRN	SCL	8,758	6,907
	AZPS	CISO	200,118	158,672
	AZPS	EPE	899	0
	AZPS	LADWP	51,435	50,657
	AZPS	NEVP	0	0
	AZPS	PACE	119,048	104,451
	AZPS	PNM	6,932	14,876
	AZPS	SRP	11,837	10,594
	AZPS	TEPC	1,581	421
	AZPS	WALC	9,683	9,393
	BANC	BPAT	0	0
	BANC	CISO	12,899	10,454
	BANC	TIDC	193	4
	BPAT	AVA	4,314	2,905

July	BPAT	AVRN	6,081	3,953
	BPAT	BANC	0	0
	BPAT	CISO	9,183	12,913
	BPAT	IPCO	1,888	1,060
	BPAT	LADWP	0	0
	BPAT	NEVP	0	0
	BPAT	NWMT	6,378	1,820
	BPAT	PACW	3,934	2,569
	BPAT	PGE	11,044	10,669
	BPAT	PSEI	4,573	4,514
	BPAT	PWRX	8,667	0
	BPAT	SCL	8,653	5,922
	BPAT	TPWR	12,572	10,627
	CISO	AVA	0	0
	CISO	AZPS	17,909	19,265
	CISO	BANC	155,495	168,362
	CISO	BPAT	3,559	8,501
	CISO	LADWP	38,431	46,028
	CISO	NEVP	33,641	44,798
	CISO	PACW	5,389	35,031
	CISO	PGE	26,401	40,834
	CISO	PSEI	97,123	2,297
	CISO	PWRX	229,840	256,016
July	CISO	SRP	26,888	28,781
	CISO	TEPC	0	0
	CISO	TIDC	13,194	14,082
	CISO	WALC	8,582	13,909
	EPE	AZPS	1,613	0
	EPE	PNM	33,995	31,537
	EPE	TEPC	62,488	56,701
	IPCO	AVA	23,977	22,584
	IPCO	BPAT	1,054	776

July	IPCO	NEVP	39,822	37,030
	IPCO	NWMT	644	1,936
	IPCO	PACE	18,263	17,094
	IPCO	PACW	54,392	47,279
	IPCO	PSEI	14,314	14,825
	IPCO	SCL	0	0
	LADWP	AZPS	142	513
	LADWP	BPAT	0	0
	LADWP	CISO	39,936	40,122
	LADWP	NEVP	10,801	10,391
	LADWP	PACE	3,230	1,313
	LADWP	TEPC	0	0
	LADWP	WALC	1,471	489
	NEVP	AZPS	0	0
	NEVP	BPAT	0	0
July	NEVP	CISO	86,519	71,791
	NEVP	IPCO	70,463	62,128
	NEVP	LADWP	72,123	69,106
	NEVP	PACE	85,935	71,404
	NEVP	WALC	8,781	9,772
	NWMT	AVA	35,186	26,751
	NWMT	BPAT	3,920	1,399
	NWMT	IPCO	7,190	7,189
	NWMT	PACE	20,687	19,129
	NWMT	PACW	56	0
	NWMT	PGE	263	0
	NWMT	PSEI	231	0
	NWMT	TPWR	0	0
	PACE	AZPS	35,897	31,025
	PACE	IPCO	35,999	32,501
	PACE	LADWP	70,208	68,601
	PACE	NEVP	18,568	20,847



July	PACE	NWMT	16,816	17,294
	PACE	PACW	62,735	56,347
	PACE	SRP	0	0
	PACE	TEPC	7	0
	PACW	AVA	4,261	4,227
	PACW	AVRN	15,960	30,327
	PACW	BPAT	7,223	3,664
	PACW	CISO	16,034	38,076
	PACW	IPCO	18,766	15,034
	PACW	NWMT	0	0
	PACW	PGE	80,092	76,120
	PACW	PSEI	49,653	47,013
	PACW	SCL	2,241	1,969
	PGE	AVA	0	0
	PGE	AVRN	1,395	2,341
	PGE	BPAT	25,998	22,852
	PGE	CISO	7,296	7,048
	PGE	NWMT	326	0
	PGE	PACW	11,069	11,881
July	PGE	PSEI	491	374
	PGE	SCL	1,426	1,256
	PGE	TPWR	0	0
	PNM	AZPS	81,875	65,238
	PNM	EPE	1,132	1,360
	PNM	SRP	2,729	2,361
	PNM	TEPC	8,680	3,918
	PSEI	AVA	0	0
	PSEI	BPAT	16,061	11,884
	PSEI	CISO	17,727	4,678
	PSEI	IPCO	2,981	2,404
	PSEI	NWMT	188	0
	PSEI	PACW	10,936	18,347

