

# 2020 Demand Response Operations Markets Activity Report: March 2021

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PJM Demand Side Response Operations

March 5, 2021



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Figure 1: DY 20/21 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	1.1	238	61.1			239	62.2
DE	DPL	DEMEC	9	5.1	23	12.7			24	17.3
DE	DPL	DOVDE			15	1.6			15	1.6
DE	DPL	DPL	1	24.0	183	54.0	4	29.5	187	83.5
DE	DPL	ODEC			11	4.3			11	4.3
DE	DPL-SOUTH	DPL					29	9.5	29	9.5
IL	COMED	COMED	20	67.5	2,356	1,248.2			2,357	1,250.3
IL	COMED	IMEAA1	1	0.3					0	0.0
IN	AEP	AEPIMP			136	394.1			136	394.1
IN	AEP	HEREC			1	19.7			1	19.7
IN	AEP	WVPA	1	6.1	1	5.8			1	5.8
KY	AEP	AEPKPT			3	9.5			3	9.5
KY	DEOK	DEK			4	3.6			4	3.6
KY	EKPC	EKPC			10	142.9			10	142.9
MD	APS	AETSAP	14	38.1	109	62.8			109	62.8
MD	APS	FESCTH			4	0.5			4	0.5
MD	BGE	BC	29	36.6	609	122.5	1,053	341.9	1,662	464.4
MD	DPL	DPL	6	7.7	142	33.1	55	6.8	197	39.9
MD	DPL	EASTON			7	1.1			7	1.1
MD	DPL	ODEC			12	6.1			12	6.1
MD	DPL-SOUTH	DPL					768	23.1	768	23.1
MD	PEPCO	PEPCO	3	0.6	200	47.9	111	201.7	314	250.1
MD	PEPCO	SMECO	4	0.7	23	0.7			23	0.7
MI	AEP	AEPIMP			1	13.0			1	13.0
MI	AEP	STURGS			1	4.5			1	4.5
NJ	AECO	AE	2	1.8	181	40.8			181	40.8
NJ	AECO	VMEU			22	5.5			22	5.5
NJ	JCPL	JCBGS	2	40.5	318	101.0			320	141.5
NJ	PSEG	PSEG	14	49.6	859	257.9			864	278.2
NJ	RECO	RECO			15	2.0			15	2.0
NY	PENELEC	PaElec			1	1.2			1	1.2
OH	AEP	AEOPT	44	199.7	736	457.4			740	526.2
OH	AEP	AMPO			51	38.8			51	38.8
OH	ATSI	AMPO			25	67.6			25	67.6
OH	ATSI	CPP			13	10.9			13	10.9
OH	ATSI	OEECD	4	27.5	862	879.4			862	879.4
OH	DAY	AMPO			11	37.7			11	37.7
OH	DAY	DAYEDC	1	0.5	166	143.3			166	143.3
OH	DEOK	AMPO			7	11.4			7	11.4
OH	DEOK	DEOEDC	10	154.7	196	150.2			203	175.7
PA	APS	AECI			2	1.9			2	1.9
PA	APS	AETSAP	7	74.6	532	366.5			533	367.5
PA	ATSI	PAPWR	2	40.6	89	118.7			90	119.3
PA	DUQ	DLCO	7	45.0	335	106.6			339	151.4
PA	METED	MetEd	17	36.0	398	176.7			400	178.1
PA	PECO	PE	19	67.0	888	265.5			893	284.9
PA	PENELEC	AECI			13	9.1			13	9.1
PA	PENELEC	PaElec	2	62.0	461	267.6			462	289.6

State	Zone	EDC	Economic		Load Management		Price Responsive Demand		Unique	
			Locations	MW	Locations	MW	Locations	MW	Locations	MW
PA	PENELEC	WELLSB			3	1.1			3	1.1
PA	PPL	AMPO			4	0.5			4	0.5
PA	PPL	CTZECL			4	1.5			4	1.5
PA	PPL	PPL	21	139.7	1,009	484.5			1,015	514.1
PA	PPL	UGI-UI			10	3.6			10	3.6
TN	AEP	AEPAPT			10	2.7			10	2.7
VA	AEP	AEPAPT	3	5.9	229	249.2			229	249.2
VA	AEP	AMPO			16	7.4			16	7.4
VA	AEP	RADFRD			1	1.6			1	1.6
VA	AEP	VATECH			1	2.2			1	2.2
VA	APS	ODEC	3	0.9	49	23.2			49	23.2
VA	DOM	CVEC			4	3.4			4	3.4
VA	DOM	DOMEDC	20	102.5	757	561.1			758	641.1
VA	DOM	DOMVME			27	85.8			27	85.8
VA	DOM	NVEC			93	11.2			93	11.2
VA	DOM	ODEC	1	0.2	43	21.0			43	21.0
VA	DPL	ODEC			9	0.8			9	0.8
WV	AEP	AEPAPT	2	80.2	164	415.6			165	495.6
WV	APS	AETSAP	24	43.8	269	216.9			269	216.9
<b>Total</b>			<b>294</b>	<b>1,361</b>	<b>12,972</b>	<b>7,861</b>	<b>2,020</b>	<b>612</b>	<b>15,038</b>	<b>8,915</b>

## Note:

- 1) Data as of 3/4/2021.
- 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: represents total estimated demand reduction assuming full Load Management and Economic reductions.
- 6) As of March 2, 2021, DY20/21 RPM Committed Values is 6,296 MW for Load Management.
- 7) As of March 2, 2021, DY20/21 RPM Committed Values is 558 MW for PRD.

