

2022 Demand Response Operations Markets Activity Report: July 2023

James McAnany

PJM Demand Side Response Operations

July 11, 2023



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Figure 1: DY 22/23 Active Participants in DR Programs

State	Zone	EDC	Economic		Load Management		Price Responsive Demand		Unique	
			Locations	MW	Locations	MW	Locations	MW	Locations	MW
DC	PEPCO	PEPCO	1	14.2	247	81.3			247	81.3
DE	DPL	DEMEC	9	9.5	29	14.7			29	14.7
DE	DPL	DOVDE			15	3.5			15	3.5
DE	DPL	DPL	3	96.0	195	84.2	131	29.0	327	113.3
DE	DPL	ODEC			11	3.5			11	3.5
DE	DPL-SOUTH	DPL					125	8.9	125	8.9
IL	COMED	BATAV			1	0.8			1	0.8
IL	COMED	COMED	63	44.1	2,599	1,315.5			2,639	1,320.4
IL	COMED	GENEVA			10	10.4			10	10.4
IL	COMED	IMEAA1			2	21.5			2	21.5
IL	COMED	ROCH			20	24.1			20	24.1
IN	AEP	AEPIMP	1	5.0	159	467.2			160	472.2
IN	AEP	HEREC			1	28.1			1	28.1
IN	AEP	WVPA	1	6.1	1	6.1			1	6.1
KY	AEP	AEPKPT			7	15.4			7	15.4
KY	DEOK	DEK			2	3.7			2	3.7
KY	EKPC	EKPC			11	325.9			11	325.9
MD	AEP	ODEC			1	0.0			1	0.0
MD	APS	AETSAP	12	26.9	108	69.9			110	70.1
MD	APS	FESCHG			1	0.0			1	0.0
MD	APS	FESCTH			1	0.1			1	0.1
MD	BGE	BC	27	273.9	736	187.3	119	172.5	860	611.1
MD	DPL	DPL	7	40.7	142	33.7	78	6.8	220	40.5
MD	DPL	EASTON			6	0.4			6	0.4
MD	DPL	ODEC			11	8.0			11	8.0
MD	DPL-SOUTH	DPL					757	23.2	757	23.2
MD	PEPCO	PEPCO	6	150.5	254	65.5	1,472	202.1	1,730	268.0
MD	PEPCO	SMECO	3	0.4	36	7.9			38	8.1
MI	AEP	AEPIMP			3	15.4			3	15.4
NJ	AECO	AE	7	3.2	167	41.3			169	42.4
NJ	AECO	VMEU			25	6.8			25	6.8
NJ	JCPL	JCBGS	9	41.3	326	109.4			329	149.6
NJ	PSEG	BSRNJ	1	10.0					0	0.0
NJ	PSEG	PSEG	20	56.0	925	306.1			936	323.5
NJ	RECO	RECO			16	2.0			16	2.0
NY	PENELEC	PaElec			1	1.2			1	1.2
OH	AEP	AEPOPT	76	294.5	835	594.1			854	649.1
OH	AEP	AMPO	1	10.0	49	80.2			50	90.2
OH	ATSI	AMPO	1	12.0	17	33.4			17	33.4
OH	ATSI	CPP	2	14.0	13	17.2			13	17.2
OH	ATSI	OEEDC	24	261.1	952	979.4			972	1,217.1
OH	DAY	AMPO			19	35.9			19	35.9
OH	DAY	DAYEDC	4	5.2	193	158.2			194	160.8
OH	DEOK	AMPO			19	15.8			19	15.8
OH	DEOK	DEOEDC	14	176.4	345	192.4			346	227.4
PA	APS	AECI			2	2.2			2	2.2
PA	APS	AETSAP	7	85.4	590	312.9			593	329.1

State	Zone	EDC	Economic		Load Management		Price Responsive Demand		Unique	
			Locations	MW	Locations	MW	Locations	MW	Locations	MW
PA	ATSI	PAPWR	12	100.8	98	89.2			108	105.0
PA	DUQ	DLCO	9	103.5	384	119.2			391	196.5
PA	METED	MetEd	8	21.9	439	194.0			442	196.4
PA	PECO	PE	34	84.3	980	322.3			987	354.4
PA	PENELEC	AECI			6	10.8			6	10.8
PA	PENELEC	AMPO			1	2.8			1	2.8
PA	PENELEC	PaElec	6	72.1	503	268.1			506	293.1
PA	PENELEC	WELLSB			1	1.2			1	1.2
PA	PPL	AMPO			11	26.8			11	26.8
PA	PPL	CTZECL			1	0.0			1	0.0
PA	PPL	PPL	29	140.2	1,082	491.5			1,097	549.4
PA	PPL	UGI-UI			10	3.5			10	3.5
TN	AEP	AEPAPT			11	4.2			11	4.2
VA	AEP	AEPAPT	9	45.6	250	277.2			254	282.5
VA	AEP	AMPO	2	20.5	18	11.1			18	11.1
VA	AEP	RADFRD	1	4.4	1	1.3			1	1.3
VA	AEP	SALEM			5	0.2			5	0.2
VA	AEP	VATECH			1	6.6			1	6.6
VA	APS	ODEC	2	0.4	49	25.2			49	25.2
VA	DOM	CVEC			8	2.5			8	2.5
VA	DOM	DOMEDC	62	144.4	927	679.6			971	784.6
VA	DOM	DOMVME			24	88.0			24	88.0
VA	DOM	NVEC	2	1.3	97	23.2			97	23.2
VA	DOM	ODEC	5	3.4	43	14.7			46	15.0
VA	DPL	ODEC			10	1.5			10	1.5
WV	AEP	AEPAPT	6	169.0	203	465.2			205	545.3
WV	AEP	APWVP			1	0.1			1	0.1
WV	APS	AETSAP	22	87.6	265	261.0			265	261.0
Total			508	2,636	14,532	9,074	2,682	442	17,428	10,595

Note:

- 1) Data as of 4/3/2023.
- 2) Load Management MW are Winter ICAP, PRD MW are ICAP
- 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: represent total estimated demand reduction assuming full Load Management and Economic reductions.
- 6) As of April 1, 2023, DY22/23 Total Commitment Value is 7,529 MW with RPM Committed Values of 7,067 MW for Load Management
- 7) As of April 1, 2023, DY22/23 RPM Committed Values is 230 MW for PRD.

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Figure 2: DY 22/23 MWs in Load Management DR by Resource, Product, and Lead Times

Zone		Capacity Performance			Total DR MW	
		Annual	30	60		120
AECO						
	Pre-Emergency	48.1	33.2	4.0	10.9	48.1
	Emergency	0.0	0.0	0.0	0.0	0.0
	Total	48.1	33.2	4.0	10.9	48.1
AEP						
	Pre-Emergency	1,942.7	1,021.5	140.6	780.6	1,942.7
	Emergency	29.7	13.3	1.1	15.3	29.7
	Total	1,972.4	1,034.8	141.7	795.8	1,972.4
APS						
	Pre-Emergency	651.8	353.9	16.1	281.8	651.8
	Emergency	19.6	14.6	0.0	5.0	19.6
	Total	671.4	368.4	16.1	286.8	671.4
ATSI						
	Pre-Emergency	1,070.0	404.4	71.9	593.7	1,070.0
	Emergency	49.2	18.9	2.2	28.1	49.2
	Total	1,119.2	423.3	74.1	621.8	1,119.2
BGE						
	Pre-Emergency	176.1	121.8	11.2	43.0	176.1
	Emergency	11.3	8.4	0.0	2.9	11.3
	Total	187.3	130.3	11.2	45.8	187.3
COMED						
	Pre-Emergency	1,305.8	916.6	23.0	366.2	1,305.8
	Emergency	66.5	33.1	3.1	30.3	66.5
	Total	1,372.3	949.7	26.1	396.4	1,372.3
DAY						
	Pre-Emergency	187.8	129.6	1.8	56.4	187.8
	Emergency	6.3	5.8	0.0	0.4	6.3
	Total	194.1	135.4	1.8	56.9	194.1
DEOK						
	Pre-Emergency	210.5	97.0	7.6	105.9	210.5
	Emergency	1.5	1.5	0.0	0.0	1.5
	Total	212.0	98.4	7.6	105.9	212.0
DOM						
	Pre-Emergency	666.3	141.8	37.8	486.7	666.3
	Emergency	141.7	74.7	13.3	53.7	141.7
	Total	808.0	216.5	51.1	540.4	808.0
DPL						
	Pre-Emergency	145.8	100.6	3.3	41.9	145.8
	Emergency	3.6	1.2	2.0	0.4	3.6
	Total	149.4	101.9	5.3	42.3	149.4
DUQ						
	Pre-Emergency	118.8	67.0	9.3	42.5	118.8
	Emergency	0.4	0.4	0.0	0.0	0.4
	Total	119.2	67.4	9.3	42.5	119.2
EKPC						
	Pre-Emergency	323.7	19.8	12.8	291.0	323.7
	Emergency	2.2	2.2	0.0	0.0	2.2
	Total	325.9	22.1	12.8	291.0	325.9
JCPL						
	Pre-Emergency	106.3	69.7	3.6	33.0	106.3
	Emergency	3.1	3.1	0.0	0.0	3.1
	Total	109.4	72.8	3.6	33.0	109.4
METED						
	Pre-Emergency	194.0	125.6	11.8	56.6	194.0
	Emergency	0.0	0.0	0.0	0.0	0.0