July	PSEI	PGE	1,355	1,835
	PSEI	PWRX	29,584	27,757
	PSEI	SCL	87,296	82,515
	PSEI	TPWR	31,068	33,375
	PWRX	BPAT	4,241	0
	PWRX	CISO	0	0
	PWRX	PSEI	2,848	5,173
	SCL	AVA	11	0
	SCL	AVRN	478	1,257
	SCL	BPAT	1,539	1,411
	SCL	IPCO	0	0
	SCL	PACW	127	227
	SCL	PGE	468	680
	SCL	PSEI	1,407	2,263
	SRP	AZPS	6,873	8,733
	SRP	CISO	136,363	123,746
	SRP	PACE	0	0
	SRP	PNM	246	764
	SRP	TEPC	3,895	3,802
	SRP	WALC	9,528	11,929
	TEPC	AZPS	1,032	0
	TEPC	CISO	6,132	5,923
	TEPC	EPE	1,992	3,165
July	TEPC	LADWP	0	0
	TEPC	PACE	26	2
	TEPC	PNM	12,256	12,604
	TEPC	SRP	21,370	15,315
	TEPC	WALC	214,832	206,188
	TIDC	BANC	559	0
	TIDC	CISO	8,607	8,025
	TPWR	AVA	0	0
	TPWR	BPAT	7,618	9,034

<i>July</i>	TPWR	NWMT	0	0
	TPWR	PGE	0	0
	TPWR	PSEI	4,065	3,435
	WALC	AZPS	2,898	1,266
	WALC	CISO	97,829	94,976
	WALC	LADWP	31,656	27,570
	WALC	NEVP	49,484	48,951
	WALC	SRP	710	857
	WALC	TEPC	3,378	6,841
<i>August</i>	AVA	AVRN	4,697	5,332
	AVA	BPAT	10,813	11,550
	AVA	CISO	0	0
	AVA	IPCO	18,140	16,604
	AVA	NWMT	5,225	6,118
	AVA	PACW	2,485	2,444
	AVA	PGE	0	0
	AVA	PSEI	0	0
	AVA	SCL	21	0
	AVA	TPWR	0	0
	AVRN	AVA	3,635	3,193
	AVRN	BPAT	45,296	42,054
	AVRN	PACW	30,948	27,618
	AVRN	PGE	11,092	8,436
	AVRN	SCL	9,178	7,613
	AZPS	CISO	102,123	96,761
	AZPS	EPE	1,401	0
	AZPS	LADWP	40,556	36,399
	AZPS	NEVP	0	0
	AZPS	PACE	171,726	148,136
	AZPS	PNM	17,453	28,009
	AZPS	SRP	8,102	8,627
	AZPS	TEPC	525	113

<i>August</i>	AZPS	WALC	4,470	4,425
	BANC	BPAT	0	0
	BANC	CISO	8,776	8,999
	BANC	TIDC	45	0
	BPAT	AVA	3,594	2,721
	BPAT	AVRN	2,772	3,378
	BPAT	BANC	0	0
	BPAT	CISO	9,084	14,199
	BPAT	IPCO	1,725	1,325
	BPAT	LADWP	0	0
	BPAT	NEVP	0	0
	BPAT	NWMT	3,810	1,892
	BPAT	PACW	2,555	1,518
	BPAT	PGE	8,882	6,459
	BPAT	PSEI	5,405	5,092
	BPAT	PWRX	2,989	0
	BPAT	SCL	11,085	9,734
	BPAT	TPWR	11,168	9,937
	CISO	AVA	0	0
	CISO	AZPS	56,868	60,589
<i>August</i>	CISO	BANC	169,657	179,437
	CISO	BPAT	7,929	18,069
	CISO	LADWP	95,326	99,835
	CISO	NEVP	74,152	69,065
	CISO	PACW	13,757	61,532
	CISO	PGE	63,801	86,153
	CISO	PSEI	106,862	1,219
	CISO	PWRX	153,588	171,574
	CISO	SRP	42,151	49,710
	CISO	TEPC	230	543
	CISO	TIDC	9,395	10,499
	CISO	WALC	14,054	19,552