Figure 2: DY 20/21 MWs in Load Management DR by Resource, Product, and Lead Times

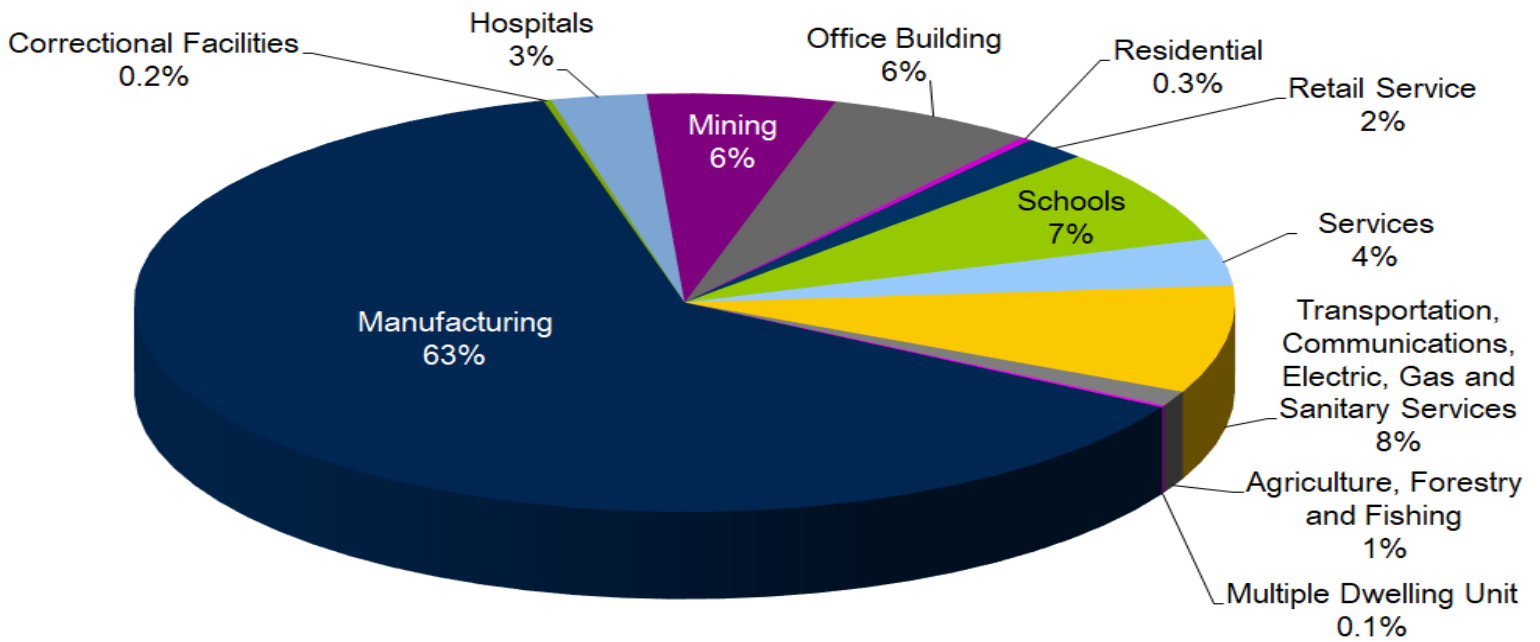
Zone		Capacity Performance	Lead Times (Minutes)			Total DR MW
			30	60	120	
<b>AECO</b>						
	Pre-Emergency	45.6	34.1	2.7	8.8	45.6
	Emergency	0.8	0.0	0.8	0.0	0.8
	Total	46.4	34.1	3.5	8.8	46.4
<b>AEP</b>						
	Pre-Emergency	1,587.1	825.7	152.6	608.9	1,587.1
	Emergency	34.2	20.9	1.3	12.0	34.2
	Total	1,621.3	846.5	153.8	620.9	1,621.3
<b>APS</b>						
	Pre-Emergency	650.7	425.1	6.1	219.5	650.7
	Emergency	21.2	15.9	0.0	5.3	21.2
	Total	671.9	441.0	6.1	224.8	671.9
<b>ATSI</b>						
	Pre-Emergency	997.5	358.3	67.4	571.8	997.5
	Emergency	79.2	30.8	2.0	46.4	79.2
	Total	1,076.7	389.1	69.4	618.2	1,076.7
<b>BGE</b>						
	Pre-Emergency	111.7	79.9	3.7	28.1	111.7
	Emergency	10.8	9.0	0.0	1.8	10.8
	Total	122.5	88.9	3.7	29.9	122.5
<b>COMED</b>						
	Pre-Emergency	1,198.7	843.7	25.5	329.5	1,198.7
	Emergency	49.5	23.9	4.2	21.4	49.5
	Total	1,248.2	867.7	29.7	350.8	1,248.2
<b>DAY</b>						
	Pre-Emergency	173.9	108.8	1.8	63.2	173.9
	Emergency	7.1	6.6	0.0	0.5	7.1
	Total	181.0	115.4	1.8	63.8	181.0
<b>DEOK</b>						
	Pre-Emergency	163.8	75.5	21.5	66.8	163.8
	Emergency	1.3	1.3	0.0	0.0	1.3
	Total	165.1	76.8	21.5	66.8	165.1
<b>DOM</b>						
	Pre-Emergency	555.4	110.4	34.0	411.0	555.4
	Emergency	127.2	89.2	11.2	26.7	127.2
	Total	682.6	199.6	45.3	437.7	682.6
<b>DPL</b>						
	Pre-Emergency	108.9	73.3	13.5	22.1	108.9
	Emergency	4.9	1.2	3.1	0.6	4.9
	Total	113.7	74.5	16.5	22.7	113.7
<b>DUQ</b>						
	Pre-Emergency	106.4	66.8	1.1	38.4	106.4
	Emergency	0.2	0.2	0.0	0.0	0.2
	Total	106.6	67.0	1.1	38.4	106.6
<b>EKPC</b>						
	Pre-Emergency	141.0	22.4	4.4	114.3	141.0
	Emergency	1.9	1.9	0.0	0.0	1.9
	Total	142.9	24.3	4.4	114.3	142.9
<b>JCPL</b>						
	Pre-Emergency	97.1	68.6	0.6	27.9	97.1
	Emergency	3.9	3.9	0.0	0.0	3.9
	Total	101.0	72.5	0.6	27.9	101.0
<b>METED</b>						