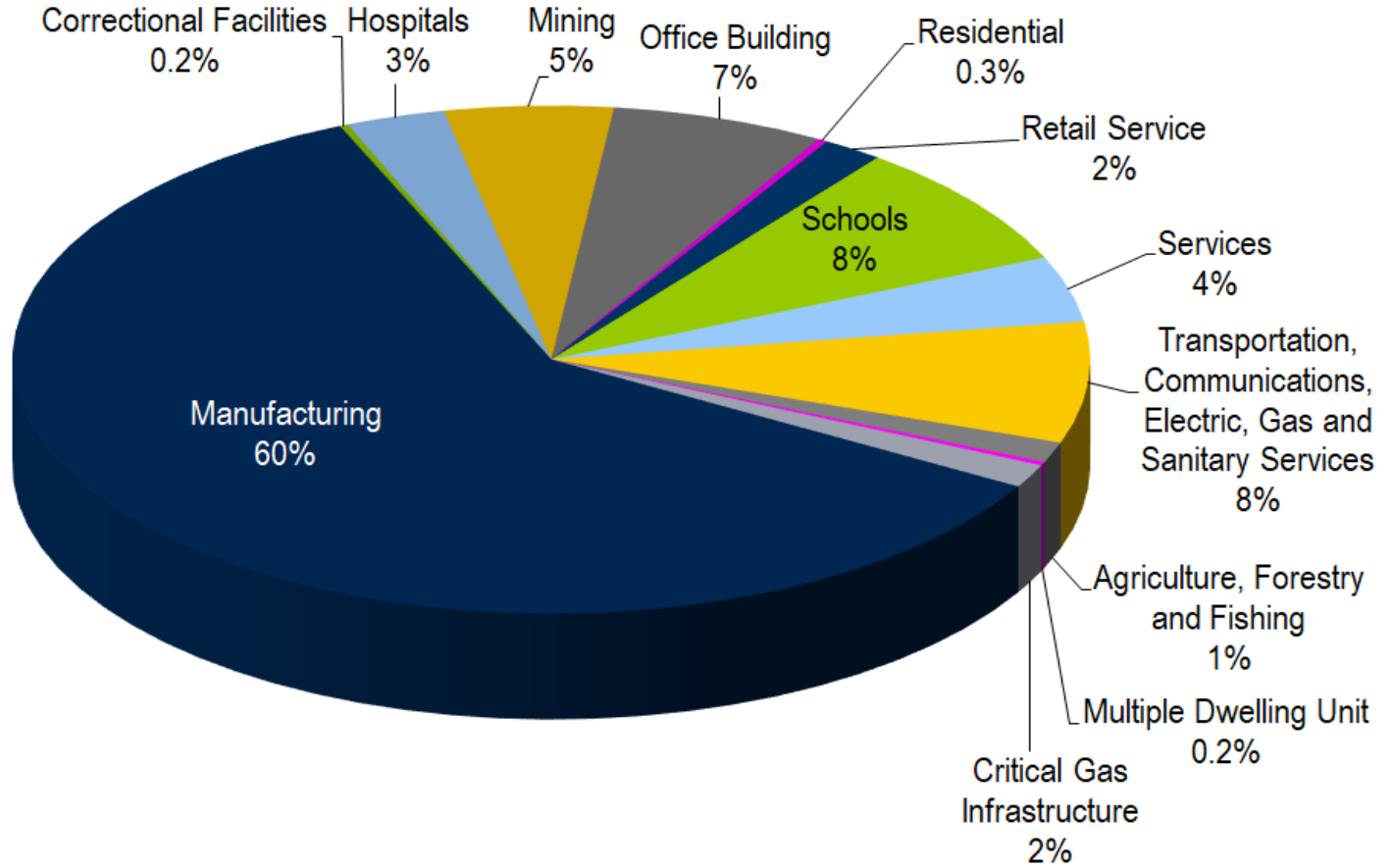
Zone		Capacity Performance	Lead Times (Minutes)			Total DR
		Annual	30	60	120	MW
	Total	194.0	125.6	11.8	56.6	194.0
PECO						
	Pre-Emergency	318.6	196.8	12.8	109.0	318.6
	Emergency	3.7	3.7	0.0	0.0	3.7
	Total	322.3	200.5	12.8	109.0	322.3
PENELEC						
	Pre-Emergency	276.2	104.2	9.3	162.8	276.2
	Emergency	7.9	0.8	7.1	0.0	7.9
	Total	284.1	105.0	16.4	162.8	284.1
PEPCO						
	Pre-Emergency	146.7	128.8	0.9	17.1	146.7
	Emergency	7.9	7.9	0.0	0.0	7.9
	Total	154.7	136.7	0.9	17.1	154.7
PPL						
	Pre-Emergency	521.0	262.8	19.9	238.3	521.0
	Emergency	0.9	0.0	0.0	0.9	0.9
	Total	521.9	262.8	19.9	239.1	521.9
PSEG						
	Pre-Emergency	306.1	230.0	8.4	67.7	306.1
	Emergency	0.0	0.0	0.0	0.0	0.0
	Total	306.1	230.0	8.4	67.7	306.1
RECO						
	Pre-Emergency	2.0	2.0	0.0	0.0	2.0
	Emergency	0.0	0.0	0.0	0.0	0.0
	Total	2.0	2.0	0.0	0.0	2.0
TOTAL						
	Pre-Emergency	8,718.1	4,527.0	406.1	3,785.0	8,718.1
	Emergency	355.6	189.8	28.8	136.9	355.6
	Total	9,073.7	4,716.8	435.0	3,921.9	9,073.7

Note:

- 1) Data as of 4/3/2023.
- 2) Load Management MW are Winter ICAP.

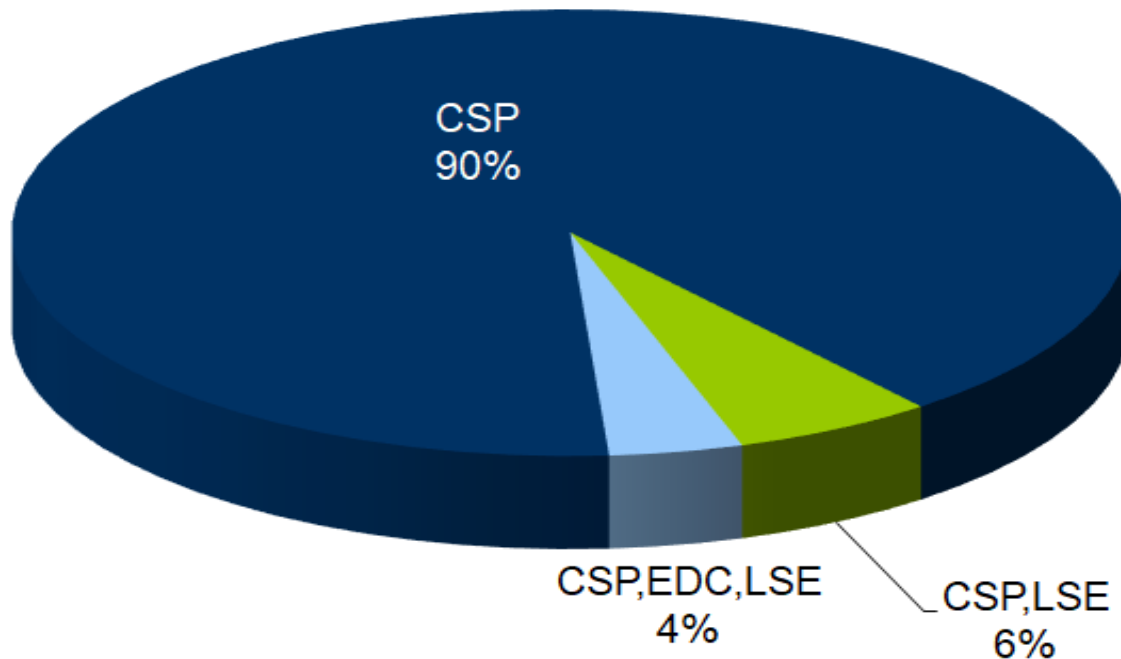
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Figure 3: DY 22/23 Confirmed Load Management DR Registrations Business Segments



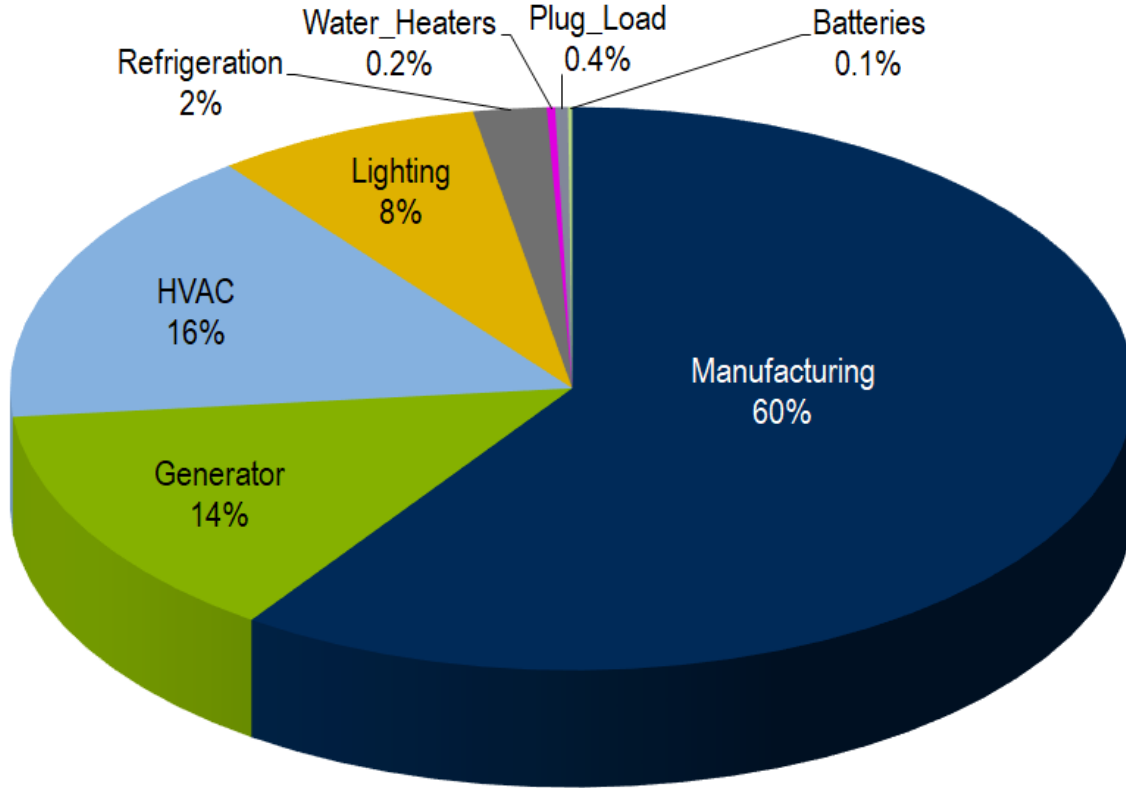
Note: Percent of Winter Nominated Capacity (MWs).

Figure 4: DY 22/23 Confirmed Load Management DR Registrations Owner/Company Type



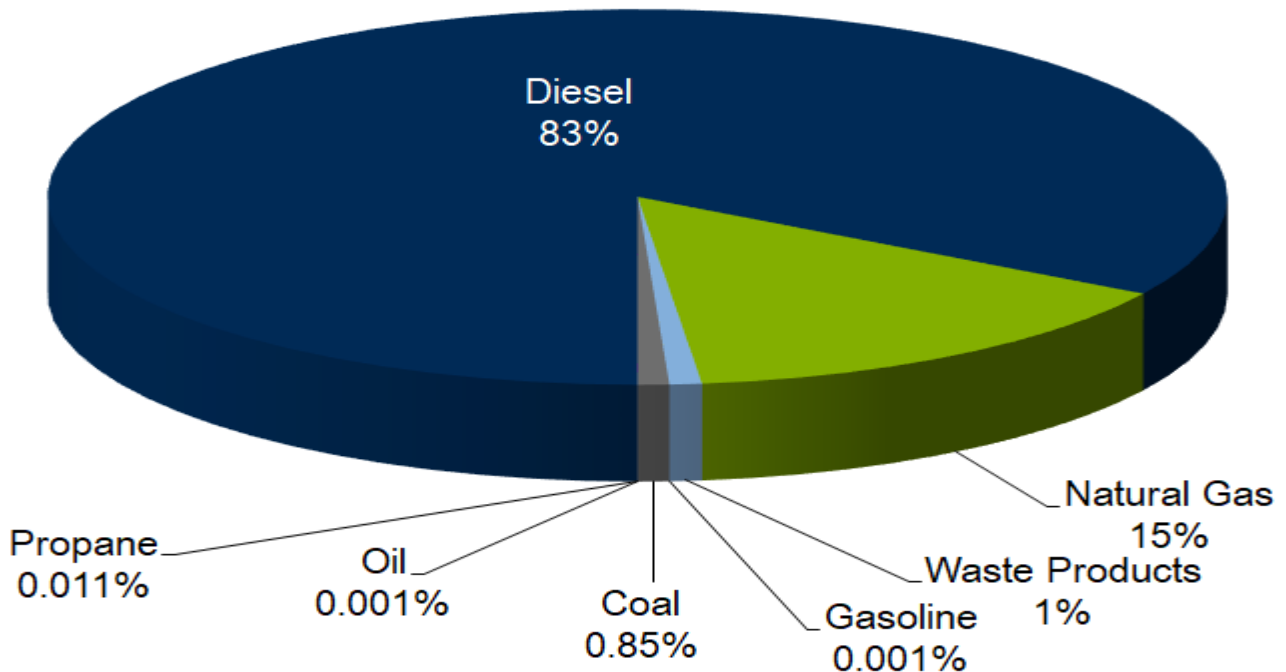
Note: Percent of Winter Nominated Capacity (MWs).

