



# WESTERN ENERGY IMBALANCE MARKET BENEFITS REPORT

**First Quarter 2024** ■ ■ ■

Prepared by: Market Performance and Advanced Analytics

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## EXECUTIVE SUMMARY

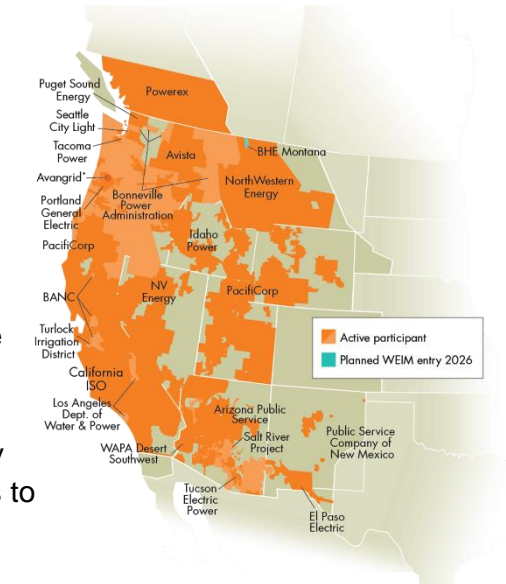
Gross benefits from WEIM since November 2014

**\$5.49 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.



\*Avangrid office, generation-only BAA with distribution across multiple states. Map boundaries are approximate and for illustrative purposes only.

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### Q1 2024 Gross Benefits by Participant (entry year)

	(\$ millions)
Arizona Public Service (2016)	\$5.54
AVANGRID (2023)	\$10.14
Avista (2022)	\$7.79
Balancing Authority of Northern California (2019)	\$20.78
Bonneville Power Administration (2022)	\$18.11
California ISO (2014)	\$54.33
El Paso Electric (2023)	\$6.08
Idaho Power Company (2018)	\$11.30
Los Angeles Dept. of Water & Power (2021)	\$46.80
NV Energy (2015)	\$32.77
NorthWestern Energy (2021)	\$7.07
PacifiCorp (2014)	\$73.83
Portland General Electric (2017)	\$22.00
Public Service Company New Mexico (2021)	\$7.30
Puget Sound Energy (2016)	\$25.88
Powerex (2018)	\$24.83
Seattle City Light (2020)	\$5.76
Salt River Project (2020)	\$22.35
Tacoma Power (2022)	\$6.79
Tucson Electric Power (2022)	\$9.11
Turlock Irrigation District (2021)	\$1.22
WAPA Desert Southwest Region (2023)	\$16.52
<b>Total</b>	<b>\$436.30</b>

### 2024

### Q1 BENEFITS

#### ECONOMICAL

**\$436.30 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

**25,802**

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

#### OPERATIONAL

**57%**

Average reduction in flexibility reserves across the footprint

During the winter conditions experienced in January 2024, the Western Energy Imbalance Market economically rebalanced supply across the West to meet increasing demand as real-time conditions evolved over the Martin Luther King Jr. Day weekend. The market identified least-cost solutions within the wider WEIM footprint, transferring lower-cost electricity from the Southwest into California. These transfers allowed exports scheduled in the day-ahead and hour-ahead markets to flow to the Northwest, replacing more expensive generation while managing congestion on key transmission lines.

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>

## ■ 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 Q1 2024

Table 2 shows the estimated WEIM gross benefits by each region per month<sup>1</sup>. The monthly savings presented show \$221.18 million for January, \$108.77 million for February and \$106.35 million for March with a total estimated benefit of \$436.30 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>	January	February	March	Total
<i>APS</i>	-\$0.24	\$3.82	\$1.96	\$5.54
<i>AVRN</i>	\$7.16	\$1.09	\$1.89	\$10.14
<i>AVA</i>	\$6.40	\$0.56	\$0.83	\$7.79
<i>BANC</i>	\$4.92	\$10.08	\$5.78	\$20.78
<i>BPA</i>	\$14.66	\$1.74	\$1.71	\$18.11
<i>CISO</i>	\$33.64	\$9.76	\$10.93	\$54.33
<i>EPE</i>	\$2.99	\$1.85	\$1.24	\$6.08
<i>IPCO</i>	\$7.65	\$1.76	\$1.89	\$11.30
<i>LADWP</i>	\$8.18	\$22.28	\$16.34	\$46.80
<i>NVE</i>	\$8.69	\$8.53	\$15.55	\$32.77
<i>NWMT</i>	\$4.39	\$1.29	\$1.39	\$7.07
<i>PAC</i>	\$53.70	\$11.68	\$8.45	\$73.83
<i>PGE</i>	\$13.65	\$3.75	\$4.60	\$22.00
<i>PNM</i>	\$3.12	\$1.67	\$2.51	\$7.30
<i>PSE</i>	\$18.31	\$4.91	\$2.66	\$25.88
<i>PWRX</i>	\$6.05	\$10.04	\$8.74	\$24.83
<i>SCL</i>	\$4.11	\$0.92	\$0.73	\$5.76
<i>SRP</i>	\$9.80	\$5.77	\$6.78	\$22.35
<i>TPWR</i>	\$5.24	\$0.89	\$0.66	\$6.79
<i>TEP</i>	\$3.62	\$1.81	\$3.68	\$9.11
<i>TID</i>	\$0.69	\$0.26	\$0.27	\$1.22
<i>WALC</i>	\$4.45	\$4.31	\$7.76	\$16.52
<b>Total</b>	\$221.18	\$108.77	\$106.35	\$436.30