<i>August</i>	EPE	AZPS	1,470	0
	EPE	PNM	43,934	42,921
	EPE	TEPC	51,961	44,425
	IPCO	AVA	21,562	21,432
	IPCO	BPAT	4,333	4,010
	IPCO	NEVP	36,204	32,373
	IPCO	NWMT	1,052	1,552
	IPCO	PACE	13,257	14,863
	IPCO	PACW	45,924	33,271
	IPCO	PSEI	17,488	14,479
	IPCO	SCL	0	0
	LADWP	AZPS	2,105	2,172
	LADWP	BPAT	0	0
	LADWP	CISO	44,391	40,688
	LADWP	NEVP	14,576	12,753
	LADWP	PACE	15,333	8,729
	LADWP	TEPC	0	0
	LADWP	WALC	1,881	1,077
	NEVP	AZPS	0	0
	NEVP	BPAT	0	0
	NEVP	CISO	50,851	43,580
	NEVP	IPCO	88,295	74,439
	NEVP	LADWP	61,058	59,821
	NEVP	PACE	120,874	89,086
	NEVP	WALC	7,597	8,220
	NWMT	AVA	24,172	23,703
	NWMT	BPAT	6,706	5,092
	NWMT	IPCO	11,020	9,950
	NWMT	PACE	15,844	18,474
<i>August</i>	NWMT	PACW	23	0
	NWMT	PGE	76	0
	NWMT	PSEI	153	0

<i>August</i>	NWMT	TPWR	0	0
	PACE	AZPS	11,375	13,554
	PACE	IPCO	44,714	31,410
	PACE	LADWP	87,503	95,306
	PACE	NEVP	9,178	12,860
	PACE	NWMT	17,093	15,575
	PACE	PACW	76,626	54,097
	PACE	SRP	0	0
	PACE	TEPC	6	0
	PACW	AVA	2,846	3,479
	PACW	AVRN	18,454	31,800
	PACW	BPAT	9,719	8,768
	PACW	CISO	15,117	34,610
	PACW	IPCO	16,525	14,309
	PACW	NWMT	3	0
	PACW	PGE	60,267	50,508
	PACW	PSEI	46,243	45,605
	PACW	SCL	2,443	2,214
	PGE	AVA	0	0
	PGE	AVRN	3,189	4,894
	PGE	BPAT	25,009	27,191
	PGE	CISO	9,504	8,967
	PGE	NWMT	131	0
	PGE	PACW	13,789	16,159
	PGE	PSEI	1,443	1,515
	PGE	SCL	1,808	1,753
	PGE	TPWR	0	0
<i>August</i>	PNM	AZPS	42,177	40,627
	PNM	EPE	1,078	851
	PNM	SRP	1,036	1,339
	PNM	TEPC	3,703	2,852
	PSEI	AVA	75	0



<i>August</i>	PSEI	BPAT	17,029	15,900
	PSEI	CISO	2,642	1,466
	PSEI	IPCO	2,420	2,497
	PSEI	NWMT	224	0
	PSEI	PACW	5,586	9,657
	PSEI	PGE	1,021	1,312
	PSEI	PWRX	18,785	18,195
	PSEI	SCL	86,609	82,415
	PSEI	TPWR	30,264	32,535
	PWRX	BPAT	2,354	0
	PWRX	CISO	0	0
	PWRX	PSEI	2,732	5,945
	SCL	AVA	7	0
	SCL	AVRN	299	784
	SCL	BPAT	856	1,211
	SCL	IPCO	0	0
	SCL	PACW	36	77
	SCL	PGE	284	336
	SCL	PSEI	439	660
	SRP	AZPS	18,172	19,424
	SRP	CISO	113,258	105,035
	SRP	PACE	0	0
	SRP	PNM	799	1,502
	SRP	TEPC	5,356	5,183
	SRP	WALC	8,330	9,832
<i>August</i>	TEPC	AZPS	181	0
	TEPC	CISO	892	889
	TEPC	EPE	1,938	2,271
	TEPC	LADWP	0	0
	TEPC	PACE	7	2
	TEPC	PNM	20,818	26,097
	TEPC	SRP	21,773	17,723