Figure 5: DY 22/23 Confirmed Load Management DR Registrations Customer Load Reduction Methods



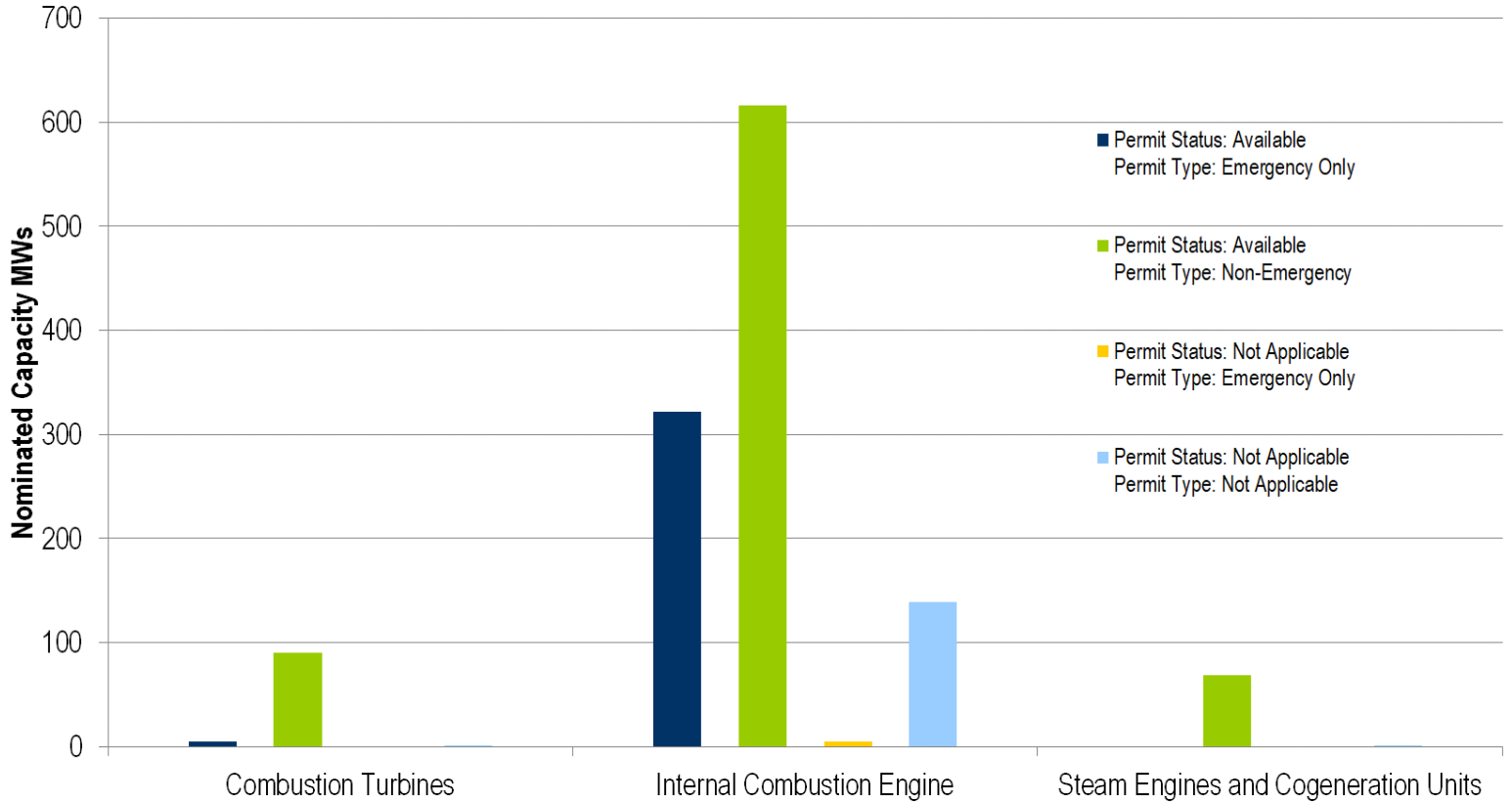
Note: Percent of Winter Nominated Capacity (MWs).

Figure 6: DY 22/23 Confirmed Load Management DR Registrations Fuel Mix with Behind the Meter Generation



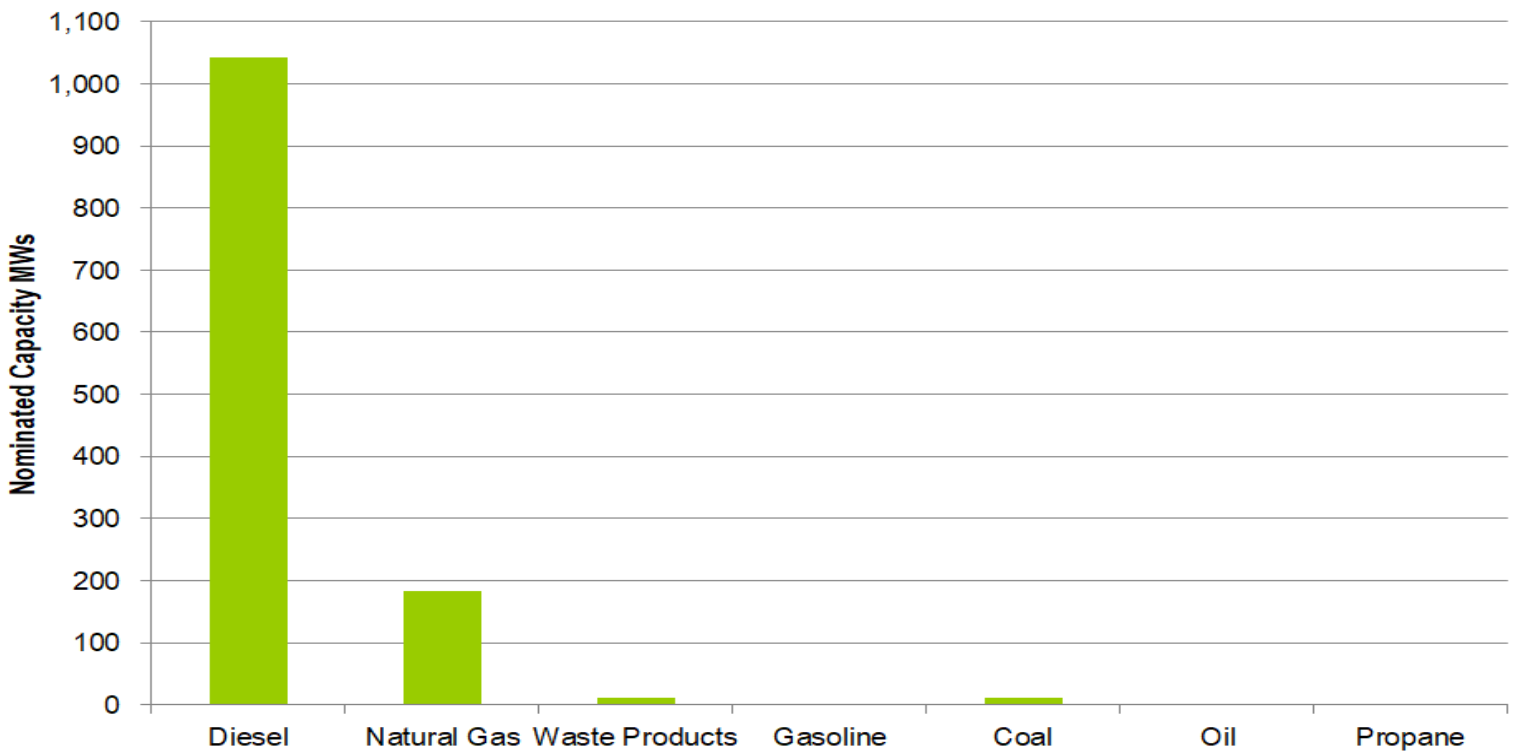
Note: Percent of Winter Nominated Capacity (MWs).

Figure 7: DY 22/23 Confirmed Load Management DR Registrations Generator and Permit Type



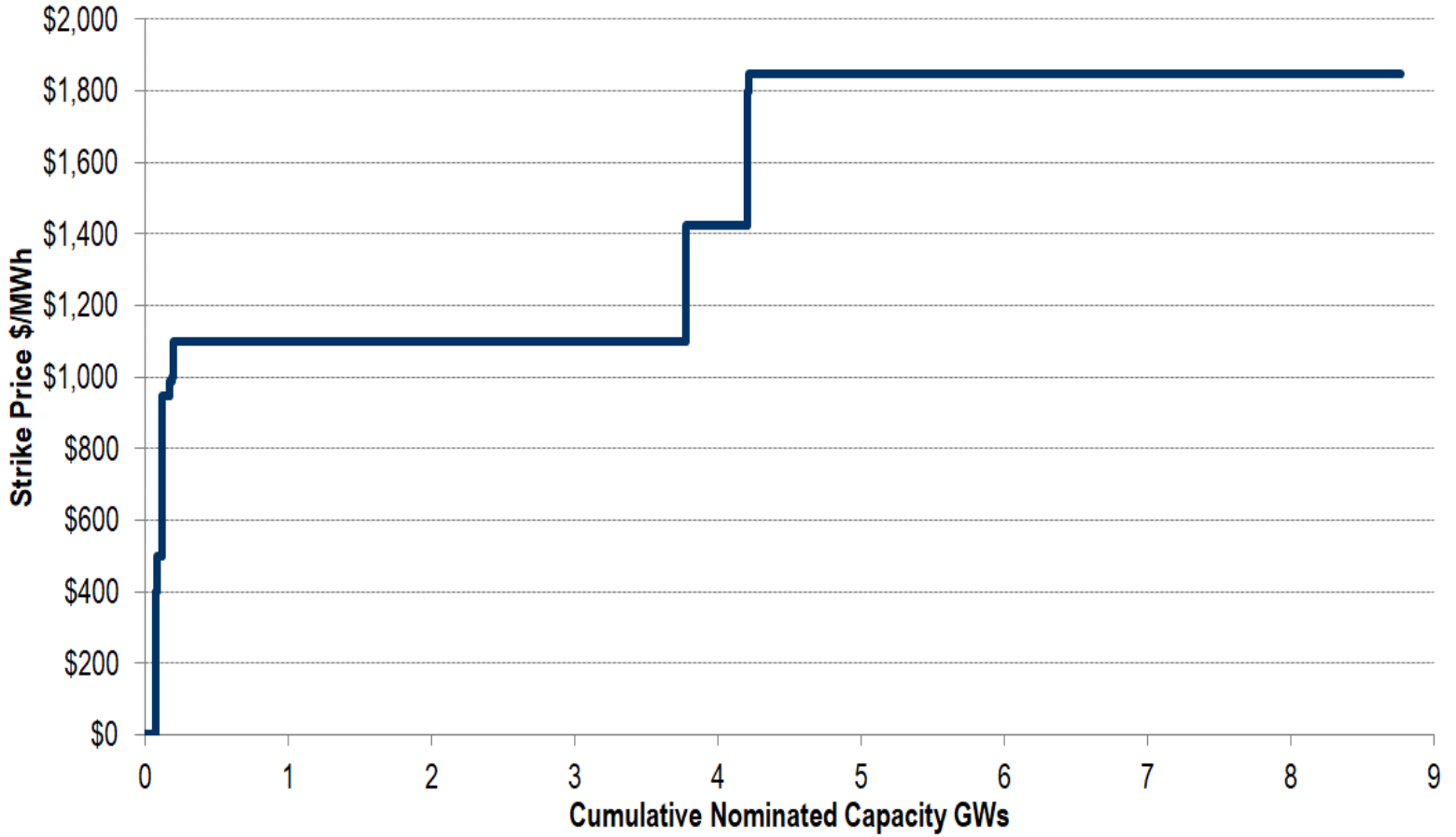
Note: Winter Nominated Capacity (MWs).

Figure 8: DY 22/23 Confirmed Load Management DR Registrations Fuel Mix with Behind the Meter Generation



Note: Winter Nominated Capacity (MWs).

Figure 9: DY 22/23 Confirmed Load Management Full DR Registrations Energy Supply Curve:



Note: Winter Nominated Capacity (GWs).