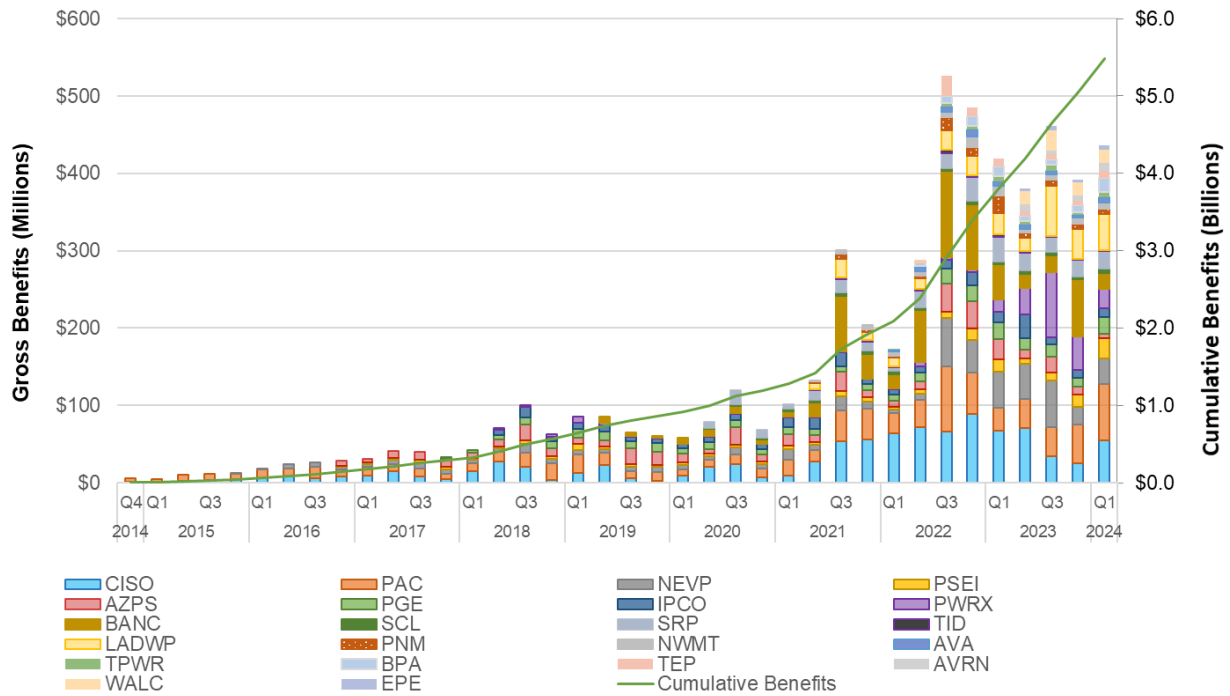
TABLE 1: Q1 2024 benefits in millions USD

## ■ CUMULATIVE ECONOMIC BENEFITS SINCE INCEPTION

Since the start of the WEIM in November 2014, the cumulative economic benefits of the market have totaled \$5.49 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.

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



## ■ 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.

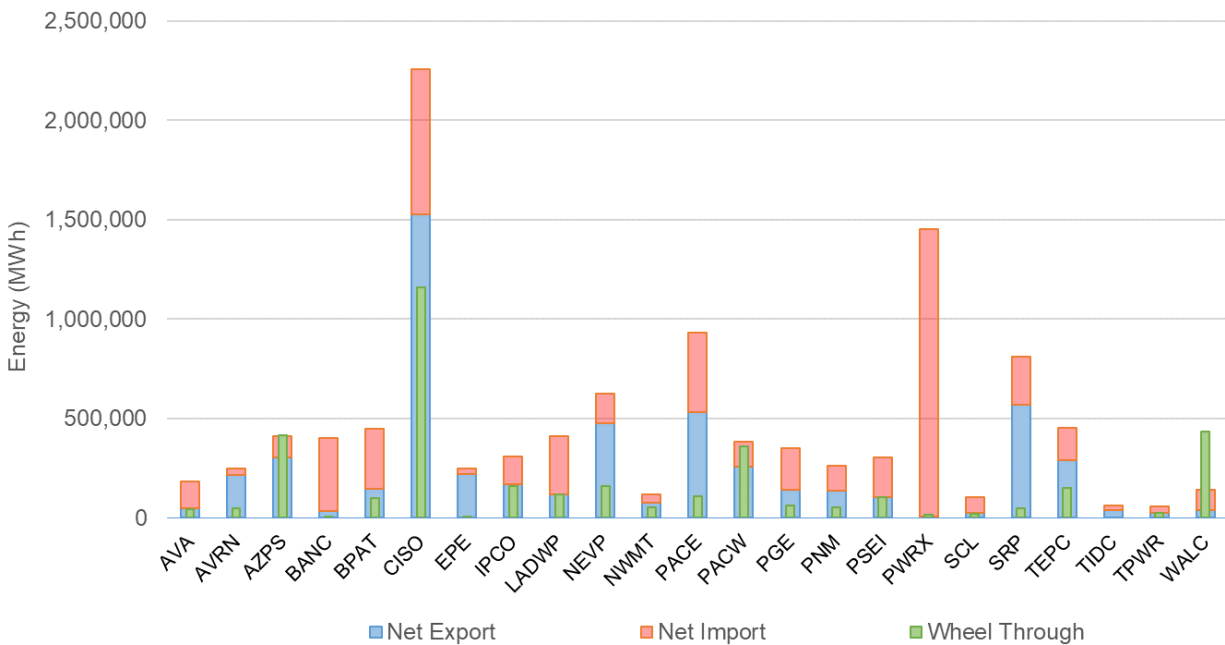
The metric is measured as energy in MWh for each month and the corresponding calendar quarter, as shown in Tables 3 through 6 and Graphs 3 through 6.

BAA	Net Export	Net Import	Wheel Through
AVA	45,565	137,273	42,175
AVRN	214,581	34,132	45,541
AZPS	301,670	110,091	415,680
BANC	31,258	370,899	399
BPAT	143,425	303,133	99,265
CISO	1,527,297	727,850	1,158,366
EPE	220,365	29,105	257
IPCO	168,958	139,514	158,176
LADWP	117,792	291,627	118,962



NEVP	477,146	147,703	157,685
NWMT	74,658	43,663	51,733
PACE	532,570	397,221	108,768
PACW	255,798	128,315	360,134
PGE	140,527	210,245	61,875
PNM	134,834	127,123	52,568
PSEI	104,148	197,212	104,490
PWRX	5,770	1,446,907	13,749
SCL	25,704	79,477	18,066
SRP	570,401	238,594	45,698
TEPC	288,278	162,478	151,599
TIDC	36,874	26,181	-
TPWR	24,057	32,060	23,241
WALC	39,151	100,024	431,489