Zone		Capacity Performance	Lead Times (Minutes)			Total DR MW
			30	60	120	
	Pre-Emergency	175.8	113.8	17.6	44.3	175.8
	Emergency	0.8	0.0	0.0	0.8	0.8
	Total	176.7	113.8	17.6	45.2	176.7
<b>PECO</b>						
	Pre-Emergency	262.0	186.0	7.6	68.4	262.0
	Emergency	3.5	3.5	0.0	0.0	3.5
	Total	265.5	189.5	7.6	68.4	265.5
<b>PENELEC</b>						
	Pre-Emergency	270.2	150.3	6.7	113.2	270.2
	Emergency	8.8	0.8	8.1	0.0	8.8
	Total	279.0	151.1	14.7	113.2	279.0
<b>PEPCO</b>						
	Pre-Emergency	101.9	80.2	1.0	20.8	101.9
	Emergency	7.8	7.8	0.0	0.0	7.8
	Total	109.7	87.9	1.0	20.8	109.7
<b>PPL</b>						
	Pre-Emergency	489.1	234.5	19.2	235.4	489.1
	Emergency	1.0	0.2	0.0	0.8	1.0
	Total	490.1	234.7	19.2	236.2	490.1
<b>PSEG</b>						
	Pre-Emergency	257.9	201.8	4.3	51.8	257.9
	Emergency	0.0	0.0	0.0	0.0	0.0
	Total	257.9	201.8	4.3	51.8	257.9
<b>RECO</b>						
	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
<b>TOTAL</b>						
	Pre-Emergency	7,496.7	4,061.2	391.3	3,044.2	7,496.7
	Emergency	364.1	217.1	30.7	116.3	364.1
	Total	7,860.8	4,278.2	421.8	3,160.6	7,860.8

## Note:

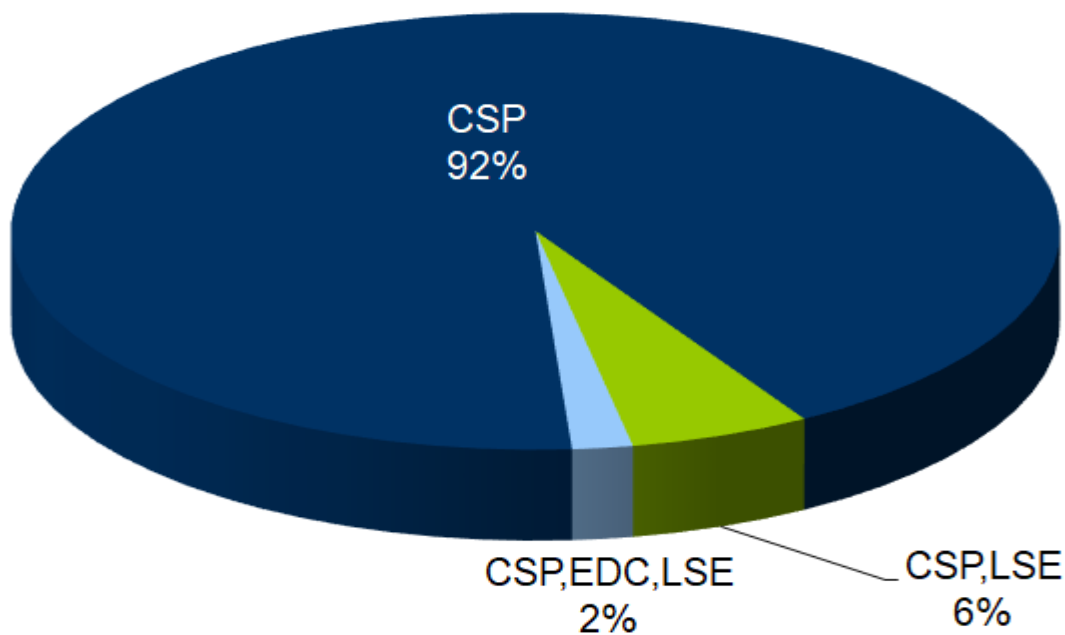
- 1) Data as of 3/2/2021.
- 2) Load Management MW are Winter ICAP.

Figure 3: DY 20/21 Confirmed Load Management DR Registrations Business Segments



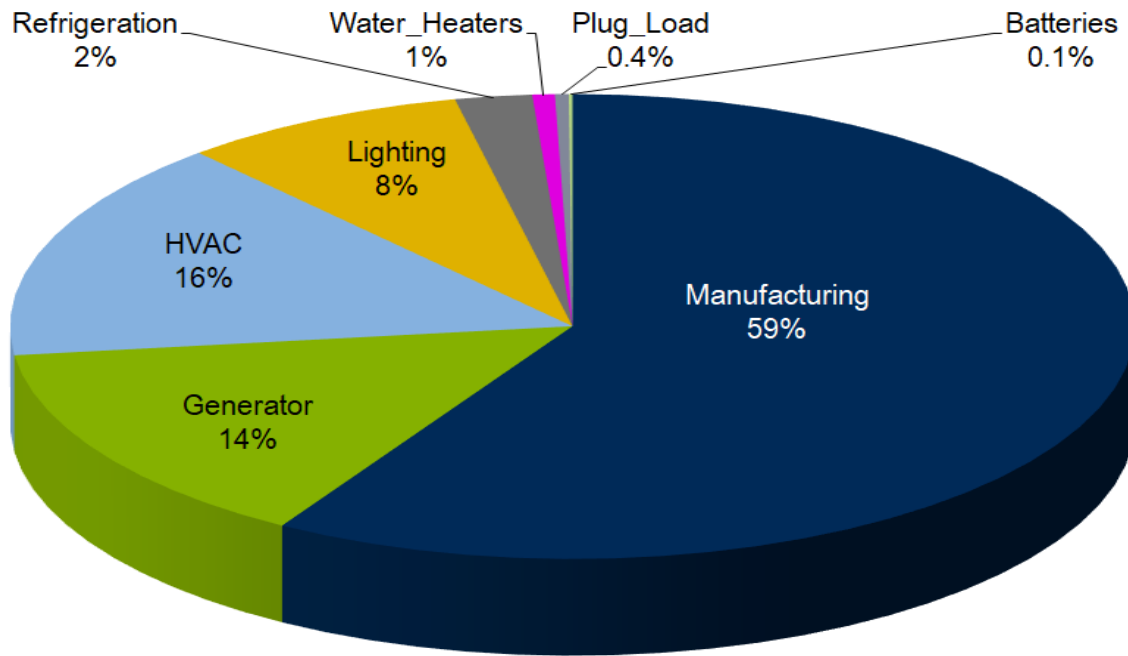
Note: Percent of Winter Nominated Capacity (MWs).