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Figure 10: 2022 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	134	131	148	148	148	152	142	147	148	150	149	152
	Non-MAD	110	117	125	129	130	134	140	150	153	155	155	158
	RTO	244	248	273	277	278	286	282	297	301	305	304	310
Average Number of Unique Participating Locations per Month:					284								
MWs	MAD	359	380	395	429	424	429	392	409	411	417	418	425
	Non-MAD	672	673	709	751	801	828	944	955	1,054	1,063	1,068	1,098
	RTO	1,031	1,053	1,105	1,180	1,225	1,257	1,336	1,364	1,465	1,480	1,486	1,523
Average MWs per Month:		1,292											

Regulation	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Locations	RTO	138	135	137	138	138	137	138	138	141	143	143	152
	Average Number of Unique Participating Locations per Month:		140										
MWs	RTO	89	96	98	109	109	116	116	116	118	129	123	130
	Average MWs per Month:		112										

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

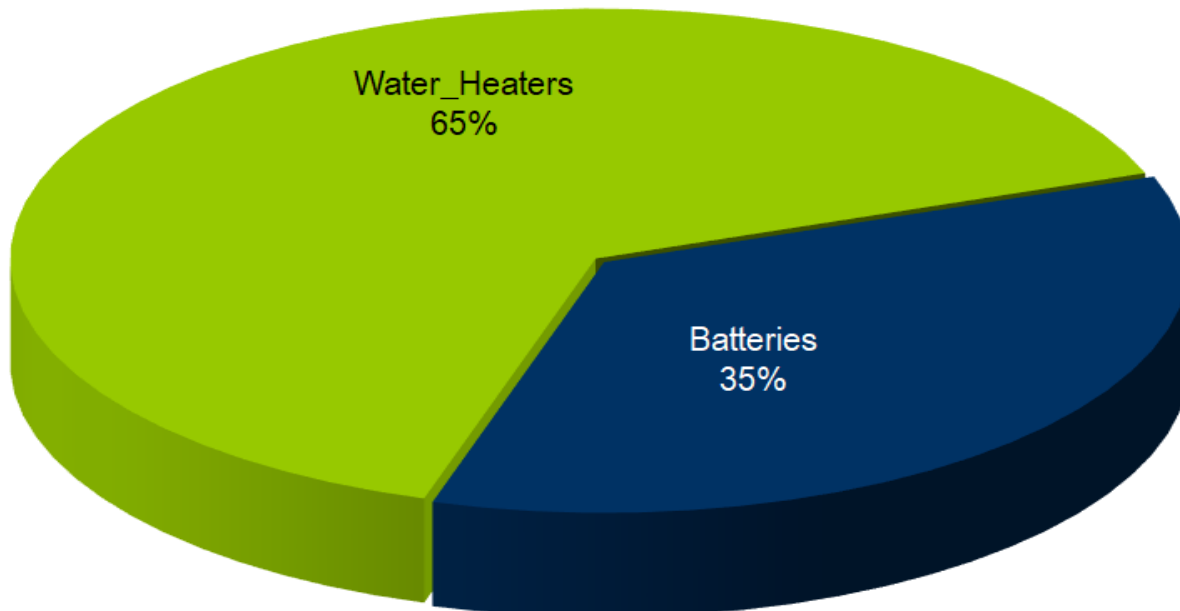
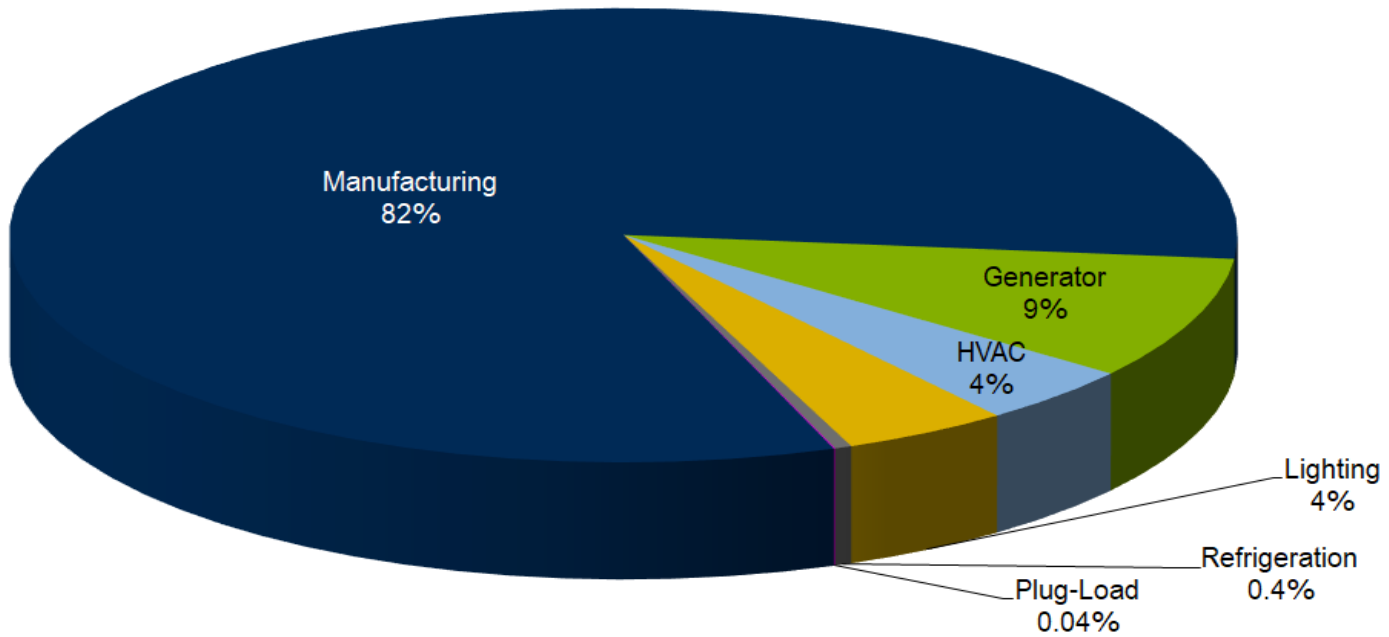
Figure 11: 2022 PJM Demand Response Confirmed Regulation Registrations Load Reduction Methods


Figure 12: 2022 PJM Demand Response Confirmed Synch Reserve Registrations Load Reduction Methods:



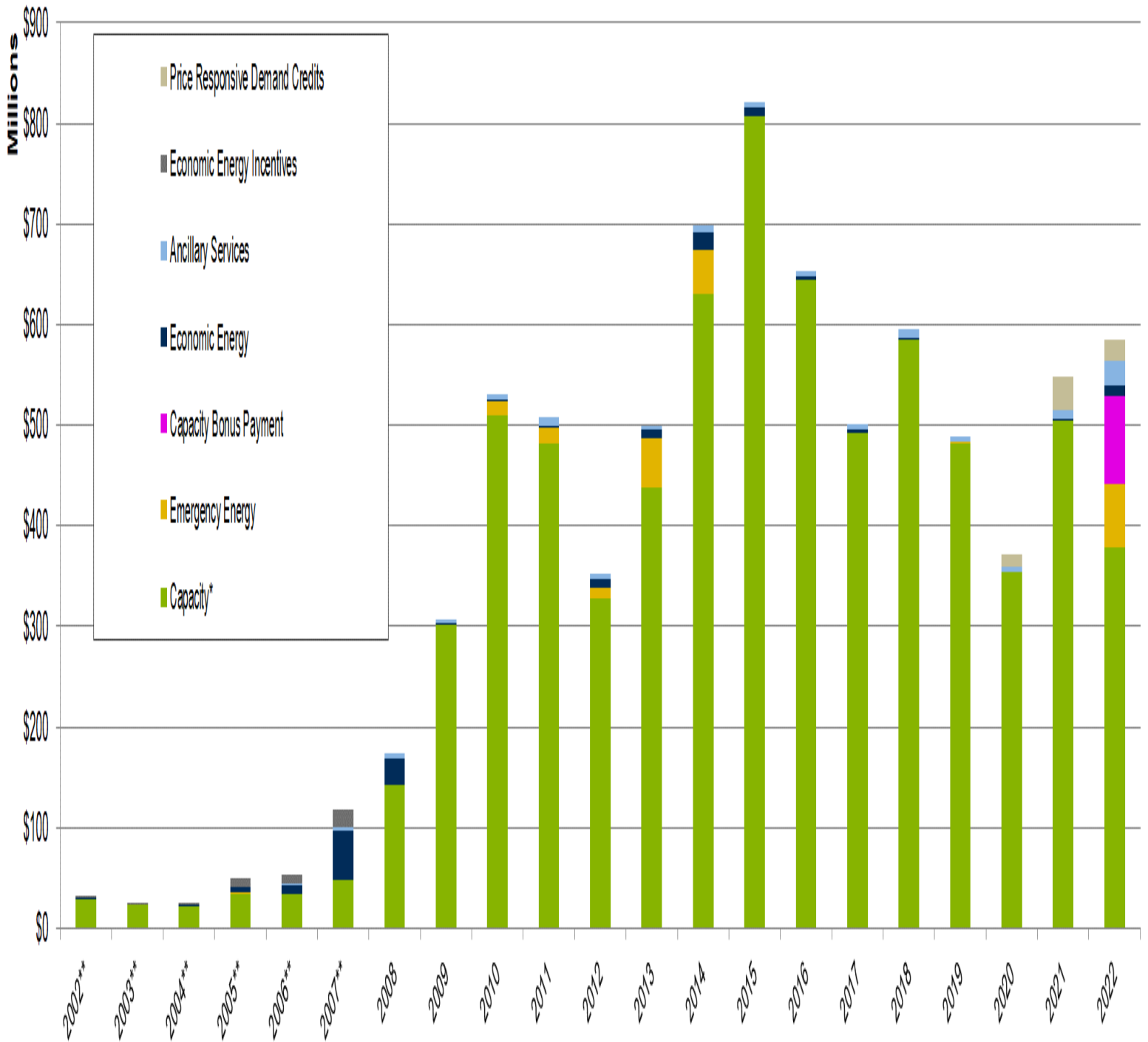
Note: Percent of CSP Reported Load Reduction MWs

Figure 13: PJM Economic Demand Response Capability in Energy Market (3/1/2006-4/3/2023)



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 14: PJM Estimated Revenue for Economic and Load Management DR Markets