**TABLE 2: Estimated wheel-through transfers in Q1 2024**

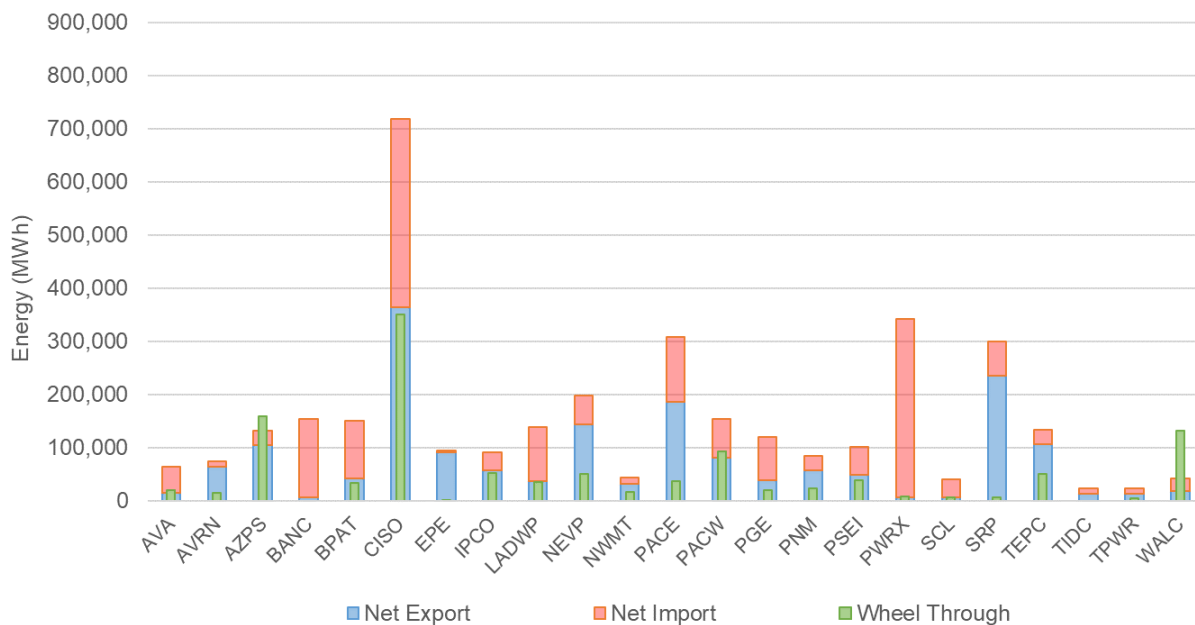


**GRAPH 3: Estimated wheel-through transfers in Q1 2024**

BAA	Net Export	Net Import	Wheel Through
AVA	14,623	49,861	18,877
AVRN	62,868	11,133	14,308
AZPS	105,190	25,527	158,625
BANC	5,548	147,186	-
BPAT	41,690	108,806	33,454
CISO	363,837	353,353	350,271

EPE	90,451	3,054	15
IPCO	57,430	33,781	52,181
LADWP	37,091	101,169	35,163
NEVP	143,229	54,149	50,571
NWMT	31,017	11,745	16,359
PACE	185,638	121,424	35,849
PACW	80,902	72,677	92,240
PGE	39,104	80,195	20,188
PNM	56,996	27,108	23,797
PSEI	48,226	52,968	37,487
PWRX	5,455	336,809	7,402
SCL	5,840	33,747	5,411
SRP	234,694	63,826	6,504
TEPC	105,733	27,507	50,794
TIDC	13,049	9,681	-
TPWR	12,566	9,756	4,008
WALC	17,815	23,530	130,870

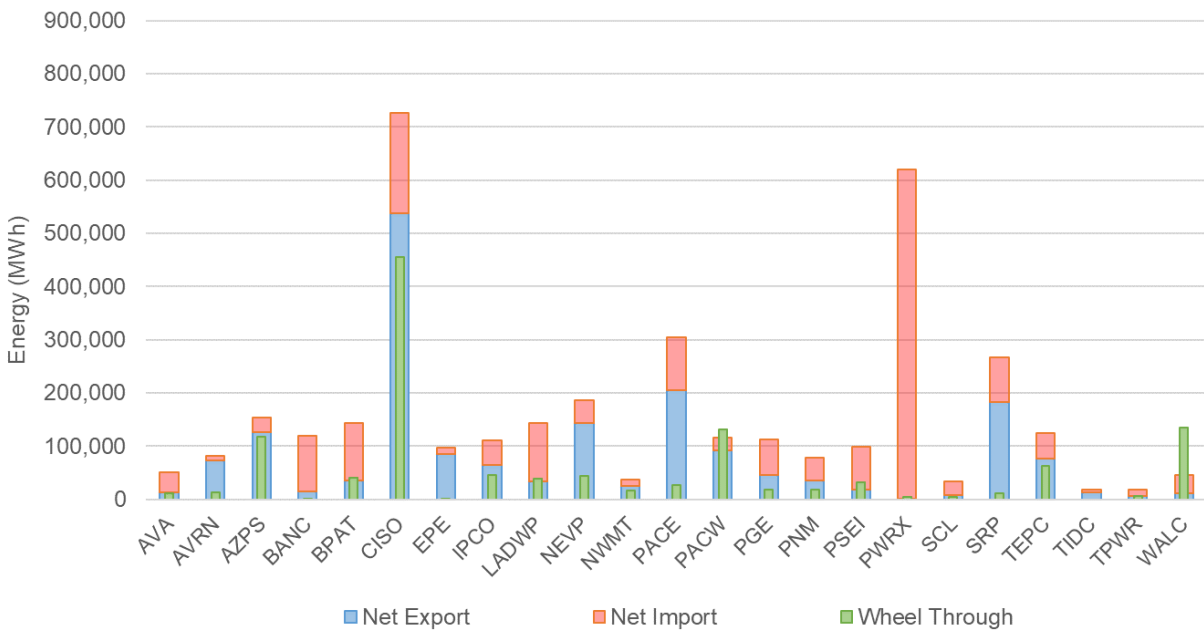
TABLE 3: Estimated wheel-through transfers in January 2024



