

# 2023 Demand Response Operations Markets Activity Report: April 2024

James McAnany

PJM Demand Side Response Operations

April 9, 2024



This page intentionally left blank

**Figure 1: DY 23/24 Active Participants in DR Programs**

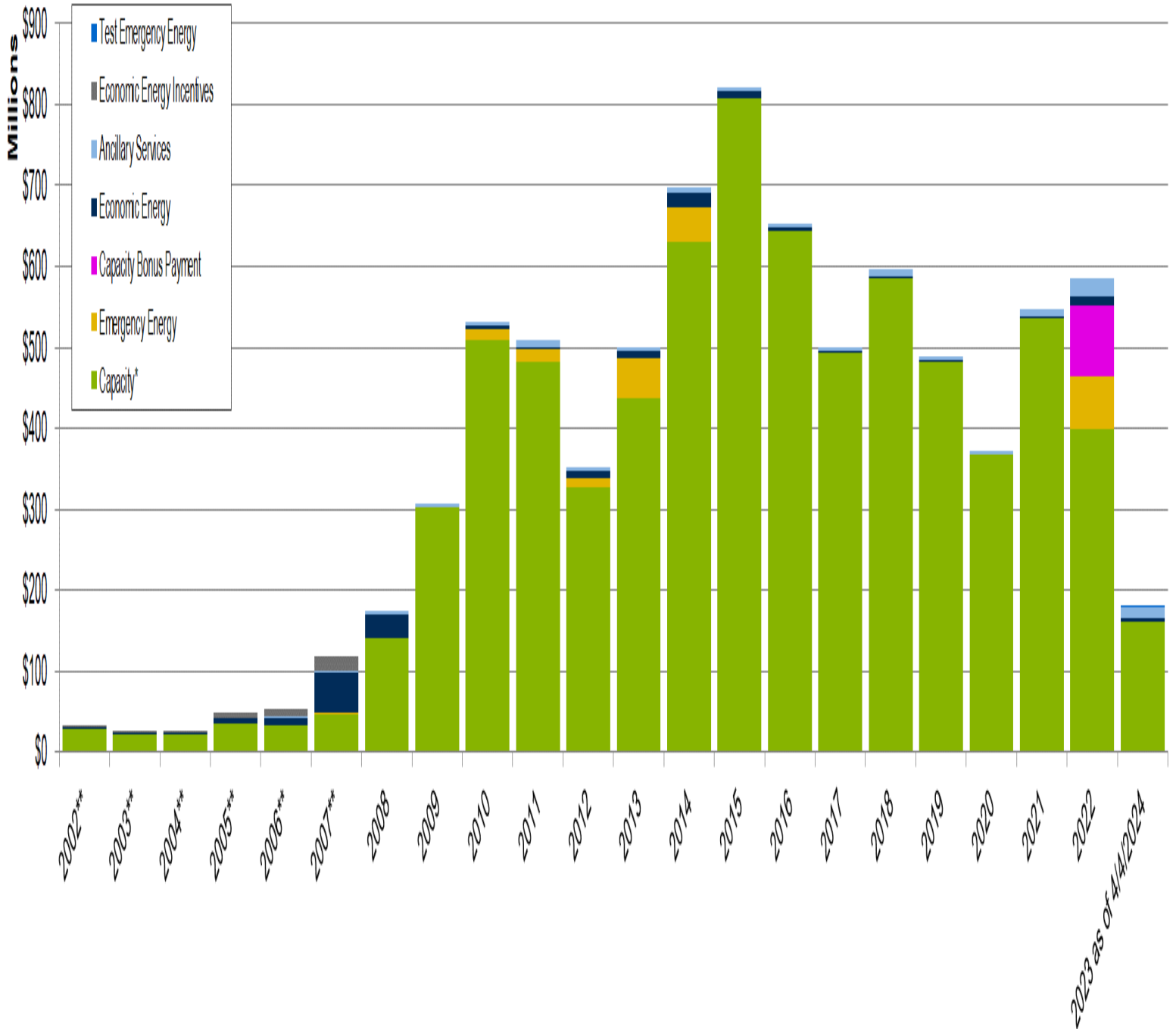
Zone	Economic		Load Management		Unique	
	Locations	MW	Locations	MW	Locations	MW
AECO	14	5.2	168	48.9	170	50.5
AEP	136	666.6	1,801	1,609.0	1,823	1,857.3
APS	27	308.6	1,166	726.1	1,176	747.6
ATSI	58	731.5	1,181	1,203.4	1,214	1,724.7
BGE	17	274.2	770	180.8	774	431.1
COMED	76	74.8	2,498	1,197.1	2,543	1,204.5
DAY	9	18.0	200	176.9	203	186.0
DEOK	15	161.9	381	186.8	382	227.2
DOM	58	137.5	1,200	646.5	1,248	753.2
DPL	131	33.7	401	108.5	402	108.6
DUQ	14	126.7	403	92.4	411	113.1
EKPC			19	266.1	19	266.1
JCPL	18	45.7	331	121.5	335	163.7
METED	14	109.8	467	162.7	475	255.0
PECO	40	89.3	1,147	325.0	1,157	359.1
PENELEC	12	60.4	593	231.1	599	239.6
PEPCO	13	24.3	584	136.4	594	141.9
PPL	26	103.1	1,338	475.1	1,354	514.0
PSEG	33	35.6	933	306.1	943	321.2
RECO			16	2.4	16	2.4
<b>Totals</b>	<b>711</b>	<b>3,007</b>	<b>15,597</b>	<b>8,203</b>	<b>15,838</b>	<b>9,667</b>

**Note:**

- 1) Data as of April 1, 2024.
- 2) Load Management MW are Winter ICAP and include FRR values.
- 3) Economic MW are CSP reported Load Reduction values.
- 4) Residential Locations reported as one location not a total number of end use customers in that program.
- 5) Unique MW: represents total estimated demand reduction assuming full Load Management and Economic reductions.
- 6) For the winter period of DY23/24, Total DR Commitment Value is 7,206 MW (includes FRR value of 413 MW)

This area intentionally left blank

**Figure 2: PJM Estimated Revenue for Economic and Load Management DR by Wholesale Markets**



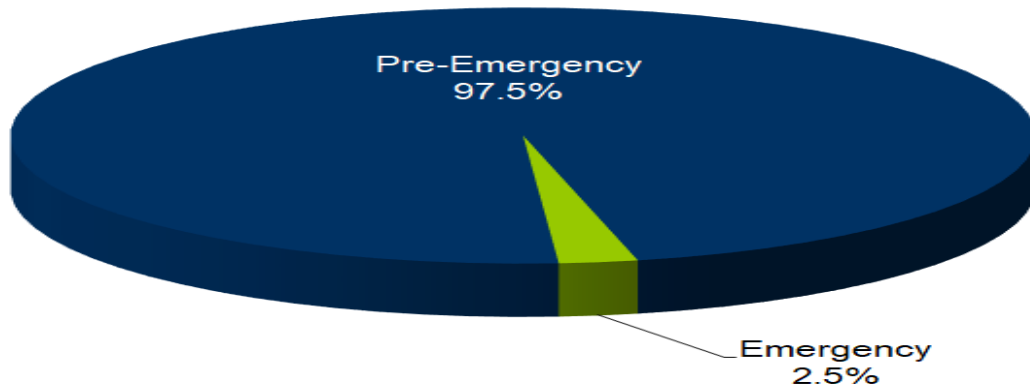
\* Capacity Net Revenue inclusive of Capacity Credits and Charges. From 2020 on this value also includes Price Responsive Demand Credits.