Figure 4: DY 20/21 Confirmed Load Management DR Registrations Owner/Company Type



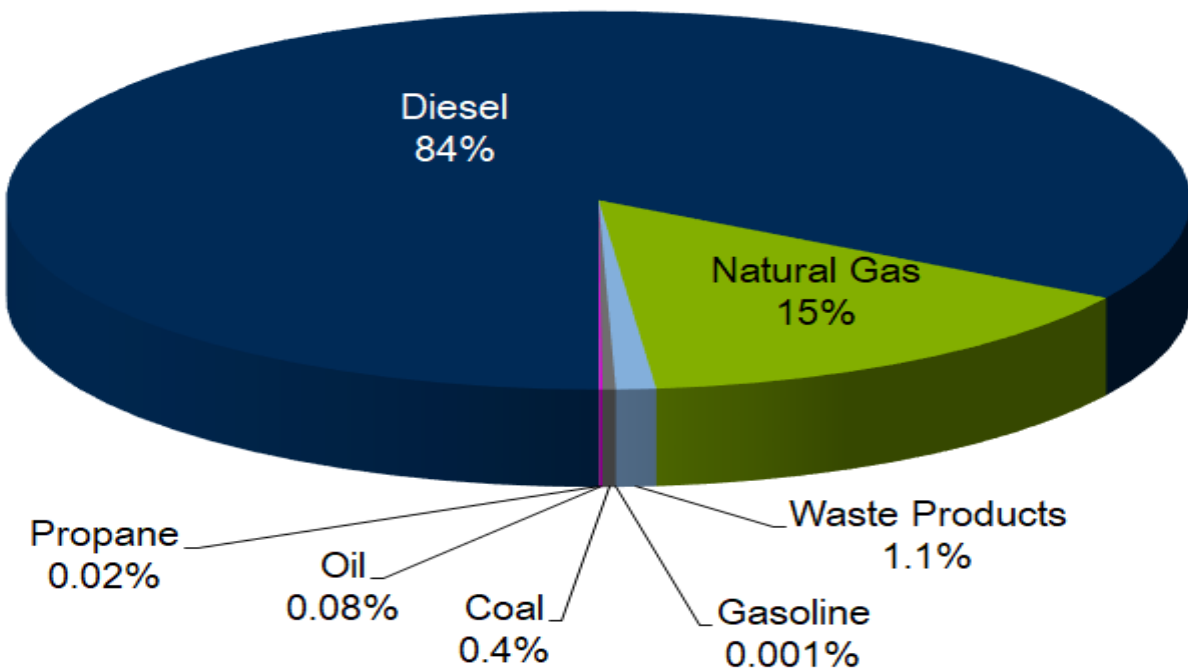
Note: Percent of Winter Nominated Capacity (MWs).

Figure 5: DY 20/21 Confirmed Load Management DR Registrations Customer Load Reduction Methods



Note: Percent of Winter Nominated Capacity (MWs).

Figure 6: DY 20/21 Confirmed Load Management DR Registrations Fuel Mix with Behind the Meter Generation



Note: Percent of Winter Nominated Capacity (MWs).



Figure 7: DY 20/21 Confirmed Load Management DR Registrations Generator and Permit Type