<i>August</i>	TEPC	WALC	203,768	191,729
	TIDC	BANC	148	0
	TIDC	CISO	10,561	10,134
	TPWR	AVA	0	0
	TPWR	BPAT	4,018	5,318
	TPWR	NWMT	0	0
	TPWR	PGE	0	0
	TPWR	PSEI	2,871	1,935
	WALC	AZPS	5,591	5,976
	WALC	CISO	77,023	78,452
	WALC	LADWP	38,993	30,253
	WALC	NEVP	46,478	45,211
	WALC	SRP	655	549
	WALC	TEPC	6,537	8,180
<i>September</i>	AVA	AVRN	8,353	7,659
	AVA	BPAT	27,550	22,695
	AVA	CISO	0	0
	AVA	IPCO	5,193	5,836
	AVA	NWMT	1,573	2,680
	AVA	PACW	7,951	7,112
	AVA	PGE	0	0
	AVA	PSEI	0	0
	AVA	SCL	7	0
	AVA	TPWR	0	0
	AVRN	AVA	2,022	1,824
	AVRN	BPAT	49,668	46,581
	AVRN	PACW	24,318	23,272
	AVRN	PGE	12,766	9,071
	AVRN	SCL	9,223	8,240
	AZPS	CISO	122,558	119,997
	AZPS	EPE	2,807	0
	AZPS	LADWP	21,127	19,389

<i>September</i>	AZPS	NEVP	0	0
	AZPS	PACE	165,701	125,764
	AZPS	PNM	15,531	27,318
	AZPS	SRP	9,946	8,235
	AZPS	TEPC	835	34
	AZPS	WALC	3,827	4,560
	BANC	BPAT	0	0
	BANC	CISO	6,423	8,073
	BANC	TIDC	28	0
	BPAT	AVA	2,029	1,942
	BPAT	AVRN	4,996	5,716
	BPAT	BANC	0	0
	BPAT	CISO	3,281	6,472
	BPAT	IPCO	1,244	428
	BPAT	LADWP	0	0
	BPAT	NEVP	0	0
	BPAT	NWMT	3,169	1,352
	BPAT	PACW	4,521	2,078
	BPAT	PGE	14,172	10,765
	BPAT	PSEI	5,415	5,615
	BPAT	PWRX	2,046	0
	BPAT	SCL	9,448	8,729
	BPAT	TPWR	6,942	7,290
	CISO	AVA	0	0
	CISO	AZPS	80,358	79,884
<i>September</i>	CISO	BANC	158,598	162,625
	CISO	BPAT	36,945	65,164
	CISO	LADWP	68,178	59,028
	CISO	NEVP	76,349	61,706
	CISO	PACW	6,588	47,379
	CISO	PGE	55,319	92,160
	CISO	PSEI	139,387	955

<i>September</i>	CISO	PWRX	164,338	182,562
	CISO	SRP	80,651	87,740
	CISO	TEPC	1,034	1,486
	CISO	TIDC	6,498	6,762
	CISO	WALC	15,980	19,205
	EPE	AZPS	202	0
	EPE	PNM	32,898	30,771
	EPE	TEPC	54,706	49,779
	IPCO	AVA	62,232	54,627
	IPCO	BPAT	8,137	6,715
	IPCO	NEVP	15,545	15,918
	IPCO	NWMT	348	799
	IPCO	PACE	11,004	10,679
	IPCO	PACW	39,984	32,140
	IPCO	PSEI	37,050	33,341
	IPCO	SCL	9,124	8,453
	LADWP	AZPS	700	948
	LADWP	BPAT	0	0
	LADWP	CISO	61,354	62,499
	LADWP	NEVP	17,393	12,976
	LADWP	PACE	22,716	17,619
	LADWP	TEPC	0	0
	LADWP	WALC	3,068	2,656
	NEVP	AZPS	0	0
	NEVP	BPAT	0	0
<i>September</i>	NEVP	CISO	56,280	56,324
	NEVP	IPCO	104,908	73,261
	NEVP	LADWP	27,301	27,787
	NEVP	PACE	121,745	96,711
	NEVP	WALC	6,955	8,163
	NWMT	AVA	22,021	18,979
	NWMT	BPAT	15,791	12,660