\*\* PJM assumes capacity value at \$50 MW Day (PJM does not know the value of capacity credits in the forward market prior to RPM; only a portion of capacity was purchased through the daily capacity market at the time).

Note: Capacity Bonus Payments include payments for Load Management, Economic (includes Ancillary Services) and Price Responsive Demand registrations.

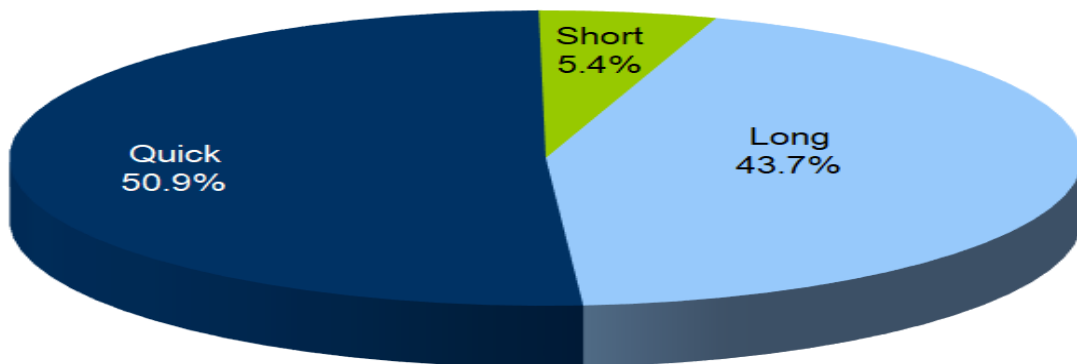


**Figure 4: DY 23/24 Confirmed Load Management DR Registrations by Resource**



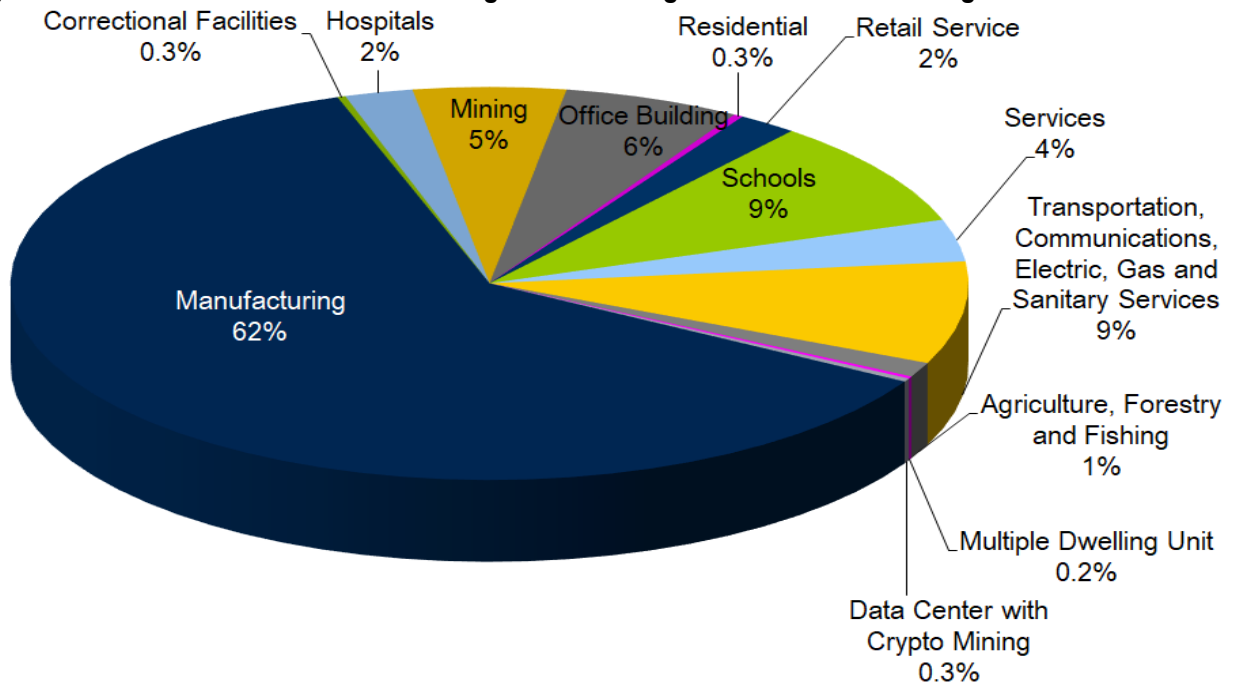
Note: Percent of Winter Nominated Capacity (MWs).

**Figure 5: DY 23/24 Confirmed Load Management DR Registrations Lead Times**



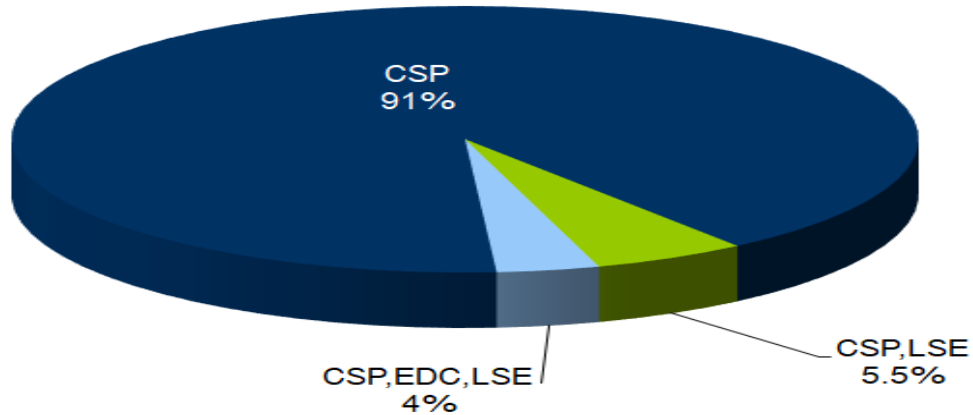
Note: Percent of Winter Nominated Capacity (MWs).

**Figure 6: DY 23/24 Confirmed Load Management DR Registrations Business Segments**



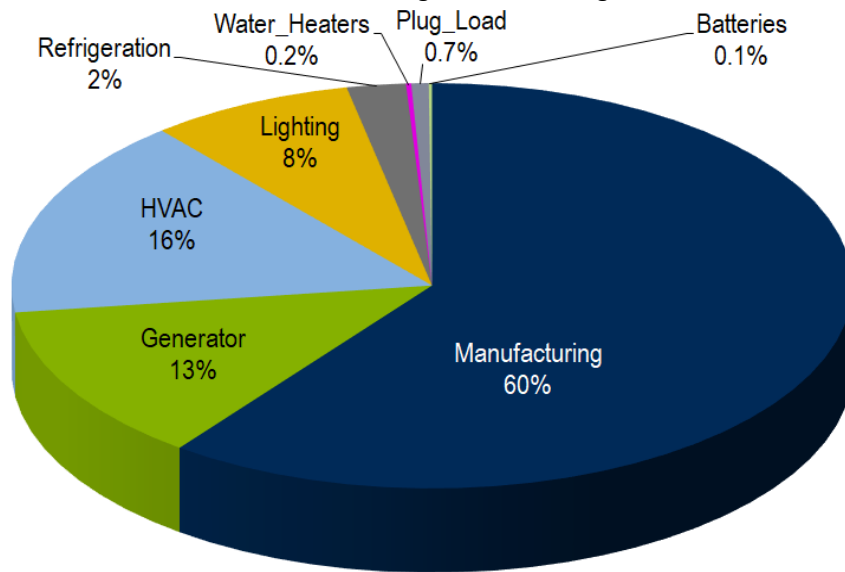
Note: Percent of Winter Nominated Capacity (MWs).