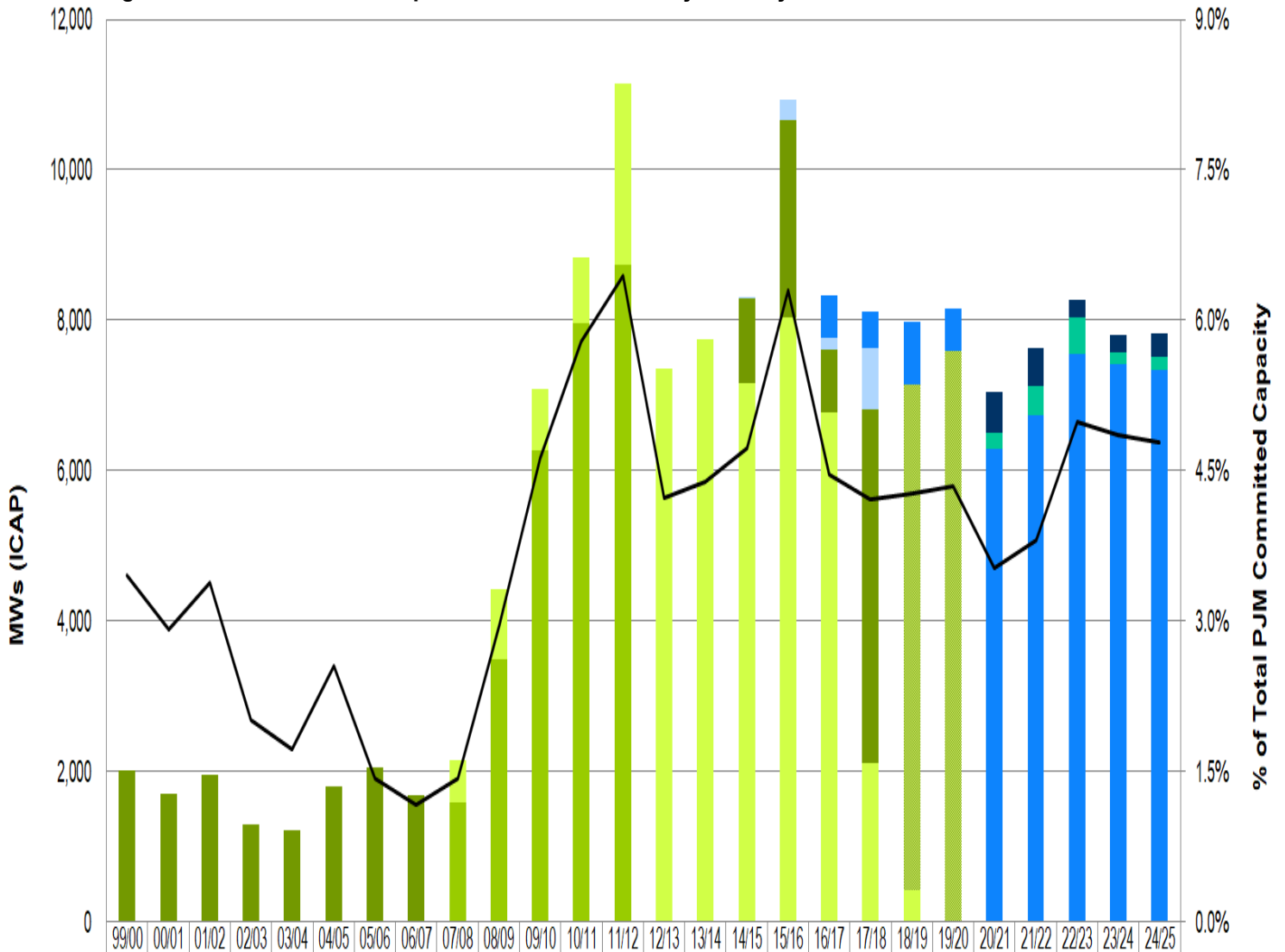


*Capacity Net Revenue inclusive of Capacity Credits and Charges.

**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 15: PJM Demand Response Committed MWs by Delivery Year



	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	
PRD																						558	510	230	235	305	
Summer - CP																							196	394	489	162	173
Annual - CP																			574	493	843	556	6,296	6,732	7,555	7,407	7,336
Base DR																					6,717	7,596					
Annual - DR																22	266	144	822								
Extended Summer - DR																1,126	2,635	836	4,694								
Limited - DR									555	940	815	869	2,425	7,361	7,753	7,166	8,027	6,783	2,111	427							
Limited - ILR									1,585	3,489	6,274	7,961	8,731														
Limited - ALM	2,005	1,693	1,962	1,292	1,207	1,806	2,042	1,677																			
DR as % of Total PJM Committed Capacity	3.5%	2.9%	3.4%	2.0%	1.7%	2.5%	1.4%	1.2%	1.4%	2.9%	4.6%	5.8%	6.4%	4.2%	4.4%	4.7%	6.3%	4.5%	4.2%	4.3%	4.3%	3.5%	3.8%	5.0%	4.8%	4.8%	

- Notes:
- 1) Data represents net commitment ICAP value (for each product specified) on 4/1/2023
 - 2) DY 23/24 and 24/25 MWs include values from the Base Residual Auctions.
 - 3) RPM was implemented DY 07/08.
 - 4) ALM MWs are seasonal averages for Delivery Years before 07/08.

Figure 16: 2022 Economic Demand Response Monthly Registration Participation

State	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DE	DPL								1				
IL	COMED	1	1	1	1	1	1	1	1	1	1	1	1
NJ	JCPL							1	1				
	PSEG	6	5	4	6	7	8	8	9	7	4	3	7
OH	AEP	1	1	1	1	1	1	1	1	1	1	1	
	ATSI		1	1	1	1	2	2	2	1			1
PA	APS					2	2	2	1	1	1		
	DUQ	1	1	1	1		1	1	1	1	1	1	1
	METED	2	3	3	3	2	2	3	3	1	1	3	3
	PECO	2	3	3	3	2	3	2	1	1			1
	PENELEC				2	1	1	2	1			1	
	PPL							1	2	1			
VA	DOM	1											1
Total		14	15	14	18	17	21	24	24	15	9	10	15

Average Unique Participating Registrations per Month: 16

Figure 17: 2022 Economic Demand Response Monthly Registration Participation Day-Ahead Activity

State	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DE	DPL												
IL	COMED												
NJ	JCPL							1	1				
	PSEG	3	2	1	2	4	3	4	5	3	2	2	4
OH	AEP	1	1	1	1	1	1	1	1	1		1	
	ATSI												1
PA	APS					1	1	1	1	1	1		
	DUQ						1	1	1	1	1	1	1
	METED	1	1	1	1	1	2	2	2	1	1	2	2
	PECO	2	3	3	3	2	3	2	1	1			1
	PENELEC				1	1	1	1	1			1	
	PPL												
VA	DOM												
Total		7	7	6	8	10	12	13	13	8	5	7	9

Average Unique Participating Registrations per Month (Day-Ahead): 9

Figure 18: 2022 Economic Demand Response Monthly Registration Participation Real-Time Activity

State	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DE	DPL								1				
IL	COMED	1	1	1	1	1	1	1	1	1	1	1	1
NJ	JCPL												
	PSEG	3	3	3	4	3	5	4	4	4	2	1	3
OH	AEP										1		
	ATSI		1	1	1	1	2	2	2	1			
PA	APS					1	1	1					
	DUQ	1	1	1	1								
	METED	1	2	2	2	1		1	1			1	1
	PECO												
	PENELEC				1			1					
	PPL							1	2	1			
VA	DOM	1											1
Total		7	8	8	10	7	9	11	11	7	4	3	6

Average Unique Participating Registrations per Month (Real-Time): 8

Figure 19: 2022 Economic Demand Response Monthly MWh Reductions

State	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DE	DPL								0				
IL	COMED	175	83	236	171	184	93	71	63	114	81	41	61
NJ	JCPL							239	110				
	PSEG	422	204	86	498	687	628	502	402	210	41	32	48
OH	AEP	1,510	304	8	292	1,190	504	133	174	170	8	32	
	ATSI		1,090	655	150	866	1,854	971	2,513	2,031			5,219
PA	APS					22	48	318	1,328	1,092	837		
	DUQ	7	0	1	3		807	11,097	9,917	8,927	10,937	10,303	16,442
	METED	78	58	162	143	19	12	414	428	44	0	49	295
	PECO	869	216	63	320	484	150	259	192	46			32
	PENELEC				299	534	202	34	363			0	
	PPL							192	312	52			
VA	DOM	0											0
Total		3,062	1,956	1,211	1,877	3,988	4,298	14,231	15,801	12,685	11,904	10,457	22,096

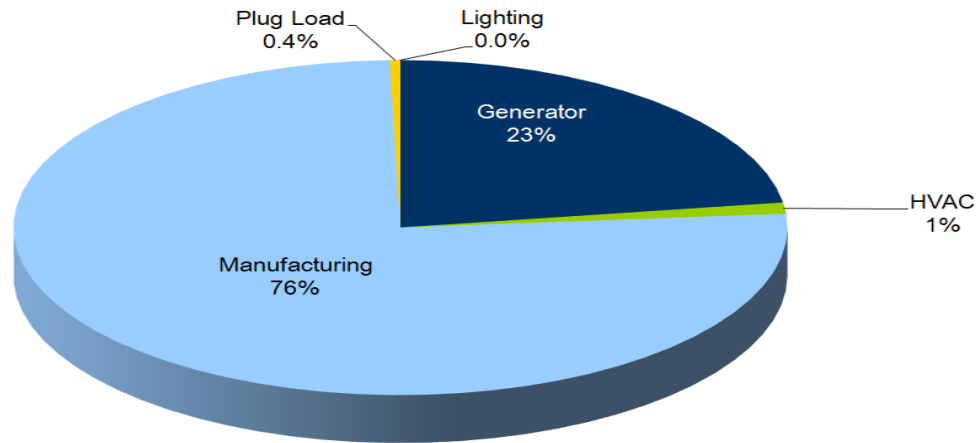
Total MWh: 103,566

Figure 20: 2022 Economic Demand Response Monthly MWh Reductions Day-Ahead Activity

State	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DE	DPL												
IL	COMED												
NJ	JCPL							239	110				
	PSEG	391	199	57	412	632	492	462	374	133	37	32	41
OH	AEP	1,510	304	8	292	1,190	504	133	174	170		32	
	ATSI												5,219
PA	APS					13	30	20	1,328	1,092	837		
	DUQ						807	11,097	9,917	8,927	10,937	10,303	16,442
	METED	53	49	124	91	3	12	410	375	44	0	36	253
	PECO	869	216	63	320	484	150	259	192	46			32
	PENELEC				247	534	202	11	363			0	
	PPL												
VA	DOM												
Total		2,824	768	252	1,362	2,858	2,198	12,630	12,833	10,411	11,811	10,403	21,987
Total Day-Ahead MWh:		90,337											

Figure 21: 2022 Economic Demand Response Monthly MWh Reductions Real-Time Activity

State	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DE	DPL								0				
IL	COMED	175	83	236	171	184	93	71	63	114	81	41	61
NJ	JCPL												
	PSEG	31	6	30	86	54	136	40	28	77	4	0	6
OH	AEP										8		
	ATSI		1,090	655	150	866	1,854	971	2,513	2,031			
PA	APS					8	17	299					
	DUQ	7	0	1	3								
	METED	25	9	38	52	16		5	52			12	42
	PECO												
	PENELEC				52			24					
	PPL							192	312	52			
VA	DOM	0											0
Total		238	1,188	959	515	1,130	2,100	1,601	2,968	2,274	93	54	110
Total Real-Time MWh:		13,230											

Figure 22: 2022 Estimated Economic DR Load Reduction MWh by Load Reduction Method

Figure 23: 2022 Economic Demand Response Monthly Energy Market Revenue

State	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DE	DPL								\$0				
IL	COMED	\$7,807	\$3,360	\$8,826	\$9,833	\$16,669	\$8,903	\$6,523	\$6,548	\$8,067	\$3,505	\$1,822	\$4,963
NJ	JCPL							\$49,013	\$19,424				
	PSEG	\$36,299	\$14,419	\$5,341	\$33,143	\$50,021	\$51,383	\$53,139	\$50,000	\$17,369	\$984	\$2,151	\$11,500
OH	AEP	\$103,673	\$21,789	\$513	\$25,421	\$118,341	\$57,314	\$18,016	\$24,636	\$22,915	\$466	\$2,857	
	ATSI		\$59,709	\$28,868	\$8,029	\$68,911	\$255,357	\$90,271	\$284,004	\$190,569			\$1,068,883
PA	APS					\$11,077	\$9,256	\$49,811	\$179,558	\$117,767	\$63,189		
	DUQ	\$324	\$0	\$59	\$158		\$100,494	\$1,366,900	\$1,177,506	\$883,020	\$849,642	\$748,596	\$1,690,256
	METED	\$5,889	\$4,401	\$9,460	\$9,973	\$1,948	\$471	\$54,756	\$61,302	\$5,422	\$51	\$5,095	\$27,749
	PECO	\$65,588	\$19,723	\$5,797	\$24,811	\$40,823	\$12,094	\$31,883	\$25,360	\$4,759			\$3,502
	PENELEC				\$20,144	\$48,898	\$30,929	\$5,291	\$41,563			\$120	
	PPL							\$33,972	\$108,840	\$3,706			
VA	DOM	\$0											\$0
Total		\$219,580	\$123,402	\$58,865	\$131,511	\$356,688	\$526,201	\$1,759,575	\$1,978,740	\$1,253,594	\$917,838	\$760,642	\$2,806,854
Total CSP Credits:		\$10,893,489											

Figure 24: 2022 Economic Demand Response Monthly Energy Market Revenue Day-Ahead Activity