September	NWMT	IPCO	10,152	9,018
	NWMT	PACE	14,546	17,658
	NWMT	PACW	0	0
	NWMT	PGE	29	0
	NWMT	PSEI	112	0
	NWMT	TPWR	0	0
	PACE	AZPS	12,925	16,322
	PACE	IPCO	72,910	50,891
	PACE	LADWP	51,071	58,756
	PACE	NEVP	7,097	7,211
	PACE	NWMT	18,917	14,985
	PACE	PACW	45,873	36,047
	PACE	SRP	0	0
	PACE	TEPC	0	0
	PACW	AVA	1,738	1,955
	PACW	AVRN	19,027	34,884
	PACW	BPAT	16,056	14,077
	PACW	CISO	9,123	24,890
	PACW	IPCO	12,022	10,823
	PACW	NWMT	0	0
	PACW	PGE	60,969	51,294
	PACW	PSEI	36,499	39,349
	PACW	SCL	1,869	1,903
September	PGE	AVA	0	0
	PGE	AVRN	2,091	3,870
	PGE	BPAT	21,066	22,684
	PGE	CISO	3,923	3,685
	PGE	NWMT	32	0
	PGE	PACW	12,220	15,480
	PGE	PSEI	1,597	1,873
	PGE	SCL	1,817	2,270
	PGE	TPWR	0	0

September	PNM	AZPS	67,462	57,498
	PNM	EPE	2,206	2,925
	PNM	SRP	1,168	1,414
	PNM	TEPC	4,472	3,130
	PSEI	AVA	0	0
	PSEI	BPAT	26,680	26,678
	PSEI	CISO	414	7,148
	PSEI	IPCO	1,144	1,044
	PSEI	NWMT	94	0
	PSEI	PACW	21,834	15,034
	PSEI	PGE	581	513
	PSEI	PWRX	13,473	14,529
	PSEI	SCL	87,386	81,840
	PSEI	TPWR	14,795	15,256
	PWRX	BPAT	3,062	0
	PWRX	CISO	0	0
	PWRX	PSEI	7,979	9,508
	SCL	AVA	4	0
	SCL	AVRN	554	784
	SCL	BPAT	1,430	1,833
	SCL	IPCO	0	0
	SCL	PACW	166	157
	SCL	PGE	432	382
	SCL	PSEI	498	834
September	SRP	AZPS	6,619	7,035
	SRP	CISO	135,386	130,630
	SRP	PACE	0	0
	SRP	PNM	0	45
	SRP	TEPC	8,350	8,172
	SRP	WALC	4,822	4,967
	TEPC	AZPS	479	0
	TEPC	CISO	3,253	4,118

<i>September</i>	TEPC	EPE	4,006	4,389
	TEPC	LADWP	0	0
	TEPC	PACE	30	0
	TEPC	PNM	10,744	11,133
	TEPC	SRP	16,160	14,953
	TEPC	WALC	178,791	170,038
	TIDC	BANC	103	0
	TIDC	CISO	11,159	11,136
	TPWR	AVA	0	0
	TPWR	BPAT	5,804	6,460
	TPWR	NWMT	0	0
	TPWR	PGE	0	0
	TPWR	PSEI	2,559	2,209
	WALC	AZPS	4,854	2,858
	WALC	CISO	97,775	103,533
	WALC	LADWP	22,443	19,155
	WALC	NEVP	40,987	34,779
	WALC	SRP	1,018	1,245
	WALC	TEPC	9,463	13,287

### APPENDIX 3: Minimum & Maximum Flexible Ramping Requirements

Month	BAA	Direction	Minimum requirement	Maximum requirement
July	AVA	up	12	83
	AVRN	up	12	395
	AZPS	up	0	414
	BANC	up	0	136
	BPAT	up	58	367
	CISO	up	0	2,615
	EPE	up	6	105
	IPCO	up	31	223
	LADWP	up	0	346
	NEVP	up	0	694
	NWMT	up	15	117
	PACE	up	0	610
	PACW	up	24	158
	PGE	up	0	226
	PNM	up	14	305
	PSEI	up	18	232
	PWRX	up	44	221
	SCL	up	5	44
	SRP	up	48	269
	TEPC	up	39	181
	TIDC	up	0	18
	TPWR	up	3	25
	WALC	up	0	51
	<b>ALL EIM</b>	<b>up</b>	<b>0</b>	<b>3,499</b>
July	AVA	down	23	117
	AVRN	down	0	359
	AZPS	down	88	516
	BANC	down	0	126
	BPAT	down	61	436
	CISO	down	0	1,732
	EPE	down	11	97
	IPCO	down	17	296