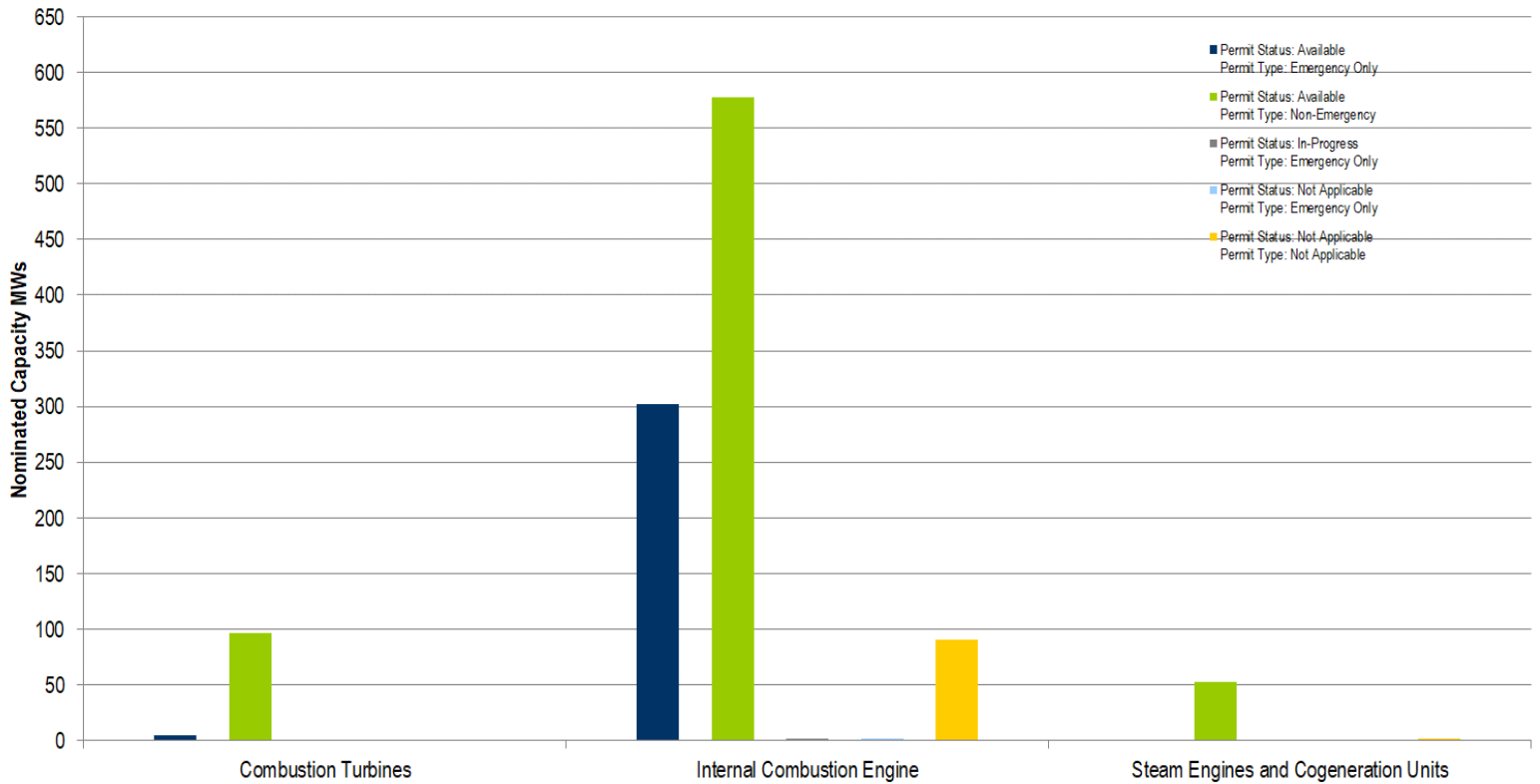


Figure 8: DY 20/21 Confirmed Load Management DR Registrations Fuel Mix with Behind the Meter Generation