State	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DE	DPL												
IL	COMED												
NJ	JCPL							\$49,013	\$19,424				
	PSEG	\$34,310	\$13,883	\$3,796	\$27,312	\$45,463	\$40,347	\$49,821	\$47,294	\$13,165	\$750	\$2,132	\$10,404
OH	AEP	\$103,673	\$21,789	\$513	\$25,421	\$118,341	\$57,314	\$18,016	\$24,636	\$22,915		\$2,857	
	ATSI												\$1,068,883
PA	APS					\$10,365	\$6,089	\$2,423	\$179,558	\$117,767	\$63,189		
	DUQ						\$100,494	\$1,366,900	\$1,177,506	\$883,020	\$849,642	\$748,596	\$1,690,256
	METED	\$4,455	\$3,925	\$7,334	\$6,477	\$562	\$471	\$54,326	\$53,392	\$5,422	\$51	\$4,173	\$24,581
	PECO	\$65,588	\$19,723	\$5,797	\$24,811	\$40,823	\$12,094	\$31,883	\$25,360	\$4,759			\$3,502
	PENELEC				\$16,955	\$48,898	\$30,929	\$3,037	\$41,563			\$120	
	PPL												
VA	DOM												
Total		\$208,026	\$59,319	\$17,440	\$100,975	\$264,451	\$247,738	\$1,575,419	\$1,568,733	\$1,047,047	\$913,633	\$757,878	\$2,797,626
Total Day-Ahead CSP Credits:		\$9,558,286											

Figure 25: 2022 Economic Demand Response Monthly Energy Market Revenue Real-Time Activity

State	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DE	DPL								\$0				
IL	COMED	\$7,807	\$3,360	\$8,826	\$9,833	\$16,669	\$8,903	\$6,523	\$6,548	\$8,067	\$3,505	\$1,822	\$4,963
NJ	JCPL												
	PSEG	\$1,989	\$536	\$1,545	\$5,831	\$4,558	\$11,037	\$3,318	\$2,705	\$4,204	\$234	\$19	\$1,096
OH	AEP										\$466		
	ATSI		\$59,709	\$28,868	\$8,029	\$68,911	\$255,357	\$90,271	\$284,004	\$190,569			
PA	APS					\$712	\$3,167	\$47,387					
	DUQ	\$324	\$0	\$59	\$158								
	METED	\$1,434	\$477	\$2,127	\$3,496	\$1,386		\$430	\$7,910			\$922	\$3,168
	PECO												
	PENELEC				\$3,190			\$2,255					
	PPL							\$33,972	\$108,840	\$3,706			
VA	DOM	\$0											
Total		\$11,554	\$64,082	\$41,425	\$30,536	\$92,237	\$278,463	\$184,156	\$410,007	\$206,547	\$4,205	\$2,763	\$9,227
Total Real-Time CSP Credits:		\$1,335,202											

Figure 26: 2022 Economic Demand Response Energy Market Cost Allocation by Zone

Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AECO	\$2,363	\$1,072	\$584	\$1,407	\$3,890	\$6,666	\$26,914	\$30,634	\$12,467	\$3,798	\$5,930	\$29,544
AEP	\$34,657	\$19,970	\$9,435	\$21,850	\$55,652	\$79,966	\$249,468	\$278,937	\$184,332	\$151,996	\$122,491	\$433,326
APS	\$14,187	\$7,967	\$3,816	\$8,499	\$20,820	\$29,702	\$95,705	\$108,185	\$67,504	\$50,081	\$50,660	\$182,920
ATSI	\$16,953	\$10,017	\$4,891	\$11,546	\$29,354	\$42,716	\$136,114	\$151,618	\$96,970	\$69,637	\$60,956	\$206,282
BGE	\$8,787	\$4,828	\$2,239	\$4,966	\$13,188	\$20,286	\$69,771	\$78,302	\$54,951	\$46,287	\$30,958	\$115,806
COMED	\$19,575	\$11,690	\$5,440	\$10,740	\$40,896	\$63,466	\$200,245	\$212,765	\$143,268	\$74,158	\$55,225	\$235,092
DAY	\$4,596	\$2,710	\$1,269	\$2,987	\$7,595	\$11,521	\$35,640	\$40,119	\$26,634	\$23,481	\$18,389	\$57,329
DEOK	\$7,009	\$4,093	\$1,869	\$4,410	\$11,876	\$17,890	\$57,871	\$63,708	\$40,942	\$31,406	\$24,596	\$88,751
DOM	\$30,914	\$16,916	\$7,900	\$18,494	\$49,629	\$71,868	\$241,484	\$268,904	\$178,766	\$147,867	\$125,124	\$433,214
DPL	\$5,437	\$2,664	\$1,218	\$2,552	\$6,545	\$10,536	\$42,634	\$49,483	\$17,488	\$10,273	\$13,312	\$67,741
DUQ	\$3,322	\$1,894	\$929	\$2,265	\$5,864	\$9,037	\$29,116	\$31,481	\$19,764	\$12,906	\$11,799	\$42,090
EKPC	\$4,225	\$2,347	\$971	\$2,113	\$5,445	\$8,413	\$26,938	\$29,981	\$19,386	\$14,545	\$14,626	\$57,560
JCPL	\$5,600	\$2,573	\$1,446	\$3,459	\$9,557	\$15,250	\$62,129	\$68,025	\$31,107	\$9,600	\$13,632	\$71,588
METED	\$4,311	\$2,398	\$1,188	\$2,756	\$6,772	\$9,700	\$33,383	\$38,197	\$21,573	\$14,843	\$13,192	\$54,076
OVEC	\$30.83	\$19	\$9	\$20	\$43	\$53	\$175	\$192	\$141	\$132	\$123	\$451
PECO	\$10,265	\$5,224	\$2,479	\$5,848	\$14,673	\$22,801	\$90,213	\$103,266	\$37,415	\$12,173	\$23,350	\$124,722
PENELEC	\$4,584	\$2,726	\$1,331	\$3,107	\$7,330	\$9,778	\$32,094	\$36,255	\$23,969	\$16,248	\$15,855	\$58,375
PEPCO	\$7,903	\$4,344	\$2,039	\$4,601	\$12,267	\$18,903	\$63,791	\$70,943	\$45,524	\$40,142	\$28,206	\$103,733
PPL	\$11,815	\$6,148	\$3,110	\$7,261	\$17,175	\$23,988	\$82,662	\$93,918	\$53,389	\$31,232	\$33,379	\$147,487
PSEG	\$10,543	\$5,553	\$2,834	\$6,882	\$18,339	\$27,971	\$105,941	\$118,415	\$55,926	\$20,598	\$27,020	\$131,978
RECO	\$331	\$187	\$93	\$224	\$650	\$1,039	\$4,048	\$4,501	\$2,241	\$790	\$924	\$4,209
Exports	\$12,173	\$8,063	\$3,775	\$5,523	\$19,127	\$24,651	\$73,238	\$100,911	\$119,836	\$135,643	\$70,895	\$160,579
TOTAL	\$219,580	\$123,402	\$58,865	\$131,511	\$356,688	\$526,201	\$1,759,575	\$1,978,740	\$1,253,594	\$917,838	\$760,642	\$2,806,854

Total Zonal Charges: \$10,893,489

Figure 27: 2022 Economic Demand Response Day-Ahead Energy Market Cost Allocation by Zone

Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AECO	\$2,645	\$702	\$205	\$1,082	\$2,845	\$3,329	\$25,006	\$24,550	\$10,317	\$3,845	\$6,375	\$27,051
AEP	\$38,494	\$11,253	\$2,884	\$16,751	\$40,341	\$39,720	\$229,317	\$223,465	\$153,080	\$153,388	\$130,533	\$398,571
APS	\$15,804	\$4,547	\$1,207	\$6,527	\$15,041	\$14,705	\$87,934	\$86,618	\$55,928	\$50,663	\$53,951	\$168,526
ATSI	\$18,671	\$5,508	\$1,465	\$8,851	\$21,227	\$21,399	\$125,060	\$121,225	\$80,380	\$70,466	\$64,972	\$190,901
BGE	\$9,848	\$2,797	\$734	\$3,813	\$9,659	\$10,023	\$64,378	\$62,808	\$46,839	\$46,645	\$32,958	\$106,638
COMED	\$21,123	\$6,039	\$1,703	\$8,260	\$29,849	\$33,650	\$183,474	\$173,421	\$118,817	\$74,679	\$58,909	\$215,409
DAY	\$5,069	\$1,492	\$384	\$2,292	\$5,503	\$5,738	\$32,709	\$32,081	\$22,241	\$23,678	\$19,517	\$52,791
DEOK	\$7,760	\$2,262	\$563	\$3,369	\$8,672	\$8,879	\$53,145	\$50,981	\$33,998	\$31,689	\$26,201	\$81,328
DOM	\$34,720	\$9,839	\$2,524	\$14,231	\$36,269	\$35,414	\$222,449	\$215,595	\$149,009	\$149,343	\$132,865	\$399,884
DPL	\$6,105	\$1,676	\$442	\$1,944	\$4,787	\$5,012	\$39,694	\$39,648	\$14,460	\$10,368	\$14,241	\$61,911
DUQ	\$3,675	\$1,049	\$283	\$1,736	\$4,284	\$4,510	\$26,738	\$25,189	\$16,319	\$13,077	\$12,584	\$38,831
EKPC	\$4,694	\$1,328	\$307	\$1,624	\$3,996	\$4,189	\$24,732	\$24,025	\$16,136	\$14,668	\$15,570	\$52,080
JCPL	\$6,213	\$1,570	\$480	\$2,657	\$6,960	\$7,555	\$57,522	\$54,288	\$25,934	\$9,816	\$14,658	\$65,991
METED	\$4,783	\$1,376	\$377	\$2,116	\$4,864	\$4,830	\$30,742	\$30,560	\$17,945	\$14,967	\$14,131	\$50,188
OVEC	\$34	\$10	\$3	\$15	\$30	\$26	\$161	\$154	\$117	\$134	\$131	\$416
PECO	\$11,433	\$3,232	\$861	\$4,430	\$10,654	\$11,183	\$83,751	\$82,533	\$30,998	\$12,304	\$25,118	\$114,175
PENELEC	\$5,057	\$1,525	\$409	\$2,383	\$5,225	\$4,879	\$29,508	\$29,039	\$19,993	\$16,389	\$16,918	\$54,165
PEPCO	\$8,833	\$2,507	\$666	\$3,535	\$8,938	\$9,338	\$58,823	\$56,903	\$37,995	\$40,493	\$30,019	\$95,599
PPL	\$13,128	\$3,644	\$986	\$5,574	\$12,262	\$11,938	\$76,157	\$75,128	\$44,472	\$31,621	\$35,828	\$136,275
PSEG	\$11,668	\$3,322	\$924	\$5,275	\$13,270	\$13,812	\$98,154	\$94,489	\$46,484	\$21,044	\$29,047	\$121,828
RECO	\$365	\$107	\$29	\$171	\$475	\$516	\$3,732	\$3,584	\$1,867	\$807	\$992	\$3,894
Exports	\$13,242	\$4,355	\$990	\$4,148	\$13,757	\$11,008	\$66,627	\$80,741	\$105,620	\$135,875	\$73,630	\$149,218
TOTAL	\$243,365	\$70,140	\$18,427	\$100,785	\$258,908	\$261,652	\$1,619,812	\$1,587,024	\$1,048,949	\$925,962	\$809,149	\$2,585,671

Total Day-Ahead Zonal Charges: \$9,529,843

Figure 28: 2022 Economic Demand Response Real-Time Energy Market Cost Allocation by Zone

Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AECO	(\$282)	\$371	\$379	\$324	\$1,045	\$3,337	\$1,908	\$6,084	\$2,150	(\$47)	(\$446)	\$2,493
AEP	(\$3,837)	\$8,717	\$6,551	\$5,099	\$15,311	\$40,246	\$20,151	\$55,472	\$31,252	(\$1,392)	(\$8,043)	\$34,755
APS	(\$1,617)	\$3,420	\$2,608	\$1,972	\$5,779	\$14,997	\$7,771	\$21,568	\$11,577	(\$582)	(\$3,292)	\$14,394
ATSI	(\$1,718)	\$4,508	\$3,426	\$2,695	\$8,127	\$21,316	\$11,054	\$30,393	\$16,590	(\$828)	(\$4,017)	\$15,381
BGE	(\$1,061)	\$2,031	\$1,505	\$1,152	\$3,530	\$10,263	\$5,394	\$15,494	\$8,112	(\$358)	(\$2,000)	\$9,168
COMED	(\$1,547)	\$5,651	\$3,737	\$2,480	\$11,047	\$29,816	\$16,771	\$39,343	\$24,451	(\$521)	(\$3,684)	\$19,683
DAY	(\$473)	\$1,218	\$885	\$696	\$2,092	\$5,782	\$2,932	\$8,038	\$4,393	(\$197)	(\$1,128)	\$4,537
DEOK	(\$751)	\$1,831	\$1,306	\$1,041	\$3,204	\$9,011	\$4,727	\$12,728	\$6,944	(\$283)	(\$1,605)	\$7,423
DOM	(\$3,806)	\$7,077	\$5,376	\$4,263	\$13,360	\$36,454	\$19,035	\$53,309	\$29,757	(\$1,477)	(\$7,741)	\$33,330
DPL	(\$668)	\$988	\$776	\$608	\$1,758	\$5,524	\$2,939	\$9,835	\$3,028	(\$94)	(\$930)	\$5,831
DUQ	(\$354)	\$846	\$646	\$529	\$1,580	\$4,527	\$2,378	\$6,293	\$3,445	(\$171)	(\$785)	\$3,259
EKPC	(\$469)	\$1,019	\$663	\$490	\$1,449	\$4,224	\$2,205	\$5,956	\$3,250	(\$124)	(\$944)	\$5,481
JCPL	(\$613)	\$1,003	\$967	\$801	\$2,597	\$7,695	\$4,607	\$13,737	\$5,174	(\$216)	(\$1,026)	\$5,597
METED	(\$472)	\$1,022	\$811	\$641	\$1,907	\$4,870	\$2,640	\$7,637	\$3,628	(\$125)	(\$938)	\$3,888
OVEC	(\$3)	\$8	\$6	\$5	\$12	\$27	\$14	\$39	\$24	(\$1)	(\$8)	\$35
PECO	(\$1,167)	\$1,992	\$1,618	\$1,418	\$4,019	\$11,619	\$6,463	\$20,734	\$6,417	(\$131)	(\$1,768)	\$10,547
PENELEC	(\$474)	\$1,201	\$922	\$724	\$2,105	\$4,899	\$2,586	\$7,217	\$3,977	(\$140)	(\$1,063)	\$4,209
PEPCO	(\$930)	\$1,837	\$1,374	\$1,066	\$3,329	\$9,566	\$4,969	\$14,039	\$7,529	(\$351)	(\$1,814)	\$8,134
PPL	(\$1,313)	\$2,504	\$2,123	\$1,687	\$4,913	\$12,049	\$6,506	\$18,789	\$8,917	(\$389)	(\$2,449)	\$11,212
PSEG	(\$1,125)	\$2,231	\$1,910	\$1,607	\$5,069	\$14,159	\$7,787	\$23,926	\$9,441	(\$446)	(\$2,027)	\$10,150
RECO	(\$34)	\$80	\$64	\$53	\$175	\$523	\$316	\$917	\$374	(\$17)	(\$68)	\$316
Exports	(\$1,069)	\$3,708	\$2,785	\$1,375	\$5,371	\$13,643	\$6,611	\$20,170	\$14,216	(\$232)	(\$2,735)	\$11,361
TOTAL	(\$23,785)	\$53,262	\$40,438	\$30,726	\$97,780	\$264,549	\$139,763	\$391,717	\$204,645	(\$8,124)	(\$48,508)	\$221,183

Total Real-Time Zonal Charges: \$1,363,646

Figure 29: 2022 Load Management Demand Response Monthly Capacity Revenue from RPM

Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AECO	\$428,479	\$387,013	\$428,479	\$414,657	\$428,479	\$182,606	\$188,693	\$188,693	\$182,606	\$188,693.28	\$182,606	\$188,693
AEP	\$7,322,026	\$6,613,443	\$7,322,026	\$7,085,832	\$7,322,026	\$1,957,200	\$2,022,440	\$2,022,440	\$1,957,200	\$2,022,440.00	\$1,957,200	\$2,022,440
APS	\$4,439,739	\$4,010,087	\$4,439,739	\$4,296,522	\$4,439,739	\$1,003,500	\$1,036,950	\$1,036,950	\$1,003,500	\$1,036,950.00	\$1,003,500	\$1,036,950
ATSI	\$6,106,337	\$5,515,401	\$6,106,337	\$5,909,358	\$6,106,337	\$1,400,571	\$1,447,257	\$1,447,257	\$1,400,571	\$1,447,256.70	\$1,400,571	\$1,447,257
BGE	\$1,209,572	\$1,092,516	\$1,209,572	\$1,170,553	\$1,209,572	\$618,432	\$639,046	\$639,046	\$618,432	\$639,046.40	\$618,432	\$639,046
COMED	\$11,191,922	\$10,108,833	\$11,191,922	\$10,830,893	\$11,191,922	\$2,827,436	\$2,921,684	\$2,921,684	\$2,827,436	\$2,921,683.66	\$2,827,436	\$2,921,684
DAY	\$988,218	\$892,584	\$988,218	\$956,340	\$988,218	\$315,750	\$326,275	\$326,275	\$315,750	\$326,275.00	\$315,750	\$326,275
DEOK	\$828,075	\$747,939	\$828,075	\$801,363	\$828,075	\$398,094	\$411,364	\$411,364	\$398,094	\$411,364.11	\$398,094	\$411,364
DOM	\$4,965,896	\$4,485,326	\$4,965,896	\$4,805,706	\$4,965,896	\$1,119,105	\$1,156,409	\$1,156,409	\$1,119,105	\$1,156,408.50	\$1,119,105	\$1,156,409
DPL	\$1,037,801	\$937,369	\$1,037,801	\$1,004,324	\$1,037,801	\$452,406	\$467,487	\$467,487	\$452,406	\$467,486.51	\$452,406	\$467,487
DUQ	\$587,636	\$530,768	\$587,636	\$568,680	\$587,636	\$222,900	\$230,330	\$230,330	\$222,900	\$230,330.00	\$222,900	\$230,330
EKPC	\$698,005	\$630,456	\$698,005	\$675,489	\$698,005	\$428,100	\$442,370	\$442,370	\$428,100	\$442,370.00	\$428,100	\$442,370
JCPL	\$874,938	\$790,267	\$874,938	\$846,714	\$874,938	\$433,911	\$448,375	\$448,375	\$433,911	\$448,375.01	\$433,911	\$448,375
METED	\$1,570,553	\$1,418,564	\$1,570,553	\$1,519,890	\$1,570,553	\$662,963	\$685,062	\$685,062	\$662,963	\$685,061.56	\$662,963	\$685,062
PECO	\$2,293,438	\$2,071,493	\$2,293,438	\$2,219,456	\$2,293,438	\$1,069,806	\$1,105,466	\$1,105,466	\$1,069,806	\$1,105,465.89	\$1,069,806	\$1,105,466
PENELEC	\$1,593,409	\$1,439,208	\$1,593,409	\$1,542,009	\$1,593,409	\$861,536	\$890,253	\$890,253	\$861,536	\$890,253.35	\$861,535	\$890,253
PEPCO	\$978,670	\$883,960	\$978,670	\$947,100	\$978,670	\$455,338	\$470,516	\$470,516	\$455,338	\$470,515.83	\$455,338	\$470,516
PPL	\$2,980,867	\$2,692,396	\$2,980,867	\$2,884,710	\$2,980,867	\$1,901,527	\$1,964,912	\$1,964,912	\$1,901,528	\$1,964,911.75	\$1,901,528	\$1,964,912
PSEG	\$2,586,854	\$2,336,513	\$2,586,854	\$2,503,407	\$2,586,854	\$864,887	\$893,716	\$893,716	\$864,887	\$893,716.36	\$864,887	\$893,716
RECO	\$29,798	\$26,915	\$29,798	\$28,837	\$29,798	\$4,697	\$4,854	\$4,854	\$4,697	\$4,853.67	\$4,697	\$4,854
Total	\$52,712,236	\$47,611,052	\$52,712,236	\$51,011,841	\$52,712,236	\$17,180,765	\$17,753,458	\$17,753,458	\$17,180,765	\$17,753,458	\$17,180,765	\$17,753,458

Total Capacity Credits: \$379,315,726

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Figure 30: 2022 Economic Demand Response Dispatched vs Settled Real-Time Energy Market Summary

Time		CSPs		Zone		Registrations			MWh			Registration Hours		
Year	Month	Dispatched	Settled	Dispatched	Settled	Dispatched	Settled	%	Dispatched	Settled	%	Dispatched	Settled	%
2022	1	3	3	5	5	7	7	100%	258	238	92%	648	648	100%
2022	2	3	3	5	5	8	8	100%	953	1,188	125%	352	352	100%
2022	3	3	3	5	5	8	8	100%	829	959	116%	532	532	100%
2022	4	3	3	6	6	10	10	100%	330	515	156%	501	501	100%
2022	5	3	3	5	5	7	7	100%	947	1,130	119%	673	673	100%
2022	6	5	5	4	4	9	9	100%	2,018	2,100	104%	771	771	100%
2022	7	4	4	7	7	11	11	100%	1,140	1,601	140%	578	578	100%
2022	8	4	4	6	6	11	11	100%	1,804	2,968	165%	759	759	100%
2022	9	3	3	4	4	7	7	100%	1,579	2,274	144%	725	725	100%
2022	10	2	2	3	3	4	4	100%	30	93	314%	175	175	100%
2022	11	2	2	3	3	3	3	100%	23	54	237%	125	125	100%
2022	12	3	3	4	4	6	6	100%	64	110	171%	238	238	100%
YTD Totals						91	91	100%	9,974	13,230	133%	6,077	6,077	100%
YTD Average		3		5										

Figure 31: 2022 Economic Demand Response Cleared vs Settled Day-Ahead Energy Market Summary

Time		CSPs		Zone		Registrations			MWh			Registration Hours		
Year	Month	Cleared	Settled	Cleared	Settled	Cleared	Settled	%	Cleared	Settled	%	Cleared	Settled	%
2022	1	5	5	4	4	7	7	100%	3,206	2,824	88%	1,075	1,075	100%
2022	2	6	6	4	4	7	7	100%	945	768	81%	425	425	100%
2022	3	5	5	4	4	6	6	100%	267	252	94%	172	172	100%
2022	4	6	6	5	5	8	8	100%	1,385	1,362	98%	734	734	100%
2022	5	7	7	6	6	10	10	100%	2,840	2,858	101%	1,146	1,146	100%
2022	6	9	9	7	7	12	12	100%	2,326	2,198	95%	697	697	100%
2022	7	9	9	8	8	13	13	100%	13,034	12,630	97%	1,359	1,359	100%
2022	8	9	9	8	8	13	13	100%	13,061	12,833	98%	1,438	1,438	100%
2022	9	7	7	6	6	8	8	100%	10,289	10,411	101%	708	708	100%
2022	10	4	4	4	4	5	5	100%	12,024	11,811	98%	460	460	100%
2022	11	5	5	5	5	7	7	100%	11,336	10,403	92%	357	357	100%
2022	12	6	6	5	5	9	9	100%	20,981	21,987	105%	743	743	100%
YTD Totals						105	105	100%	91,693	90,337	99%	9,314	9,314	100%
YTD Average		7		6										