**Figure 7: DY 23/24 Confirmed Load Management DR Registrations Owner/Company Type**



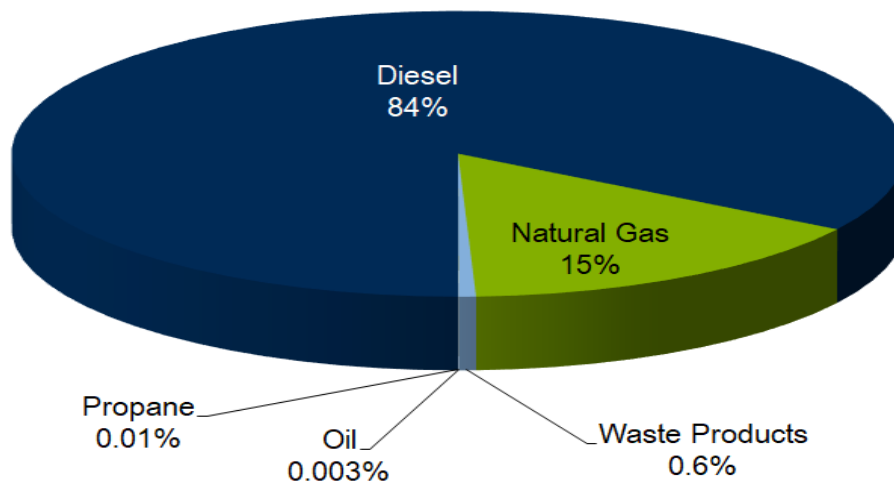
Note: Percent of Winter Nominated Capacity (MWs).

**Figure 8: DY 23/24 Confirmed Load Management DR Registrations Customer Load Reduction Methods**



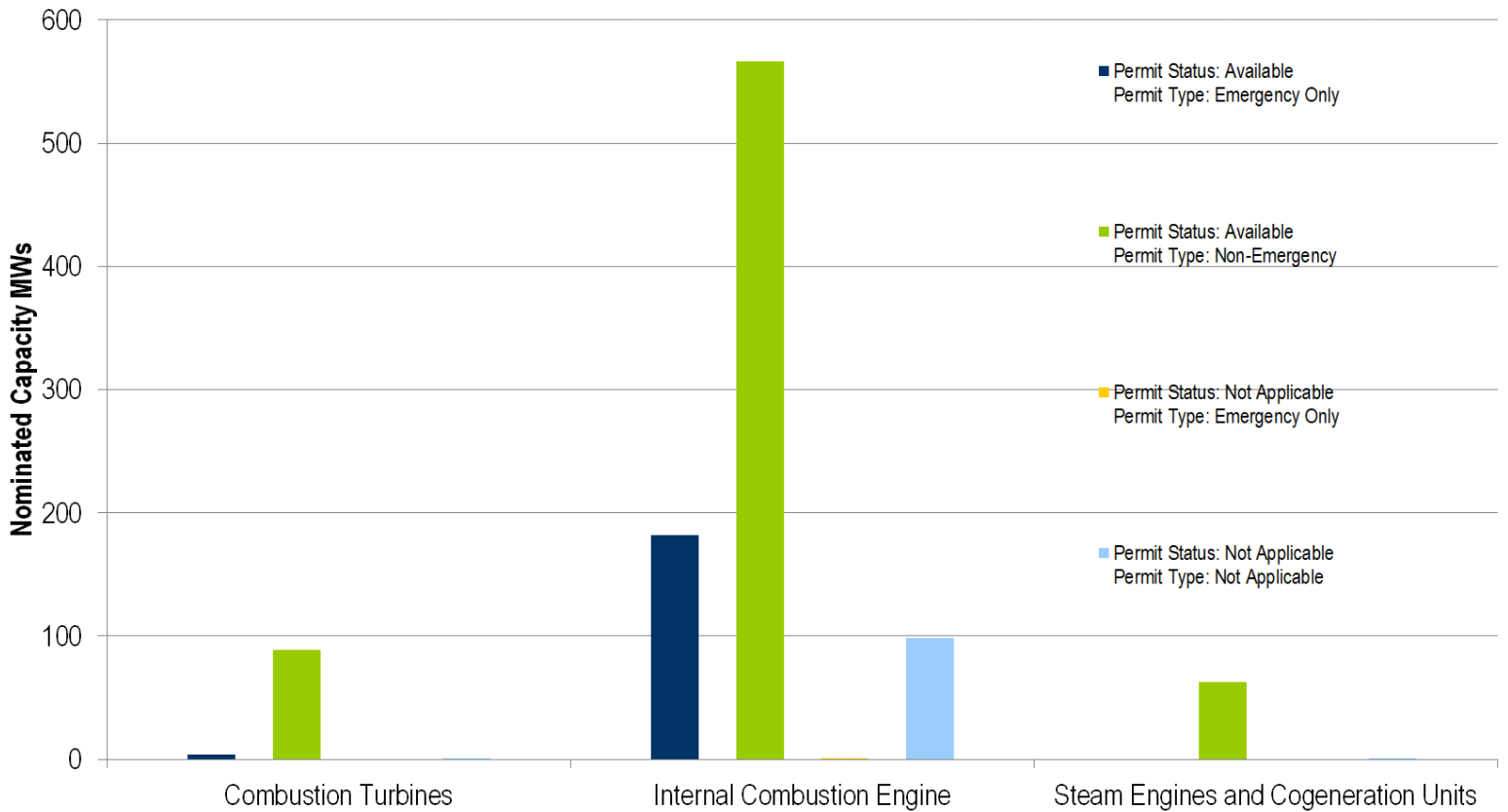
Note: Percent of Winter Nominated Capacity (MWs). Plug Load includes nominated capacity from Data Centers