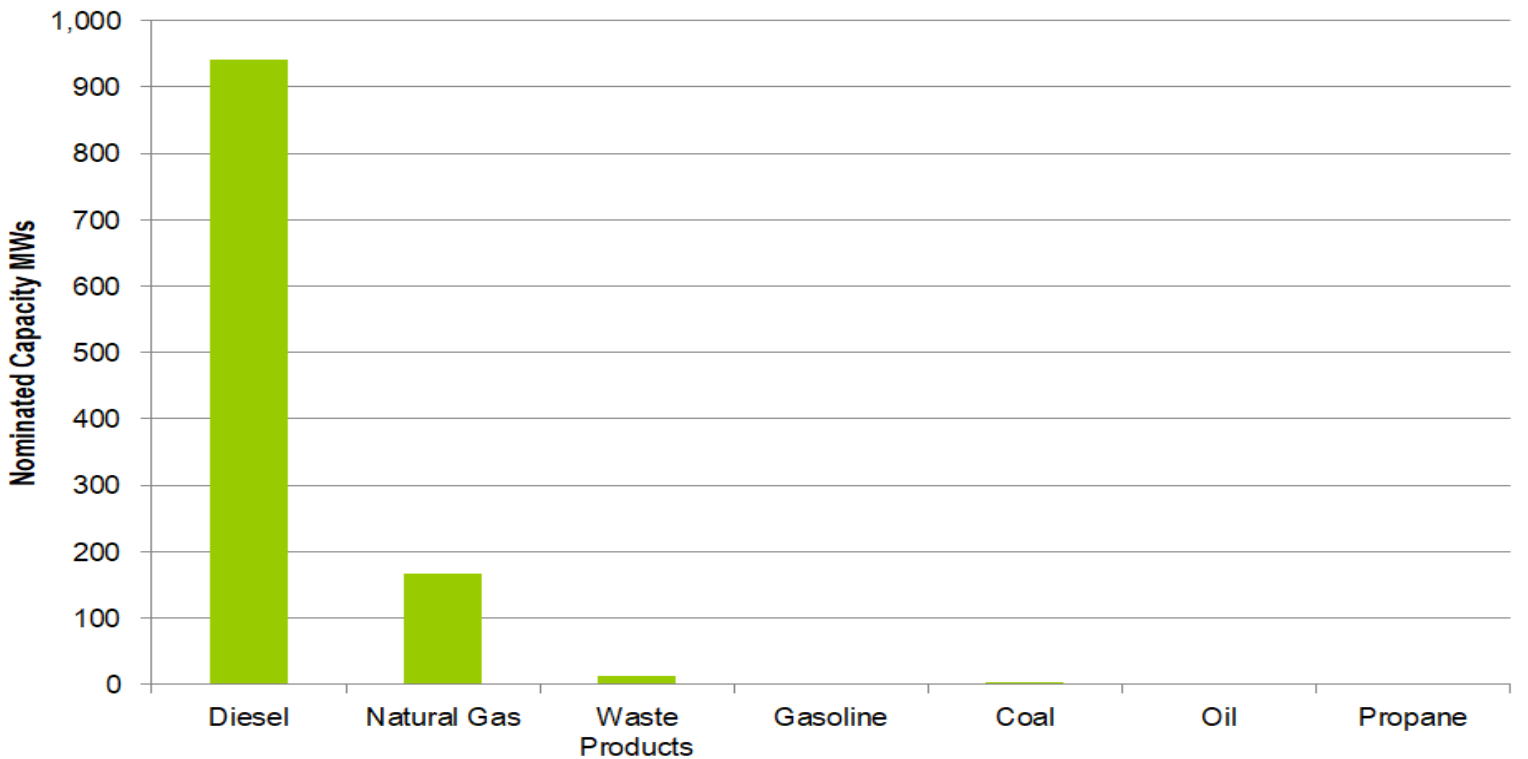
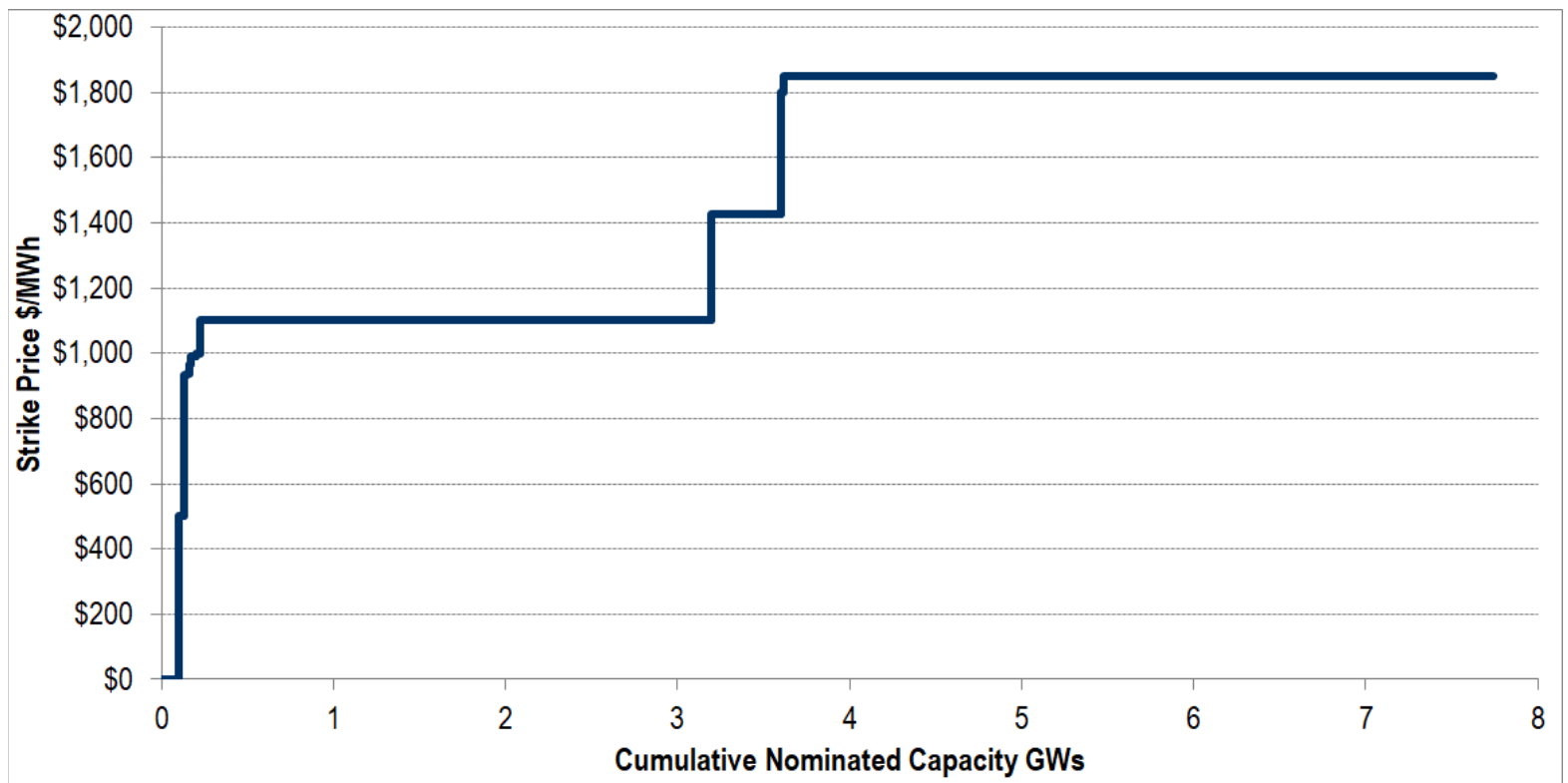


Figure 9: DY 20/21 Confirmed Load Management Full DR Registrations Energy Supply Curve:



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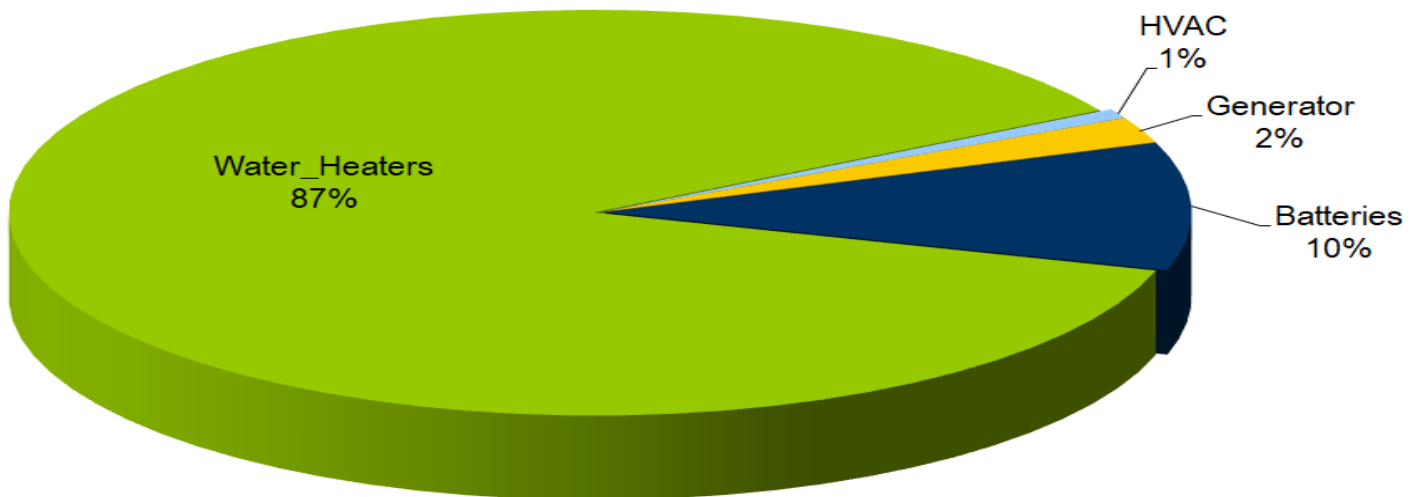
**Figure 10: 2020 Economic Demand Response Capability in the Ancillary Service Markets**