GRAPH 4: Estimated wheel-through transfers in January 2024

BAA	Net Export	Net Import	Wheel Through
AVA	12,329	37,766	10,375
AVRN	73,010	8,999	12,622
AZPS	126,271	26,677	117,839
BANC	14,669	103,869	399
BPAT	35,368	107,289	40,794
CISO	536,799	189,005	455,322
EPE	84,927	12,005	15
IPCO	65,143	45,110	45,037
LADWP	33,937	109,838	38,922
NEVP	142,619	44,163	43,977
NWMT	24,840	11,502	16,399
PACE	205,711	98,311	27,272
PACW	91,888	24,012	131,700
PGE	45,388	67,158	17,225
PNM	34,573	43,137	18,030
PSEI	18,443	80,931	32,307
PWRX	182	619,064	4,167
SCL	6,995	25,819	5,157
SRP	182,444	84,144	11,040
TEPC	75,756	49,269	62,865
TIDC	13,718	4,144	-
TPWR	5,373	12,917	5,909
WALC	10,455	35,712	134,684

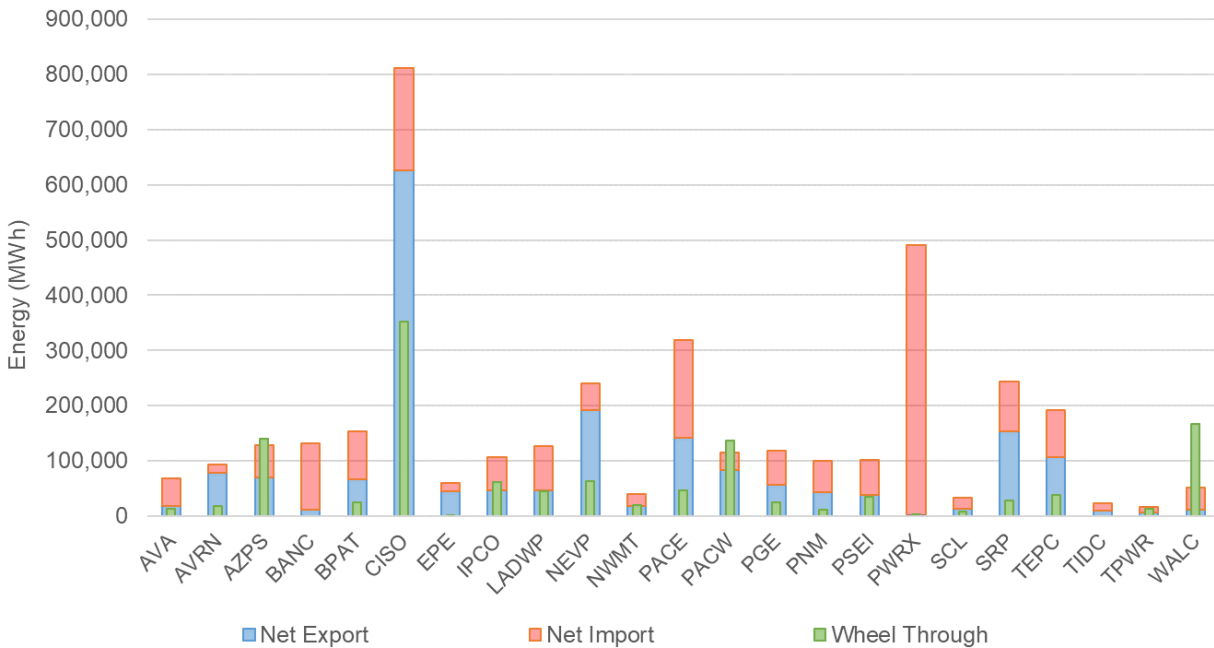
**TABLE 4: Estimated wheel-through transfers in February 2024**



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

BAA	Net Export	Net Import	Wheel Through
AVA	18,613	49,645	12,923
AVRN	78,703	14,000	18,611
AZPS	70,208	57,888	139,216
BANC	11,040	119,844	-
BPAT	66,366	87,038	25,017
CISO	626,661	185,491	352,773
EPE	44,987	14,046	227
IPCO	46,385	60,624	60,958
LADWP	46,765	80,620	44,877
NEVP	191,298	49,390	63,137
NWMT	18,802	20,415	18,976
PACE	141,221	177,487	45,648
PACW	83,007	31,626	136,195
PGE	56,034	62,893	24,461
PNM	43,265	56,878	10,742
PSEI	37,479	63,313	34,697
PWRX	133	491,034	2,180
SCL	12,868	19,912	7,497
SRP	153,263	90,624	28,155
TEPC	106,789	85,702	37,941
TIDC	10,107	12,356	-
TPWR	6,117	9,387	13,323
WALC	10,882	40,782	165,935

**TABLE 5: Estimated wheel-through transfers in March 2024**



GRAPH 6: Estimated wheel-through transfers in March 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 Q1 2024 was calculated to be 9,659 MWh (January) + 22,376 MWh (February) + 28,250 MWh (March) = 60,285 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 25,802 metric tons of CO<sub>2</sub> for Q1 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>
2015	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>	1	60,285	25,802
<b>Total</b>		2,223,015	951,370

**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.

	January		February		March	
<i>Direction</i>	Up	Down	Up	Down	Up	Down
<i>Average MW saving</i>	1,724	1,822	1,857	1,823	1,918	1,785
<i>Sum of BAA requirements</i>	3,170	3,060	3,332	3,090	3,338	3,046
<i>Percentage savings</i>	54%	60%	56%	59%	57%	59%

**Table 7: Flexible ramping procurement diversity savings in Q1 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 951,370 metric tons of CO<sub>2</sub>, roughly the equivalent of avoiding the emissions from 200,021 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)
<i>January</i>	AVA	AVRN	3,629	3,847
	AVA	BPAT	17,233	13,672
	AVA	CISO	0	0
	AVA	IPCO	2,633	3,220
	AVA	NWMT	5,278	8,986
	AVA	PACW	4,186	3,774
	AVA	PGE	0	0
	AVA	PSEI	30	0
	AVA	SCL	0	0
	AVA	TPWR	0	0
	AVRN	AVA	4,195	3,895
	AVRN	BPAT	41,666	31,794
	AVRN	PACW	29,078	25,844
	AVRN	PGE	12,275	10,074
	AVRN	SCL	6,938	5,569
	<i>January</i>	AZPS	CISO	211,897
AZPS		EPE	639	0
AZPS		LADWP	16,321	13,644
AZPS		NEVP	0	0
AZPS		PACE	63,716	66,135
AZPS		PNM	7,387	9,298
AZPS		SRP	11,873	7,911
AZPS		TEPC	1,689	204
AZPS		WALC	4,287	2,647
BANC		BPAT	0	0
BANC		CISO	4,643	5,414
BANC		TIDC	267	134
BPAT		AVA	6,788	6,970