**Figure 9: DY 23/24 Confirmed Load Management DR Registrations Fuel Mix with Behind the Meter Generation**



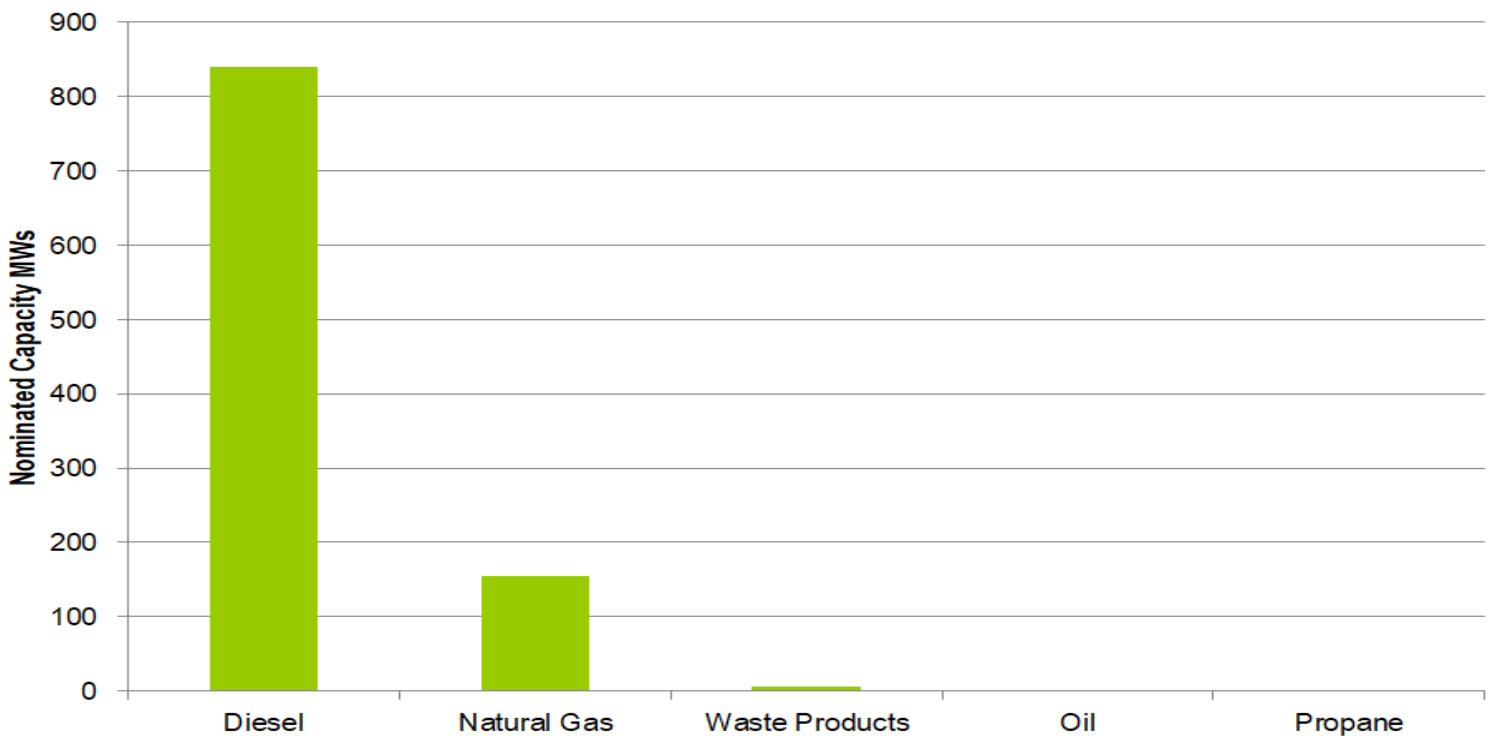
Note: Percent of Winter Nominated Capacity (MWs).

**Figure 10: DY 23/24 Confirmed Load Management DR Registrations Generator and Permit Type**



Note: Winter Nominated Capacity (MWs).

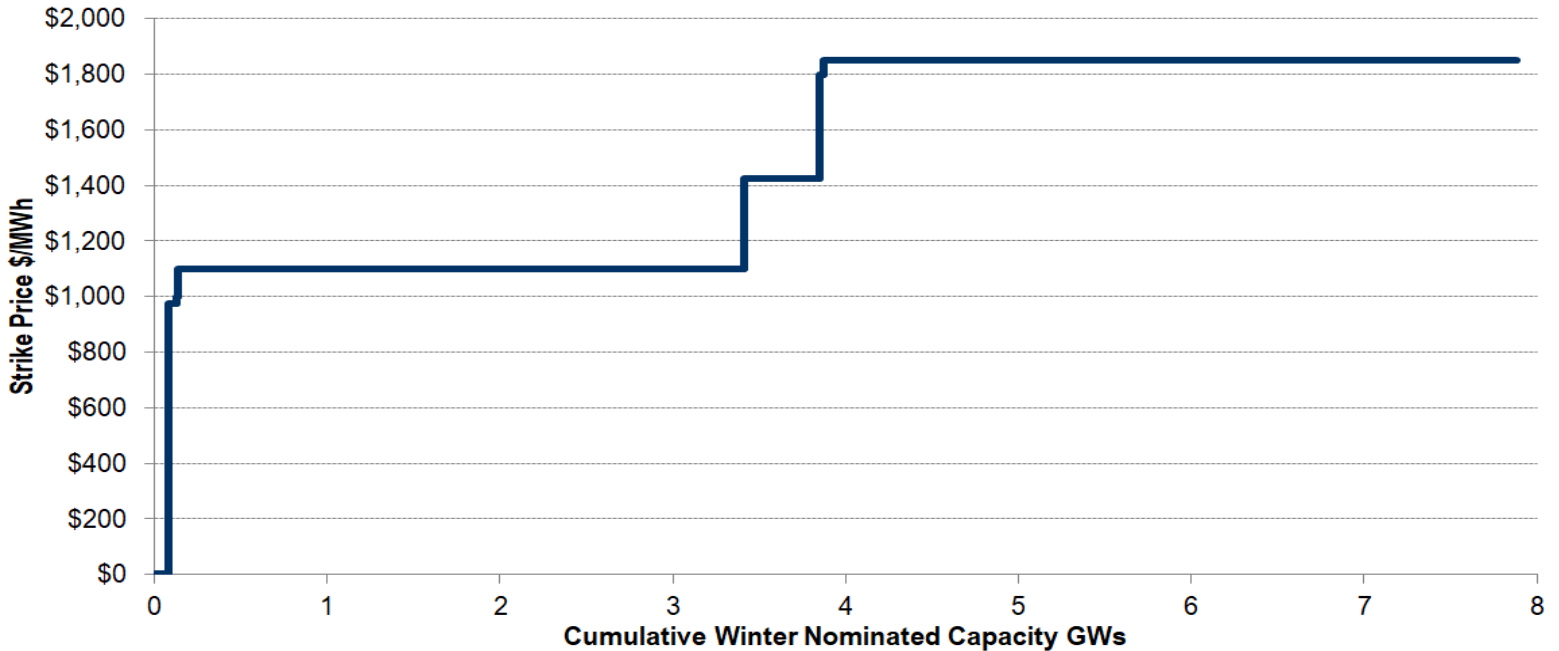
**Figure 11: DY 23/24 Confirmed Load Management DR Registrations Fuel Mix with Behind the Meter Generation**



Note: Winter Nominated Capacity (MWs).



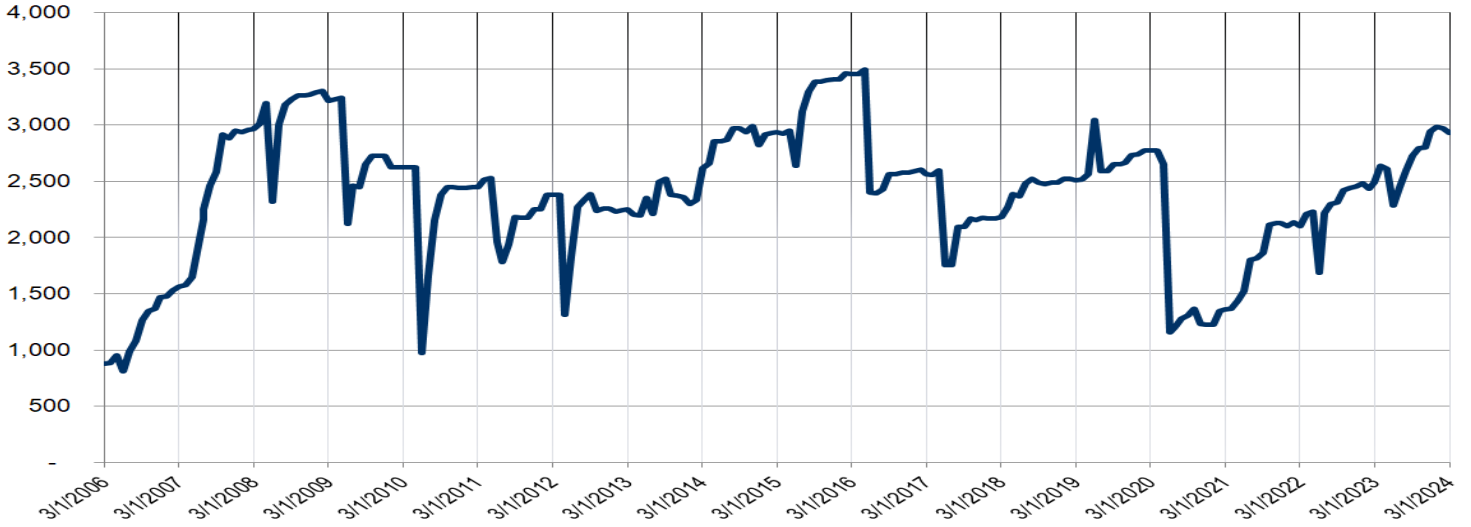
**Figure 12: DY 23/24 Confirmed Load Management Full DR Registrations Energy Supply Curve:**