Synch Reserves	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Locations	MAD	103	103	103	89	57	56	58	58	58	55	51	50
	Non-MAD	29	31	31	26	23	26	27	28	31	32	32	32
	RTO	132	134	134	115	80	82	85	86	89	87	83	82
<b>Average Number of Unique Participating Locations per Month:</b>		<b>99</b>											
MWs	MAD	511	511	511	521	391	400	434	436	436	307	301	268
	Non-MAD	347	352	352	321	349	324	327	372	463	467	467	467
	RTO	857	863	863	842	741	724	761	808	899	775	768	735
<b>Average MWs per Month:</b>		<b>803</b>											

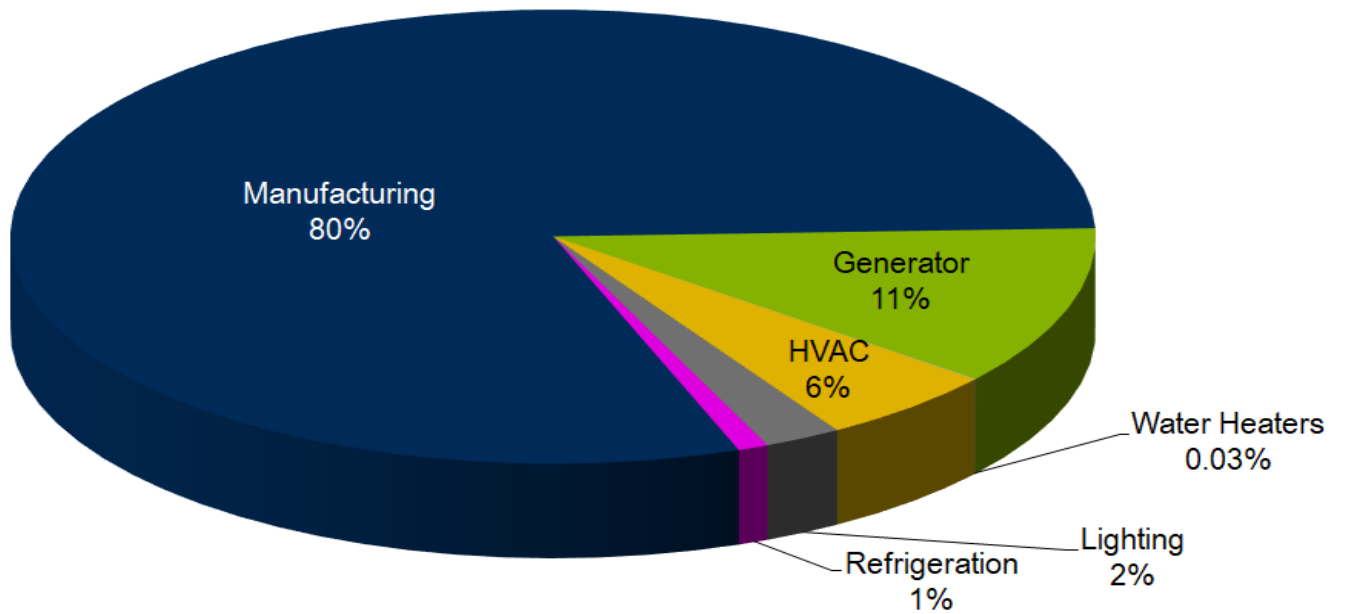
Regulation	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Locations	RTO	149	149	149	143	140	141	136	135	135	92	127	137
<b>Average Number of Unique Participating Locations per Month:</b>		<b>136</b>											
MWs	RTO	98	98	98	90	81	83	77	75	75	39	64	79
<b>Average MWs per Month:</b>		<b>80</b>											

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 11: 2020 PJM Demand Response Confirmed Regulation Registrations Load Reduction Methods**