<i>January</i>	BPAT	AVRN	2,927	3,141
	BPAT	BANC	0	0
	BPAT	CISO	10,049	20,027
	BPAT	IPCO	9,360	2,577
	BPAT	LADWP	0	0
	BPAT	NEVP	0	0
	BPAT	NWMT	7,826	3,606
	BPAT	PACW	6,134	1,789
	BPAT	PGE	20,467	11,375
	BPAT	PSEI	17,199	16,777
	BPAT	PWRX	2,416	0
	BPAT	SCL	4,152	3,116
	BPAT	TPWR	6,449	5,766
	CISO	AVA	0	0
	CISO	AZPS	18,234	24,756
	CISO	BANC	132,139	136,558
	CISO	BPAT	7,703	14,559
	CISO	LADWP	30,362	32,598
	CISO	NEVP	22,230	24,969
	CISO	PACW	14,133	48,181
	CISO	PGE	29,486	42,807
	CISO	PWRX	303,272	323,288
	CISO	SRP	42,532	43,919
CISO	TEPC	7	0	
CISO	TIDC	9,019	9,547	
CISO	WALC	10,528	11,123	
<i>January</i>	EPE	AZPS	543	0
	EPE	PNM	33,202	34,033
	EPE	TEPC	60,374	56,434
	IPCO	AVA	34,240	34,186
	IPCO	BPAT	8,663	7,929
IPCO	NEVP	15,722	14,517	

<i>January</i>	IPCO	NWMT	2,320	3,132
	IPCO	PACE	30,486	21,616
	IPCO	PACW	17,350	16,577
	IPCO	PSEI	41	148
	IPCO	SCL	12,509	11,505
	LADWP	AZPS	464	1,282
	LADWP	BPAT	0	0
	LADWP	CISO	49,182	56,163
	LADWP	NEVP	12,329	12,517
	LADWP	PACE	2,649	1,845
	LADWP	TEPC	0	0
	LADWP	WALC	1,266	446
	NEVP	AZPS	0	0
	NEVP	BPAT	0	0
	NEVP	CISO	102,115	78,350
	NEVP	IPCO	25,199	22,878
	NEVP	LADWP	33,980	30,794
	NEVP	PACE	56,318	51,505
	NEVP	WALC	14,375	10,273
	<i>January</i>	NWMT	AVA	25,269
NWMT		BPAT	14,016	9,779
NWMT		IPCO	2,992	2,674
NWMT		PACE	19,288	16,064
NWMT		PACW	0	0
NWMT		PGE	22	0
NWMT		PSEI	77	0
NWMT		TPWR	0	0
PACE		AZPS	81,957	65,139
PACE		IPCO	36,707	37,701
PACE		LADWP	41,917	43,609
PACE		NEVP	35,176	27,830
PACE	NWMT	11,867	12,379	

<i>January</i>	PACE	PACW	43,534	34,825
	PACE	SRP	0	0
	PACE	TEPC	0	4
	PACW	AVA	4,492	4,829
	PACW	AVRN	9,169	14,374
	PACW	BPAT	12,412	8,171
	PACW	CISO	27,095	47,598
	PACW	IPCO	23,932	14,922
	PACW	NWMT	0	0
	PACW	PGE	41,178	35,556
	PACW	PSEI	38,400	46,496
	PACW	SCL	1,327	1,198
	PGE	AVA	0	0
	PGE	AVRN	2,376	3,006
<i>January</i>	PGE	BPAT	22,689	24,240
	PGE	CISO	10,314	10,878
	PGE	NWMT	235	0
	PGE	PACW	18,504	20,084
	PGE	PSEI	53	61
	PGE	SCL	1,105	1,024
	PGE	TPWR	0	0
	PNM	AZPS	80,008	75,781
	PNM	EPE	1,233	988
	PNM	SRP	2,408	2,550
	PNM	TEPC	5,178	1,473
	PSEI	AVA	0	0
	PSEI	BPAT	24,435	20,476
	PSEI	IPCO	0	0
PSEI	NWMT	44	0	
PSEI	PACW	12,963	13,603	
PSEI	PGE	0	0	
PSEI	PWRX	22,692	20,923	

<i>January</i>	PSEI	SCL	18,264	16,746	
	PSEI	TPWR	7,792	7,998	
	PWRX	BPAT	12,317	0	
	PWRX	CISO	0	0	
	PWRX	PSEI	10,849	12,856	
	SCL	AVA	0	0	
	SCL	AVRN	573	1,074	
	SCL	BPAT	2,985	2,944	
	SCL	IPCO	1,303	1,988	
	SCL	PACW	158	239	
	SCL	PGE	461	572	
	SCL	PSEI	2,673	4,434	
	SRP	AZPS	8,360	14,786	
	SRP	CISO	227,841	212,199	
	SRP	PACE	0	0	
	SRP	PNM	29	141	
	SRP	TEPC	7,474	5,654	
	SRP	WALC	6,613	8,417	
	<i>January</i>	TEPC	AZPS	1,949	0
		TEPC	CISO	12,733	11,861
TEPC		EPE	2,484	2,081	
TEPC		LADWP	0	0	
TEPC		PACE	218	108	
TEPC		PNM	8,412	7,433	
TEPC		SRP	17,212	13,551	
TEPC		WALC	129,624	121,493	
TIDC		BANC	10,561	10,629	
TIDC		CISO	2,672	2,420	
TPWR		AVA	0	0	
TPWR		BPAT	8,824	8,696	
TPWR		NWMT	0	0	
TPWR		PGE	0	0	

	TPWR	PSEI	9,115	7,878
	WALC	AZPS	3,044	2,408
	WALC	CISO	95,559	88,772
	WALC	LADWP	16,129	15,686
	WALC	NEVP	18,168	24,888
	WALC	SRP	2,698	2,399
	WALC	TEPC	12,173	14,531
<i>February</i>	AVA	AVRN	1,147	1,831
	AVA	BPAT	8,614	8,599
	AVA	CISO	0	0
	AVA	IPCO	3,243	3,344
	AVA	NWMT	4,561	7,103
	AVA	PACW	1,152	1,828
	AVA	PGE	29	0
	AVA	PSEI	0	0
	AVA	SCL	0	0
	AVA	TPWR	0	0
	AVRN	AVA	5,951	4,748
	AVRN	BPAT	47,475	37,086
	AVRN	PACW	33,854	29,265
	AVRN	PGE	10,122	8,252
	AVRN	SCL	8,488	6,281
	AZPS	CISO	165,737	142,206
	AZPS	EPE	1,336	0
	AZPS	LADWP	11,490	13,506
	AZPS	NEVP	0	0
	AZPS	PACE	43,177	41,531
<i>February</i>	AZPS	PNM	25,557	27,373
	AZPS	SRP	9,327	12,462
	AZPS	TEPC	2,709	2,187
	AZPS	WALC	4,144	4,845
	BANC	BPAT	0	0