**Figure 13: 2023 Load Management Demand Response Monthly Capacity Revenue from RPM**

Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AECO	\$188,693	\$170,433	\$188,693	\$182,606	\$188,693	\$81,955	\$84,687	\$84,687	\$81,955	\$84,687	\$81,955	\$84,687
AEP	\$2,022,440	\$1,826,720	\$2,022,440	\$1,957,200	\$2,022,440	\$1,308,135	\$1,351,739	\$1,351,740	\$1,308,135	\$1,351,739.50	\$1,308,135	\$1,351,740
APS	\$1,036,950	\$936,600	\$1,036,950	\$1,003,500	\$1,036,950	\$733,317	\$757,761	\$757,761	\$733,317	\$757,761.21	\$733,317	\$757,761
ATSI	\$1,447,257	\$1,307,200	\$1,447,257	\$1,400,571	\$1,447,257	\$944,697	\$976,187	\$976,187	\$944,697	\$976,186.59	\$944,697	\$976,187
BGE	\$639,046	\$577,203	\$639,046	\$618,432	\$639,046	\$353,388	\$365,167	\$365,167	\$353,388	\$365,167.29	\$353,388	\$365,167
COMED	\$2,921,684	\$2,638,940	\$2,921,684	\$2,827,436	\$2,921,684	\$1,131,922	\$1,169,652	\$1,169,652	\$1,131,922	\$1,169,652.32	\$1,131,922	\$1,169,652
DAY	\$326,275	\$294,700	\$326,275	\$315,750	\$326,275	\$214,302	\$221,445	\$221,445	\$214,302	\$221,445.40	\$214,302	\$221,445
DEOK	\$411,364	\$371,555	\$411,364	\$398,094	\$411,364	\$179,592	\$185,579	\$185,579	\$179,592	\$185,578.71	\$179,592	\$185,579
DOM	\$1,156,409	\$1,044,498	\$1,156,409	\$1,119,105	\$1,156,409	\$818,198	\$845,472	\$845,472	\$818,198	\$845,471.68	\$818,198	\$845,472
DPL	\$467,487	\$422,246	\$467,487	\$452,406	\$467,487	\$250,143	\$258,481	\$258,481	\$250,143	\$258,481.41	\$250,143	\$258,481
DUQ	\$230,330	\$208,040	\$230,330	\$222,900	\$230,330	\$121,025	\$125,059	\$125,059	\$121,025	\$125,059.27	\$121,025	\$125,059
EKPC	\$442,370	\$399,560	\$442,370	\$428,100	\$442,370	\$276,351	\$285,562	\$285,562	\$276,351	\$285,562.39	\$276,351	\$285,562
JCPL	\$448,375	\$404,984	\$448,375	\$433,911	\$448,375	\$178,907	\$184,870	\$184,870	\$178,907	\$184,870.36	\$178,907	\$184,870
METED	\$685,062	\$618,765	\$685,062	\$662,963	\$685,062	\$320,993	\$331,692	\$331,692	\$320,993	\$331,692.25	\$320,993	\$331,692
PECO	\$1,105,466	\$998,485	\$1,105,466	\$1,069,806	\$1,105,466	\$561,811	\$580,538	\$580,538	\$561,811	\$580,538.24	\$561,811	\$580,538
PENELEC	\$890,253	\$804,100	\$890,253	\$861,536	\$890,253	\$433,978	\$448,444	\$448,444	\$433,978	\$448,444.14	\$433,978	\$448,444
PEPCO	\$470,516	\$424,982	\$470,516	\$455,338	\$470,516	\$237,849	\$245,777	\$245,777	\$237,849	\$245,777.30	\$237,849	\$245,777
PPL	\$1,964,912	\$1,774,759	\$1,964,912	\$1,901,528	\$1,964,912	\$866,174	\$895,046	\$895,046	\$866,174	\$895,046.26	\$866,174	\$895,046
PSEG	\$893,716	\$807,228	\$893,716	\$864,887	\$893,716	\$404,878	\$418,374	\$418,374	\$404,878	\$418,374.14	\$404,878	\$418,374
RECO	\$4,854	\$4,384	\$4,854	\$4,697	\$4,854	\$3,266	\$3,375	\$3,375	\$3,266	\$3,375.28	\$3,266	\$3,375
<b>Total</b>	<b>\$17,753,458</b>	<b>\$16,035,381</b>	<b>\$17,753,458</b>	<b>\$17,180,765</b>	<b>\$17,753,458</b>	<b>\$9,420,882</b>	<b>\$9,734,911</b>	<b>\$9,734,911</b>	<b>\$9,420,882</b>	<b>\$9,734,911</b>	<b>\$9,420,882</b>	<b>\$9,734,911</b>

Total Capacity Credits: \$153,678,809

**Figure 14: PJM Economic Demand Response Capability in Energy Market (3/1/2006-4/1/2024)**


Capability represents total amount that may be offered. Actual offered and cleared volume may be significantly lower and is represented in subsequent figures/tables in report.

**Figure 15: 2023 Economic Demand Response Dispatch/Cleared vs Settled Total Energy Market Summary**

Time		Zone		MWh			Registration Hours			Credits
Year	Month	Dispatched/Cleared	Settled	Dispatched/Cleared	Settled	%	Dispatched/Cleared	Settled	%	\$
2023	1	3	3	6,047	6,295	104%	195	195	100%	\$304,972
2023	2	5	5	111	124	112%	140	140	100%	\$10,804
2023	3	5	5	1,323	1,327	100%	232	232	100%	\$67,542
2023	4	5	5	3,075	3,151	102%	273	273	100%	\$158,955
2023	5	5	5	3,737	3,633	97%	325	325	100%	\$179,656
2023	6	6	6	3,157	3,036	96%	378	378	100%	\$160,406
2023	7	10	10	11,744	12,113	103%	1,061	1,061	100%	\$1,161,881
2023	8	10	10	1,905	1,832	96%	622	622	100%	\$103,073
2023	9	11	11	1,957	2,659	136%	536	536	100%	\$195,506
2023	10	8	8	11,631	11,214	96%	678	678	100%	\$669,671
2023	11	8	8	6,934	6,337	91%	523	523	100%	\$363,411
2023	12	7	7	3,870	3,788	98%	304	304	100%	\$197,323
<b>YTD Totals</b>				<b>55,491</b>	<b>55,509</b>	<b>100%</b>	<b>5,267</b>	<b>5,267</b>	<b>100%</b>	<b>\$3,573,199</b>
<b>YTD Average</b>		<b>7</b>	<b>7</b>							