Figure 32: 2022 Economic Demand Response Regulation Market Participation

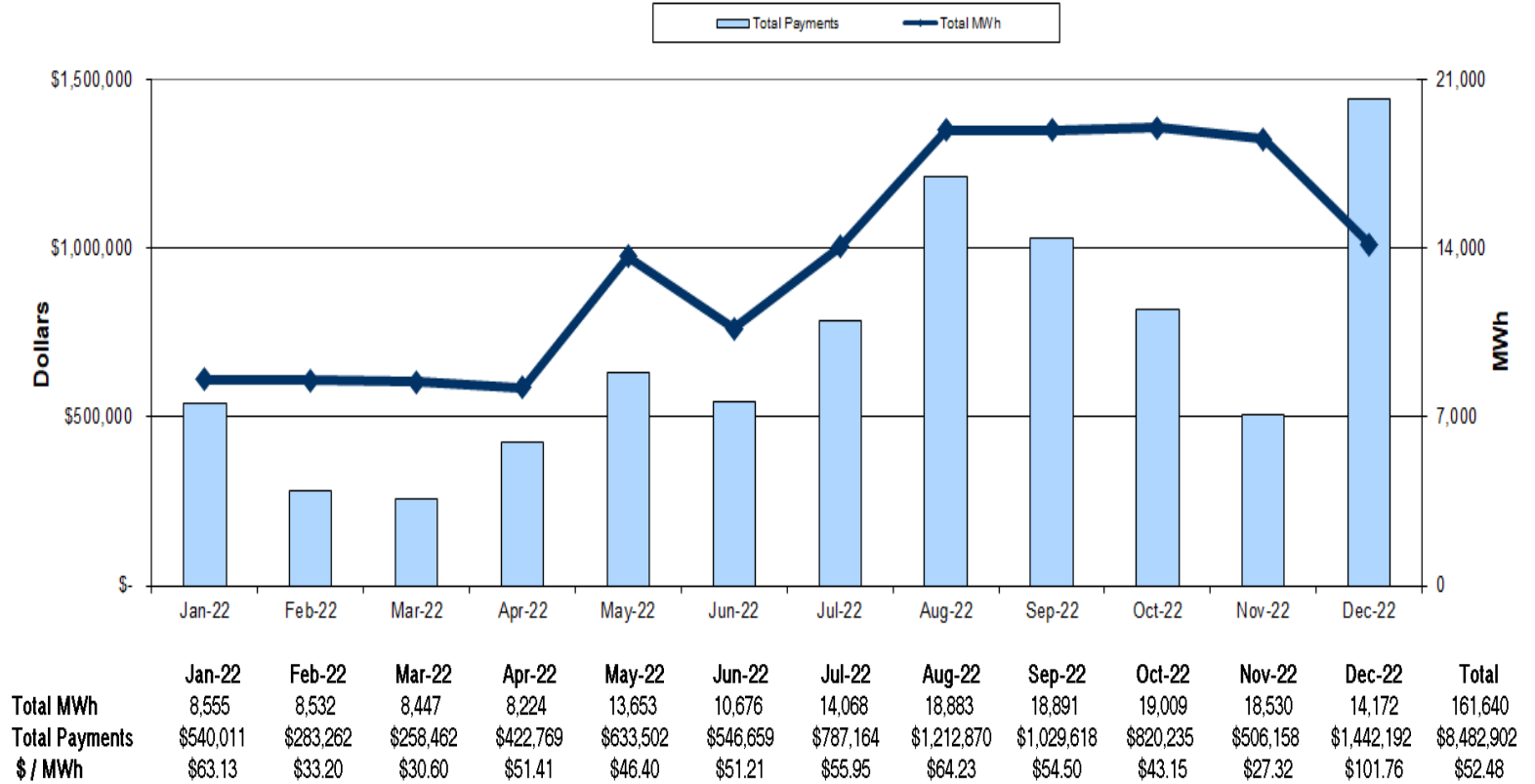
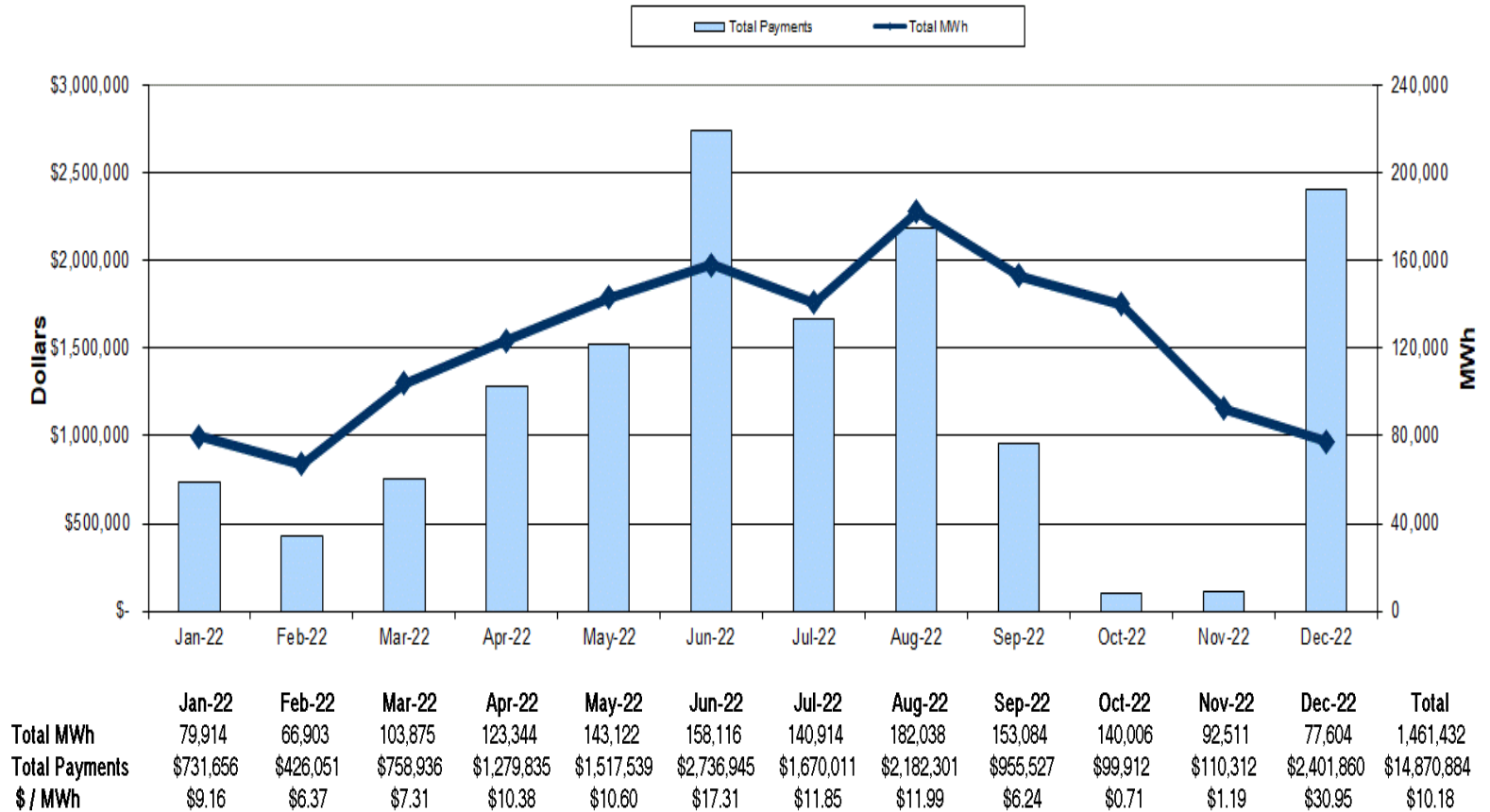
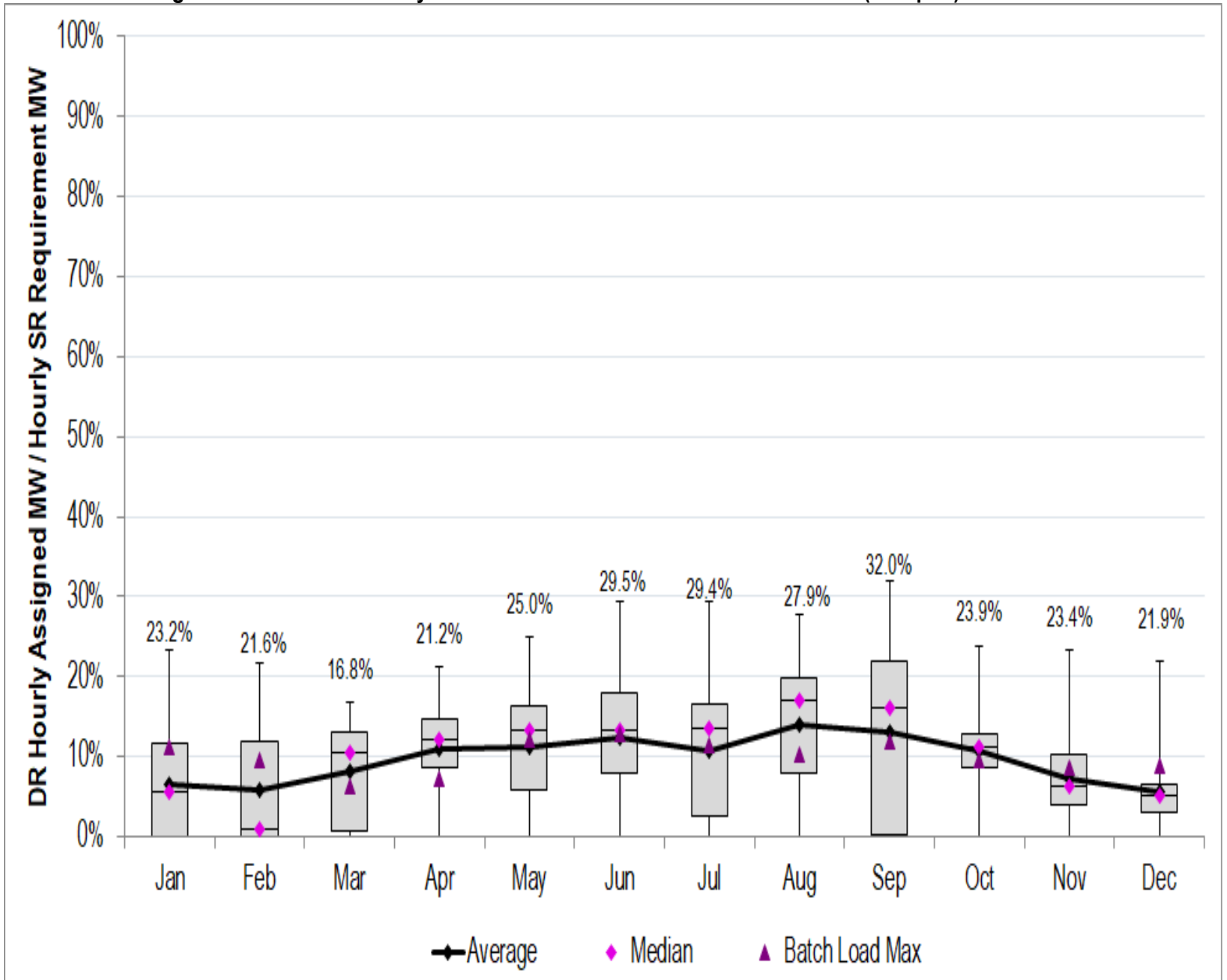


Figure 33: 2022 Economic Demand Response Synchronous Reserve Market Participation



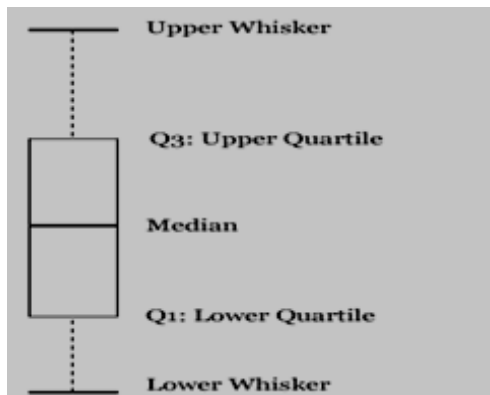
Note: For Figures 32 and 33 above, MWh=sum of the settled MW. Example: 1 MW load available for 12 hours = 12 MWh.

Figure 34: Economic DR Synchronous Reserve Penetration Distribution (Box-plot) for 2022



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