<i>February</i>	BANC	CISO	15,877	14,484	
	BANC	TIDC	582	584	
	BPAT	AVA	6,544	5,026	
	BPAT	AVRN	1,578	2,295	
	BPAT	BANC	0	0	
	BPAT	CISO	9,661	16,575	
	BPAT	IPCO	6,212	2,507	
	BPAT	LADWP	0	0	
	BPAT	NEVP	0	0	
	BPAT	NWMT	12,798	5,135	
	BPAT	PACW	2,266	1,222	
	BPAT	PGE	8,018	8,128	
	BPAT	PSEI	19,506	20,077	
	BPAT	PWRX	4,008	0	
	BPAT	SCL	3,480	2,494	
	BPAT	TPWR	13,065	12,703	
	CISO	AVA	0	0	
	CISO	AZPS	27,965	23,658	
	<i>February</i>	CISO	BANC	87,574	96,711
		CISO	BPAT	20,614	41,039
CISO		LADWP	44,191	41,377	
CISO		NEVP	15,532	16,642	
CISO		PACW	24,450	40,457	
CISO		PGE	29,927	37,936	
CISO		PWRX	572,905	597,662	
CISO		SRP	76,010	69,526	
CISO		TEPC	118	111	
CISO		TIDC	2,921	3,560	
CISO		WALC	25,532	21,470	
EPE		AZPS	624	0	
EPE	PNM	18,948	20,253		
EPE	TEPC	70,569	64,689		



<i>February</i>	IPCO	AVA	14,549	13,770
	IPCO	BPAT	12,497	12,781
	IPCO	NEVP	18,258	21,459
	IPCO	NWMT	1,710	1,879
	IPCO	PACE	35,101	32,700
	IPCO	PACW	13,969	15,565
	IPCO	PSEI	1,829	1,911
	IPCO	SCL	10,159	10,114
	LADWP	AZPS	883	1,893
	LADWP	BPAT	0	0
	LADWP	CISO	49,500	52,579
	LADWP	NEVP	12,093	13,351
	LADWP	PACE	4,617	2,621
	LADWP	TEPC	0	0
	LADWP	WALC	2,690	2,414
	NEVP	AZPS	0	0
	NEVP	BPAT	0	0
	NEVP	CISO	99,081	83,297
	NEVP	IPCO	19,670	18,313
NEVP	LADWP	29,577	24,386	
NEVP	PACE	44,587	33,396	
NEVP	WALC	21,521	27,204	
NWMT	AVA	20,180	16,396	
NWMT	BPAT	7,816	5,797	
NWMT	IPCO	3,212	4,262	
NWMT	PACE	17,773	14,784	
<i>February</i>	NWMT	PACW	26	0
	NWMT	PGE	1,129	0
	NWMT	PSEI	164	0
	NWMT	TPWR	0	0
	PACE	AZPS	51,603	62,397
	PACE	IPCO	38,389	39,689

<i>February</i>	PACE	LADWP	58,455	60,654
	PACE	NEVP	8,044	15,237
	PACE	NWMT	13,199	13,784
	PACE	PACW	41,279	41,222
	PACE	SRP	0	0
	PACE	TEPC	0	0
	PACW	AVA	8,783	8,202
	PACW	AVRN	7,585	13,893
	PACW	BPAT	11,553	9,266
	PACW	CISO	43,715	72,394
	PACW	IPCO	22,274	19,380
	PACW	NWMT	2	0
	PACW	PGE	31,330	29,714
	PACW	PSEI	69,022	69,529
	PACW	SCL	1,456	1,212
	PGE	AVA	0	0
	PGE	AVRN	1,781	3,022
	PGE	BPAT	27,631	23,218
	PGE	CISO	10,855	10,864
	PGE	NWMT	173	0
PGE	PACW	19,870	23,694	
PGE	PSEI	379	388	
PGE	SCL	1,551	1,427	
PGE	TPWR	0	0	
<i>February</i>	PNM	AZPS	43,114	42,687
	PNM	EPE	3,706	5,115
	PNM	SRP	1,130	884
	PNM	TEPC	3,614	3,917
	PSEI	AVA	0	0
	PSEI	BPAT	8,327	5,362
	PSEI	IPCO	66	200
	PSEI	NWMT	16	0

<i>February</i>	PSEI	PACW	916	2,356
	PSEI	PGE	0	0
	PSEI	PWRX	27,698	25,569
	PSEI	SCL	12,006	9,448
	PSEI	TPWR	7,081	6,123
	PWRX	BPAT	2,925	0
	PWRX	CISO	0	0
	PWRX	PSEI	1,923	4,349
	SCL	AVA	0	0
	SCL	AVRN	184	581
	SCL	BPAT	1,569	1,674
	SCL	IPCO	1,873	2,451
	SCL	PACW	29	103
	SCL	PGE	190	353
	SCL	PSEI	4,235	6,991
	SRP	AZPS	9,714	12,673
	SRP	CISO	173,450	162,463
	SRP	PACE	0	0
	SRP	PNM	0	0
	SRP	TEPC	14,201	9,020
SRP	WALC	8,971	9,328	
TEPC	AZPS	602	0	
<i>February</i>	TEPC	CISO	3,493	2,713
	TEPC	EPE	6,963	6,905
	TEPC	LADWP	0	0
	TEPC	PACE	596	550
	TEPC	PNM	14,343	13,541
	TEPC	SRP	11,005	9,775
	TEPC	WALC	112,770	105,135
	TIDC	BANC	7,684	7,557
	TIDC	CISO	7,037	6,161
	TPWR	AVA	0	0