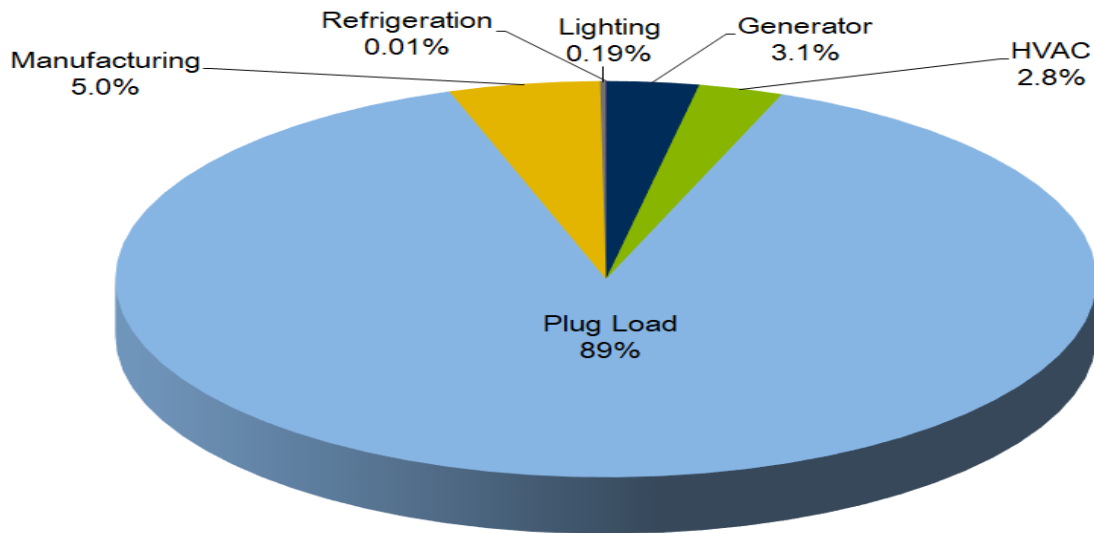
**Figure 16: 2023 Economic Demand Response Dispatched vs Settled Real-Time Energy Market Summary**

Time		Zone		MWh			Registration Hours			Credits
Year	Month	Dispatched	Settled	Dispatched	Settled	%	Dispatched	Settled	%	\$
2023	1	2	2	7	21	309%	43	43	100%	\$507
2023	2	2	2	12	36	304%	66	66	100%	\$718
2023	3	3	3	22	52	237%	198	198	100%	\$1,176
2023	4	2	2	26	100	380%	203	203	100%	\$2,166
2023	5	2	2	34	138	401%	240	240	100%	\$4,324
2023	6	2	2	31	51	164%	242	242	100%	\$1,342
2023	7	7	7	492	679	138%	347	347	100%	\$71,063
2023	8	7	7	365	250	68%	294	294	100%	\$12,717
2023	9	8	8	566	1,263	223%	286	286	100%	\$101,196
2023	10	4	4	85	150	176%	229	229	100%	\$9,472
2023	11	5	5	24	80	333%	145	145	100%	\$2,071
2023	12	4	4	28	65	235%	184	184	100%	\$2,228
<b>YTD Totals</b>				<b>1,693</b>	<b>2,885</b>	<b>170%</b>	<b>2,477</b>	<b>2,477</b>	<b>100%</b>	<b>\$208,980</b>
<b>YTD Average</b>		<b>4</b>	<b>4</b>							

**Figure 17: 2023 Economic Demand Response Cleared vs Settled Day-Ahead Energy Market Summary**

Time		Zone		MWh			Registration Hours			Credits
Year	Month	Cleared	Settled	Cleared	Settled	%	Cleared	Settled	%	\$
2023	1	2	2	6,040	6,274	104%	152	152	100%	\$304,465
2023	2	4	4	99	87	88%	74	74	100%	\$10,085
2023	3	4	4	1,301	1,275	98%	34	34	100%	\$66,366
2023	4	4	4	3,049	3,050	100%	70	70	100%	\$156,789
2023	5	3	3	3,703	3,496	94%	85	85	100%	\$175,331
2023	6	5	5	3,126	2,985	95%	136	136	100%	\$159,063
2023	7	9	9	11,252	11,435	102%	714	714	100%	\$1,090,817
2023	8	5	5	1,540	1,582	103%	328	328	100%	\$90,356
2023	9	6	6	1,390	1,396	100%	250	250	100%	\$94,311
2023	10	7	7	11,546	11,064	96%	449	449	100%	\$660,199
2023	11	7	7	6,910	6,257	91%	378	378	100%	\$361,340
2023	12	5	5	3,843	3,723	97%	120	120	100%	\$195,095
<b>YTD Totals</b>				<b>53,798</b>	<b>52,625</b>	<b>98%</b>	<b>2,790</b>	<b>2,790</b>	<b>100%</b>	<b>\$3,364,218</b>
<b>YTD Average</b>		<b>5</b>	<b>5</b>							

**Figure 18: 2023 Estimated Total Economic DR Load Reduction MWh by Load Reduction Method**



Note: Plug Load includes reductions from Data Centers

This area intentionally left blank

**Figure 19: 2023 Economic Demand Response Capability in the Ancillary Service Markets**

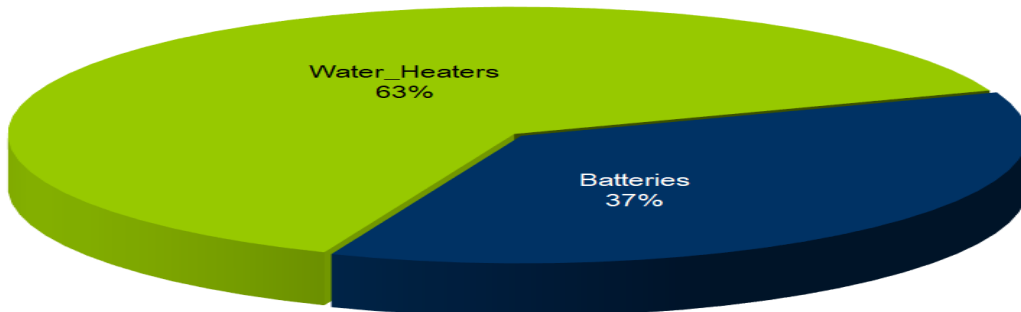
Synch Reserves	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Locations	MAD	153	152	164	164	165	179	198	200	200	205	211	215
	Non-MAD	144	156	152	153	154	167	177	183	188	196	204	217
RTO		297	308	316	317	319	346	375	383	388	401	415	432
<b>Average Number of Unique Participating Locations per Month:</b>		<b>358</b>											
MWs	MAD	427	427	478	439	434	449	454	538	538	586	597	592
	Non-MAD	938	1,005	1,229	1,230	1,326	1,345	1,426	1,546	1,568	1,541	1,579	1,654
RTO		1,365	1,431	1,707	1,669	1,760	1,794	1,880	2,084	2,106	2,127	2,176	2,245
<b>Average MWs per Month:</b>		<b>1,862</b>											

Regulation	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Locations	RTO	152	164	154	158	159	167	158	161	161	158	159	157
<b>Average Number of Unique Participating Locations per Month:</b>		<b>159</b>											
MWs	RTO	130	141	138	140	152	156	145	146	146	181	182	180
<b>Average MWs per Month:</b>		<b>153</b>											