July	LADWP	down	0	311
	NEVP	down	0	566
	NWMT	down	14	130
	PACE	down	4	732
	PACW	down	27	191
	PGE	down	0	218
	PNM	down	33	307
	PSEI	down	19	215
	PWRX	down	60	241
	SCL	down	0	43
	SRP	down	32	244
	TEPC	down	0	184
	TIDC	down	0	16
	TPWR	down	4	23
	WALC	down	0	52
	<b>ALL EIM</b>	<b>down</b>	<b>0</b>	<b>2,605</b>
August	AVA	up	8	123
	AVRN	up	0	463
	AZPS	up	30	367
	BANC	up	2	94
	BPAT	up	0	430
	CISO	up	250	2,365
	EPE	up	0	109
	IPCO	up	0	223
	LADWP	up	9	306
	NEVP	up	0	668
	NWMT	up	7	140
	PACE	up	0	823
	PACW	up	0	176
	PGE	up	7	247
	PNM	up	0	265
	PSEI	up	25	315
	PWRX	up	16	240
	SCL	up	3	37
	SRP	up	0	325
	TEPC	up	0	193

<i>August</i>	<i>TIDC</i>	up	1	16
	<i>TPWR</i>	up	3	20
	<i>WALC</i>	up	5	50
	<b>ALL WEIM</b>	<b>up</b>	<b>0</b>	<b>3,475</b>
	<i>AVA</i>	down	0	125
	<i>AVRN</i>	down	0	313
	<i>AZPS</i>	down	0	384
	<i>BANC</i>	down	8	96
	<i>BPAT</i>	down	0	442
	<i>CISO</i>	down	0	1,559
	<i>EPE</i>	down	0	104
	<i>IPCO</i>	down	0	304
	<i>LADWP</i>	down	0	296
	<i>NEVP</i>	down	0	564
	<i>NWMT</i>	down	0	130
	<i>PACE</i>	down	0	896
	<i>PACW</i>	down	0	188
	<i>PGE</i>	down	0	243
	<i>PNM</i>	down	0	307
	<i>PSEI</i>	down	0	282
	<i>PWRX</i>	down	0	243
	<i>SCL</i>	down	4	36
	<i>SRP</i>	down	0	311
	<i>TEPC</i>	down	0	212
	<i>TIDC</i>	down	2	19
	<i>TPWR</i>	down	3	29
	<i>WALC</i>	down	6	58
	<b>ALL EIM</b>	<b>down</b>	<b>0</b>	<b>2,481</b>
<i>September</i>	<i>AVA</i>	up	9	129
	<i>AVRN</i>	up	0	463
	<i>AZPS</i>	up	0	385
	<i>BANC</i>	up	0	94
	<i>BPAT</i>	up	13	439
	<i>CISO</i>	up	23	2,365
	<i>EPE</i>	up	0	112

September	IPCO	up	0	274
	LADWP	up	0	306
	NEVP	up	0	668
	NWMT	up	0	140
	PACE	up	0	769
	PACW	up	0	176
	PGE	up	4	234
	PNM	up	190	265
	PSEI	up	0	290
	PWRX	up	14	265
	SCL	up	0	37
	SRP	up	0	325
	TEPC	up	0	193
	TIDC	up	0	13
	TPWR	up	0	15
	WALC	up	0	48
	<b>ALL WEIM</b>	<b>up</b>	<b>236</b>	<b>3,466</b>
	AVA	down	0	125
	AVRN	down	0	309
	AZPS	down	0	384
	BANC	down	0	96
	BPAT	down	0	398
	CISO	down	0	1,336
	EPE	down	0	104
	IPCO	down	0	259
	LADWP	down	0	296
	NEVP	down	0	564
	NWMT	down	0	130
	PACE	down	0	896
September	PACW	down	0	185
	PGE	down	20	237
	PNM	down	0	307
	PSEI	down	0	282
	PWRX	down	0	243
	SCL	down	2	36
	SRP	down	0	311

	<i>TEPC</i>	down	0	212
	<i>TIDC</i>	down	0	19
	<i>TPWR</i>	down	0	17
	<i>WALC</i>	down	0	65
	<b>ALL WEIM</b>	<b>down</b>	<b>0</b>	<b>2,308</b>