	TPWR	BPAT	3,579	3,262
	TPWR	NWMT	0	0
	TPWR	PGE	0	0
	TPWR	PSEI	8,687	8,020
	WALC	AZPS	3,014	1,208
	WALC	CISO	88,484	78,900
	WALC	LADWP	7,441	8,836
	WALC	NEVP	17,232	21,450
	WALC	SRP	1,613	2,535
	WALC	TEPC	28,060	32,209
<i>March</i>	AVA	AVRN	843	1,907
	AVA	BPAT	7,137	5,980
	AVA	CISO	0	0
	AVA	IPCO	6,884	6,138
	AVA	NWMT	12,284	15,825
	AVA	PACW	1,365	1,687
	AVA	PGE	0	0
	AVA	PSEI	48	0
	AVA	SCL	1	0
	AVA	TPWR	0	0
	AVRN	AVA	9,365	7,500
	AVRN	BPAT	35,803	27,804
	AVRN	PACW	50,961	46,833
	AVRN	PGE	10,672	8,902
	AVRN	SCL	8,148	6,275
	AZPS	CISO	101,126	84,808
<i>March</i>	AZPS	EPE	1,230	0
	AZPS	LADWP	6,416	5,577
	AZPS	NEVP	0	0
	AZPS	PACE	72,875	64,983
	AZPS	PNM	42,211	38,625
	AZPS	SRP	9,035	10,668

<i>March</i>	AZPS	TEPC	1,360	873	
	AZPS	WALC	4,802	3,892	
	BANC	BPAT	0	0	
	BANC	CISO	10,754	9,528	
	BANC	TIDC	1,592	1,512	
	BPAT	AVA	9,386	8,088	
	BPAT	AVRN	10,326	9,909	
	BPAT	BANC	0	0	
	BPAT	CISO	12,384	24,587	
	BPAT	IPCO	5,977	2,250	
	BPAT	LADWP	0	0	
	BPAT	NEVP	0	0	
	BPAT	NWMT	11,773	4,632	
	BPAT	PACW	6,083	2,833	
	BPAT	PGE	13,702	12,819	
	BPAT	PSEI	8,889	8,495	
	BPAT	PWRX	7,645	0	
	BPAT	SCL	3,219	2,122	
	<i>March</i>	BPAT	TPWR	17,623	15,649
		CISO	AVA	0	0
CISO		AZPS	82,170	74,420	
CISO		BANC	107,499	113,248	
CISO		BPAT	10,473	28,746	
CISO		LADWP	46,777	40,570	
CISO		NEVP	55,121	47,473	
CISO		PACW	15,197	34,444	
CISO		PGE	28,072	39,309	
CISO		PWRX	434,065	461,942	
CISO		SRP	111,187	96,684	
CISO		TEPC	326	142	
CISO		TIDC	10,100	10,844	
CISO		WALC	39,207	27,971	

<i>March</i>	EPE	AZPS	1,037	0
	EPE	PNM	11,109	11,384
	EPE	TEPC	35,391	33,829
	IPCO	AVA	22,926	23,327
	IPCO	BPAT	3,330	2,829
	IPCO	NEVP	18,534	15,705
	IPCO	NWMT	3,658	4,918
	IPCO	PACE	39,279	34,551
	IPCO	PACW	11,046	15,066
	IPCO	PSEI	3,355	4,705
	IPCO	SCL	5,802	6,243
	LADWP	AZPS	2,172	6,514
	LADWP	BPAT	0	0
	LADWP	CISO	54,533	52,366
	LADWP	NEVP	17,998	16,047
	LADWP	PACE	9,416	7,969
	LADWP	TEPC	0	0
	LADWP	WALC	9,635	8,746
	NEVP	AZPS	0	0
	NEVP	BPAT	0	0
	NEVP	CISO	73,933	64,556
	NEVP	IPCO	31,727	29,433
	NEVP	LADWP	15,202	18,509
	NEVP	PACE	116,996	96,563
NEVP	WALC	29,772	45,374	
<i>March</i>	NWMT	AVA	12,720	11,701
	NWMT	BPAT	5,496	3,892
	NWMT	IPCO	2,676	3,142
	NWMT	PACE	23,441	19,042
	NWMT	PACW	53	0
	NWMT	PGE	772	0
	NWMT	PSEI	61	0

<i>March</i>	NWMT	TPWR	0	0
	PACE	AZPS	42,756	51,240
	PACE	IPCO	33,251	38,797
	PACE	LADWP	51,426	49,780
	PACE	NEVP	8,876	9,765
	PACE	NWMT	11,275	14,017
	PACE	PACW	23,298	23,270
	PACE	SRP	0	0
	PACE	TEPC	0	0
	PACW	AVA	12,666	11,953
	PACW	AVRN	7,516	14,863
	PACW	BPAT	7,764	6,808
	PACW	CISO	40,353	69,037
	PACW	IPCO	43,002	37,678
	PACW	NWMT	0	0
	PACW	PGE	26,839	25,714
	PACW	PSEI	49,703	52,228
	PACW	SCL	993	920
	PGE	AVA	0	0
	PGE	AVRN	2,846	4,345
	PGE	BPAT	23,904	21,001
	PGE	CISO	22,640	21,679
	PGE	NWMT	22	0
	PGE	PACW	28,809	31,477
	PGE	PSEI	910	751
	PGE	SCL	1,353	1,242
	<i>March</i>	PGE	TPWR	0
	PNM	AZPS	38,141	34,143
	PNM	EPE	8,198	7,975
	PNM	SRP	1,129	1,074
	PNM	TEPC	9,412	10,814
	PSEI	AVA	0	0

<i>March</i>	PSEI	BPAT	10,871	7,685	
	PSEI	IPCO	0	0	
	PSEI	NWMT	38	0	
	PSEI	PACW	7,285	11,913	
	PSEI	PGE	1	18	
	PSEI	PWRX	32,706	31,272	
	PSEI	SCL	12,210	10,606	
	PSEI	TPWR	7,528	7,061	
	PWRX	BPAT	2,430	0	
	PWRX	CISO	0	0	
	PWRX	PSEI	813	2,314	
	SCL	AVA	11	0	
	SCL	AVRN	546	1,587	
	SCL	BPAT	2,608	3,009	
	SCL	IPCO	3,879	4,144	
	SCL	PACW	110	298	
	SCL	PGE	437	592	
	SCL	PSEI	7,709	10,736	
	<i>March</i>	SRP	AZPS	21,213	25,081
		SRP	CISO	131,792	123,464
SRP		PACE	0	0	
SRP		PNM	279	497	
SRP		TEPC	35,176	23,765	
SRP		WALC	9,195	8,611	
TEPC		AZPS	660	0	
TEPC		CISO	2,388	1,333	
TEPC		EPE	6,256	6,297	
TEPC		LADWP	0	0	
TEPC		PACE	98	26	
TEPC		PNM	13,487	17,114	
TEPC		SRP	7,596	7,837	
TEPC		WALC	121,864	112,123	