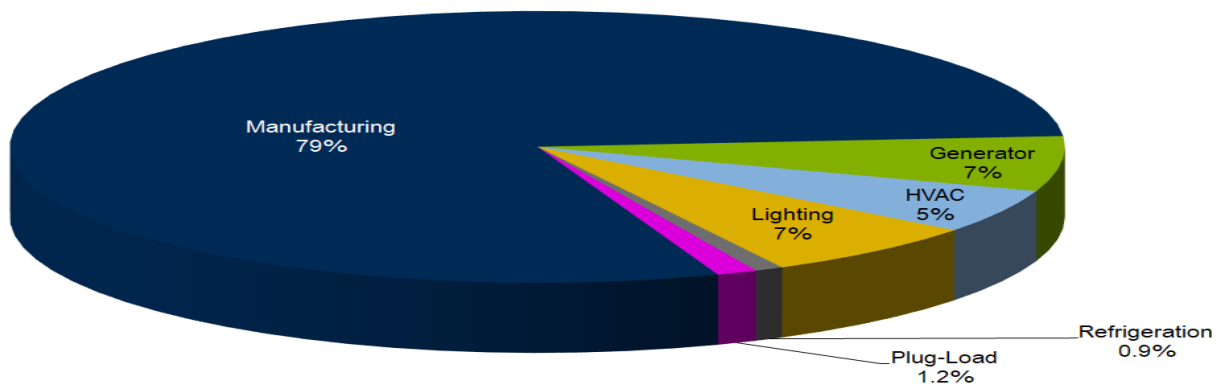
Capability represents total amount that may be offered. Actual offered and cleared volume may be significantly lower and is represented in subsequent figures/tables in report

**Figure 20: 2023 PJM Demand Response Confirmed Regulation Registrations Load Reduction Methods**



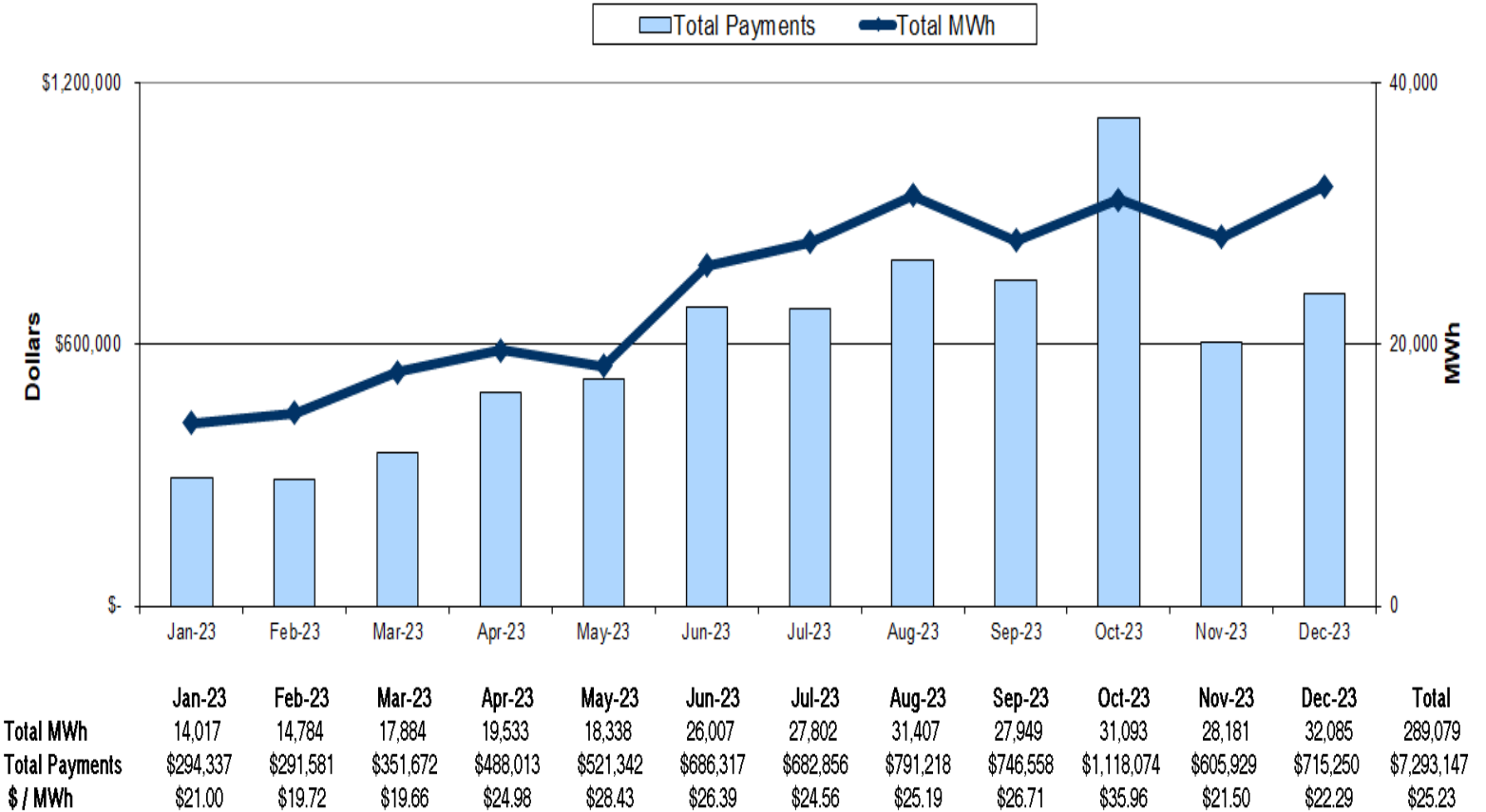
Note: Percent of CSP Reported Load Reduction MWs

**Figure 21: 2023 PJM Demand Response Confirmed Synch Reserve Registrations Load Reduction Methods**

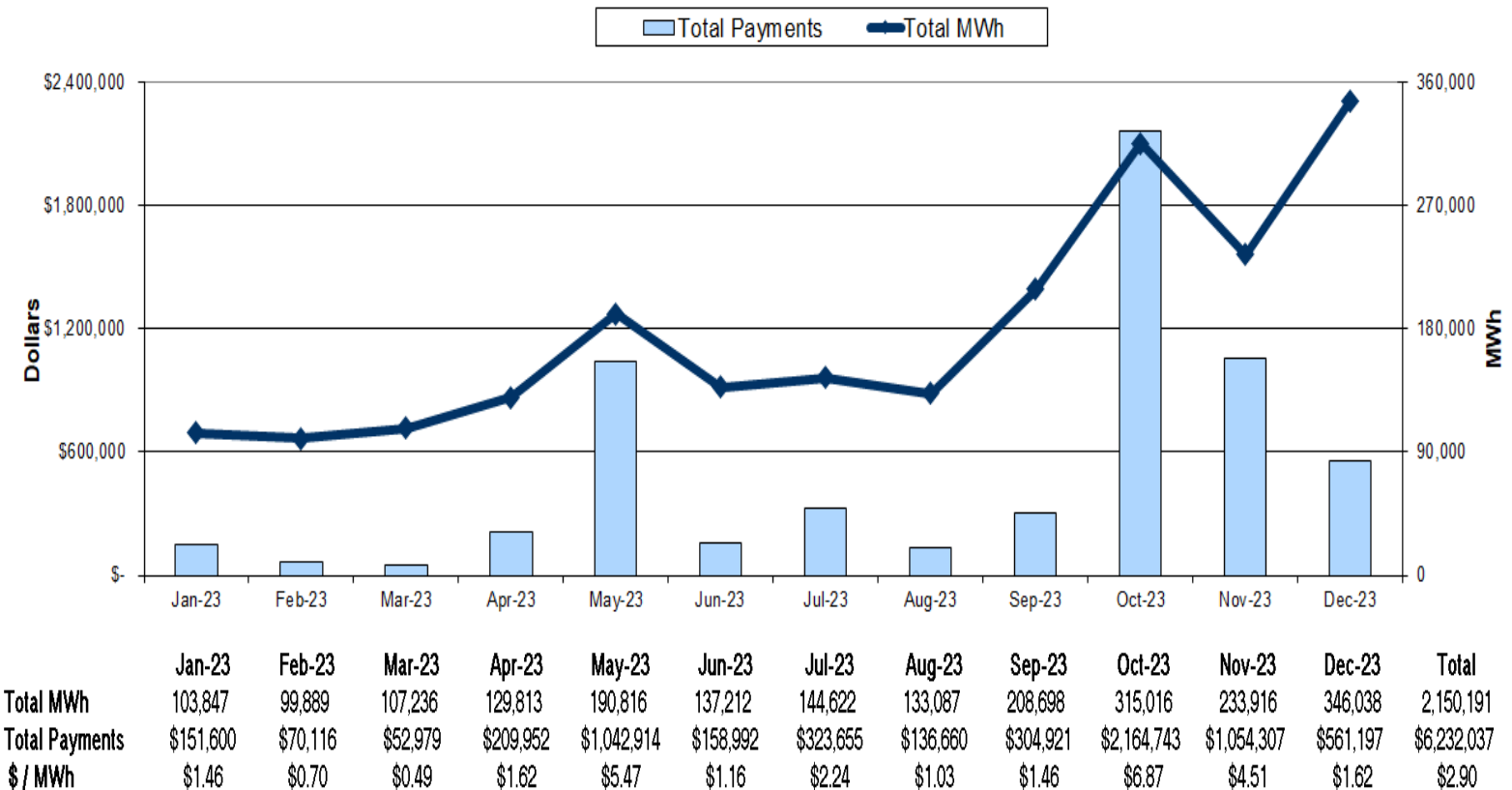


Note: Percent of CSP Reported Load Reduction MWs. Plug Load includes reported reductions from Data Centers.

**Figure 22: 2023 Economic Demand Response Regulation Market Participation**

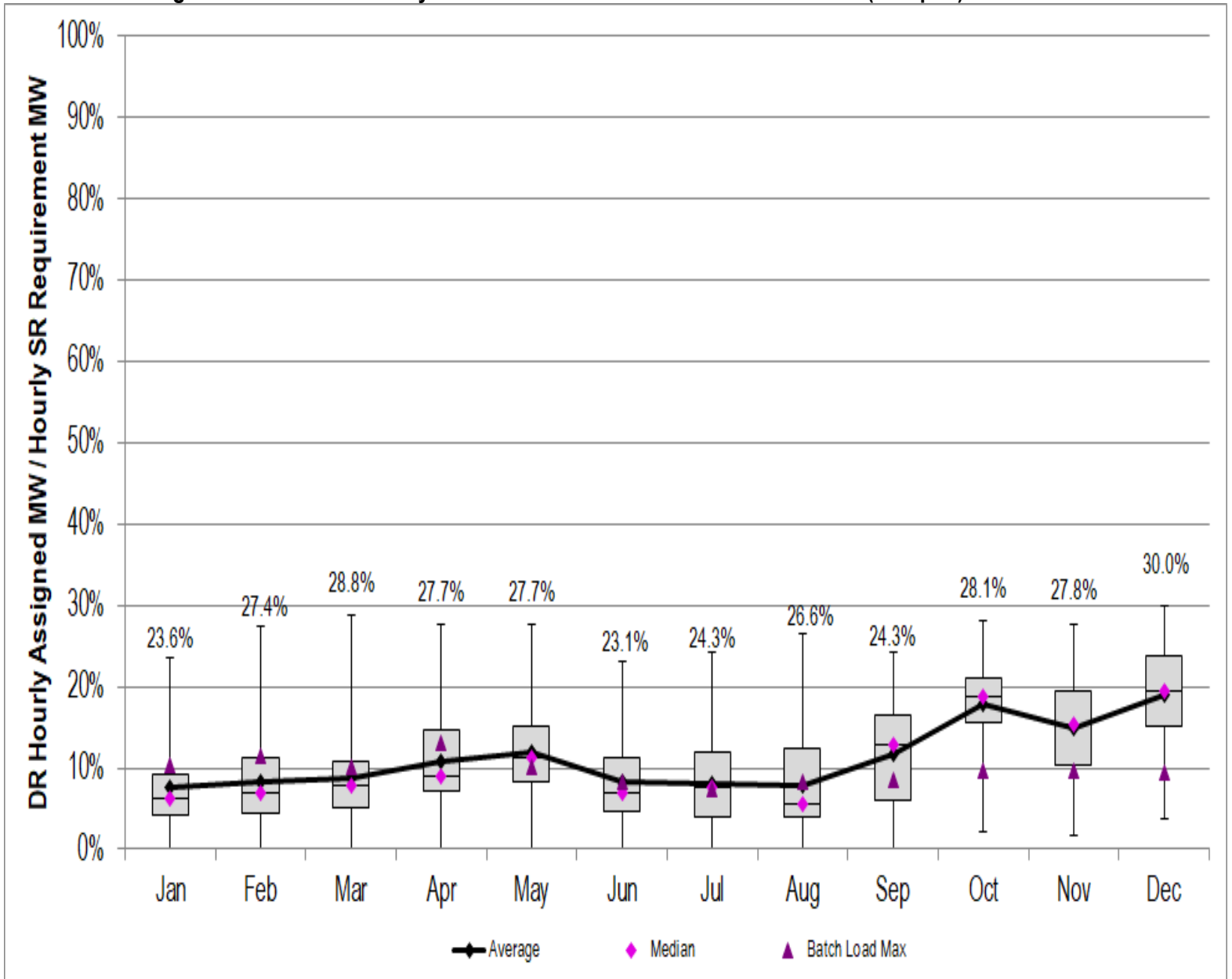


**Figure 23: 2023 Economic Demand Response Synchronous Reserve Market Participation**

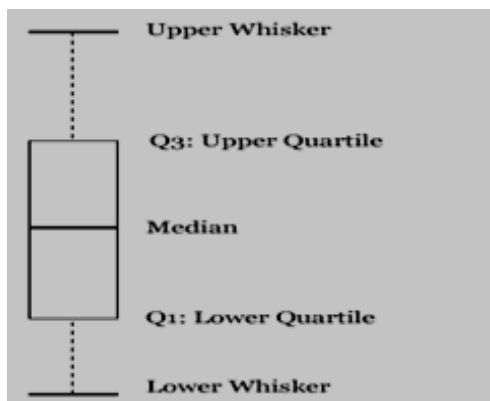


Note: For Figures 22 and 23 above, MWh=sum of the settled MW. Example: 1 MW load available for 12 hours = 12 MWh.

**Figure 24: Economic DR Synchronous Reserve Penetration Distribution (Box-plot) for 2023**



- Notes:
- 1) Economic Demand Response are Tier2 resources.
  - 2) Percents shown on upper whisker are maximum hourly DR percentage of Total SR Requirement.
  - 3) The Box-plot depicts the distribution of DR hourly assigned (as a percentage of the Total requirement) for a month:



- The upper whisker is the maximum value
- The box top is the Upper Quartile (75%) value
- The line inside the box is the median (50%) value
- The box bottom is the Lower Quartile (25%) value
- The lower whisker is the minimum value