<i>March</i>	TIDC	BANC	6,744	6,596
	TIDC	CISO	4,191	3,511
	TPWR	AVA	0	0
	TPWR	BPAT	4,849	4,301
	TPWR	NWMT	0	0
	TPWR	PGE	0	0
	TPWR	PSEI	17,255	15,140
	WALC	AZPS	4,193	5,706
	WALC	CISO	88,668	79,775
	WALC	LADWP	13,611	11,062
	WALC	NEVP	20,247	23,538
	WALC	SRP	2,078	2,516
	WALC	TEPC	46,865	54,220

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

Month	BAA	Direction	Minimum requirement	Maximum requirement
<i>January</i>	AVA	up	0	100
	AVRN	up	0	378
	AZPS	up	0	373
	BANC	up	4	95
	BPAT	up	0	474
	CISO	up	41	2,720
	EPE	up	0	90
	IPCO	up	0	192
	LADWP	up	0	276
	NEVP	up	0	620
	NWMT	up	0	107
	PACE	up	89	706
	PACW	up	0	155
	PGE	up	0	188
	PNM	up	0	201
	PSEI	up	0	234
	PWRX	up	0	292
	SCL	up	0	34
	SRP	up	0	256
	TEPC	up	0	162
	TIDC	up	1	17
	TPWR	up	0	22
WALC	up	0	49	
	<b>ALL EIM</b>	<b>up</b>	<b>0</b>	<b>3,797</b>
<i>January</i>	AVA	down	0	115
	AVRN	down	0	423
	AZPS	down	0	372
	BANC	down	8	93
	BPAT	down	0	486
	CISO	down	0	2,403
	EPE	down	5	72
	IPCO	down	0	191

	LADWP	down	0	315
	NEVP	down	15	511
	NWMT	down	0	156
	PACE	down	0	661
	PACW	down	0	220
	PGE	down	0	250
	PNM	down	0	194
	PSEI	down	0	215
	PWRX	down	0	281
	SCL	down	0	39
	SRP	down	11	258
	TEPC	down	0	132
	TIDC	down	0	17
	TPWR	down	0	25
	WALC	down	0	65
	<b>ALL EIM</b>	<b>down</b>	<b>0</b>	<b>2,920</b>
February	AVA	up	0	100
	AVRN	up	1	378
	AZPS	up	0	373
	BANC	up	0	95
	BPAT	up	0	474
	CISO	up	0	2,781
	EPE	up	0	90
	IPCO	up	6	192
	LADWP	up	0	276
	NEVP	up	23	596
	NWMT	up	3	107
	PACE	up	0	706
	PACW	up	0	155
	PGE	up	0	188
	PNM	up	0	206
	PSEI	up	0	304
	PWRX	up	24	290
	SCL	up	6	34
SRP	up	1	256	
TEPC	up	0	162	

<i>February</i>	<i>TIDC</i>	up	0	17
	<i>TPWR</i>	up	5	22
	<i>WALC</i>	up	0	53
	<b>ALL WEIM</b>	<b>up</b>	<b>159</b>	<b>4,066</b>
	<i>AVA</i>	down	0	104
	<i>AVRN</i>	down	0	423
	<i>AZPS</i>	down	0	372
	<i>BANC</i>	down	0	93
	<i>BPAT</i>	down	0	486
	<i>CISO</i>	down	0	2,403
	<i>EPE</i>	down	0	93
	<i>IPCO</i>	down	0	191
	<i>LADWP</i>	down	0	315
	<i>NEVP</i>	down	0	511
	<i>NWMT</i>	down	1	133
	<i>PACE</i>	down	46	661
	<i>PACW</i>	down	0	220
	<i>PGE</i>	down	0	250
	<i>PNM</i>	down	0	194
	<i>February</i>	<i>PSEI</i>	down	0
<i>PWRX</i>		down	68	281
<i>SCL</i>		down	5	39
<i>SRP</i>		down	0	225
<i>TEPC</i>		down	0	132
<i>TIDC</i>		down	0	16
<i>TPWR</i>		down	4	25
<i>WALC</i>		down	1	44
<b>ALL EIM</b>		<b>down</b>	<b>0</b>	<b>2,845</b>
<i>March</i>		<i>AVA</i>	up	2
	<i>AVRN</i>	up	0	378
	<i>AZPS</i>	up	0	373
	<i>BANC</i>	up	0	95
	<i>BPAT</i>	up	0	474
	<i>CISO</i>	up	134	2,781
	<i>EPE</i>	up	1	90

March

IPCO	up	0	192
LADWP	up	0	276
NEVP	up	0	620
NWMT	up	8	107
PACE	up	0	705
PACW	up	0	155
PGE	up	9	188
PNM	up	0	206
PSEI	up	0	268
PWRX	up	48	329
SCL	up	5	34
SRP	up	0	256
TEPC	up	0	162
TIDC	up	1	17
TPWR	up	4	22
WALC	up	1	55
<b>ALL WEIM</b>	<b>up</b>	<b>0</b>	<b>3,967</b>
AVA	down	0	115
AVRN	down	0	461
AZPS	down	0	372
BANC	down	0	93
BPAT	down	0	515
CISO	down	0	2,403
EPE	down	0	93
IPCO	down	0	191
LADWP	down	0	336
NEVP	down	0	511
NWMT	down	7	144
PACE	down	0	661
PACW	down	0	220
PGE	down	22	250
PNM	down	0	194
PSEI	down	0	215
PWRX	down	24	281
SCL	down	3	39
SRP	down	0	288

March

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<i>TEPC</i>	down	0	132
<i>TIDC</i>	down	0	15
<i>TPWR</i>	down	3	25
<i>WALC</i>	down	0	52
<b>ALL WEIM</b>	<b>down</b>	<b>0</b>	<b>3,018</b>