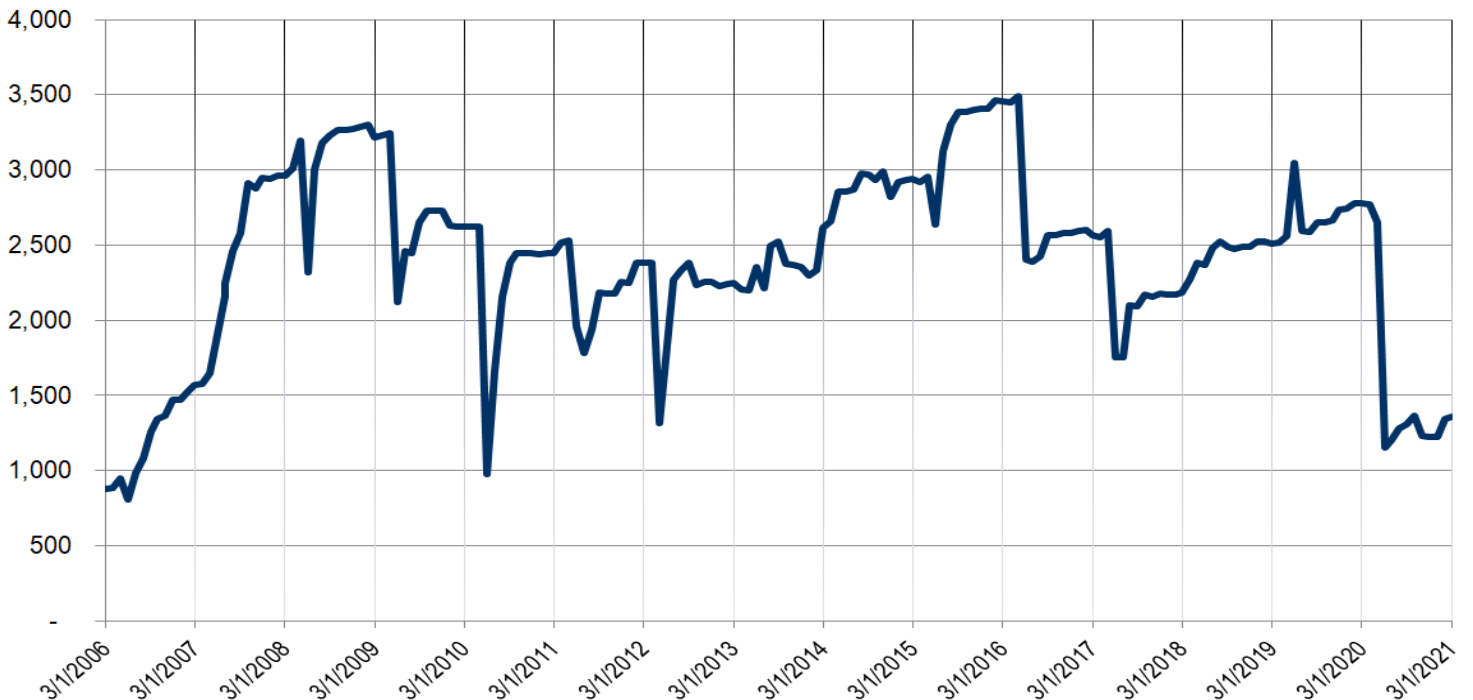
Note: Percent of CSP Reported Load Reduction MWs

Figure 12: 2020 PJM Demand Response Confirmed Synch Reserve Registrations Load Reduction Methods:



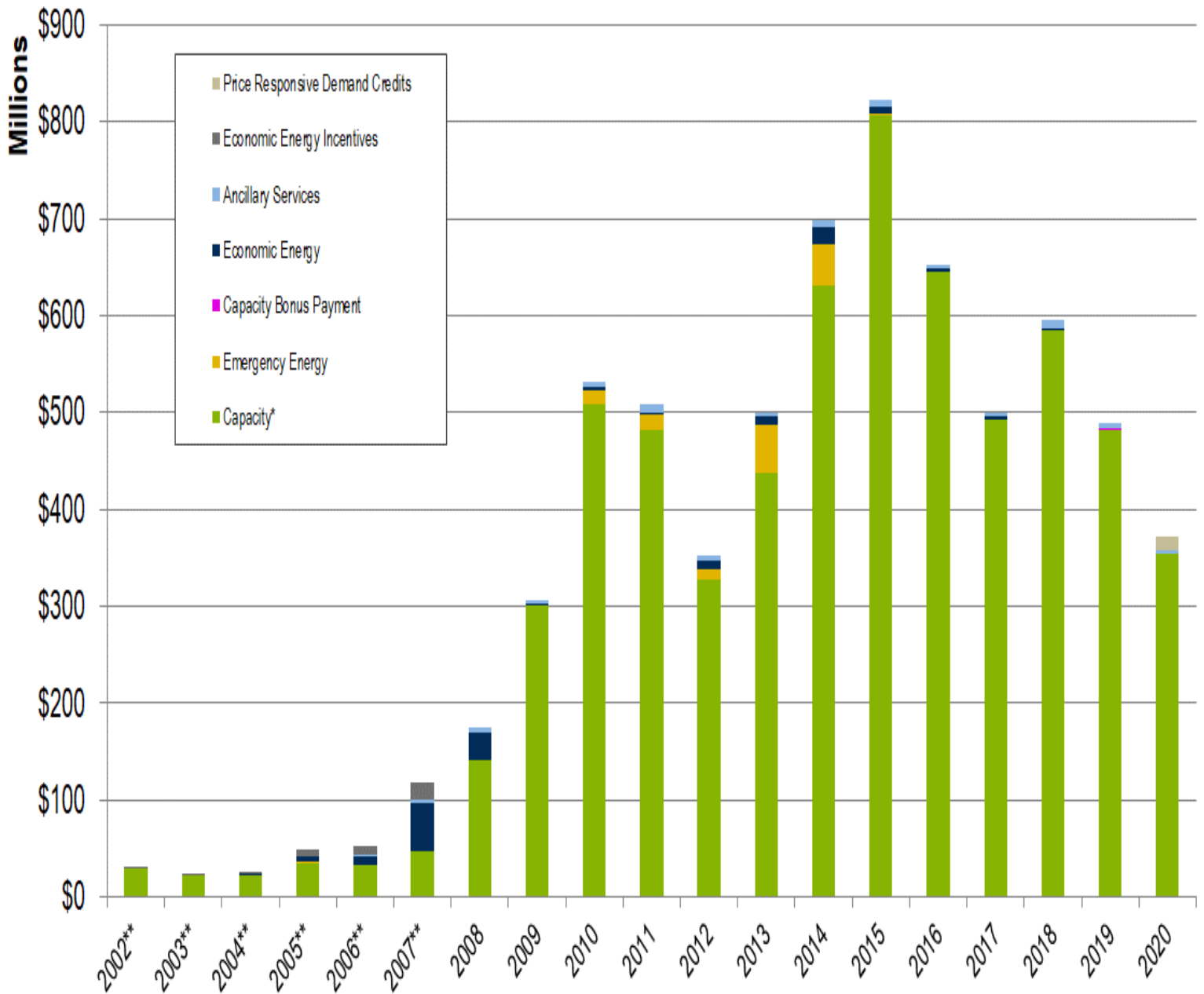
Note: Percent of CSP Reported Load Reduction MWs

Figure 13: PJM Economic Demand Response Capability in Energy Market (3/1/2006-3/2/2021)



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.

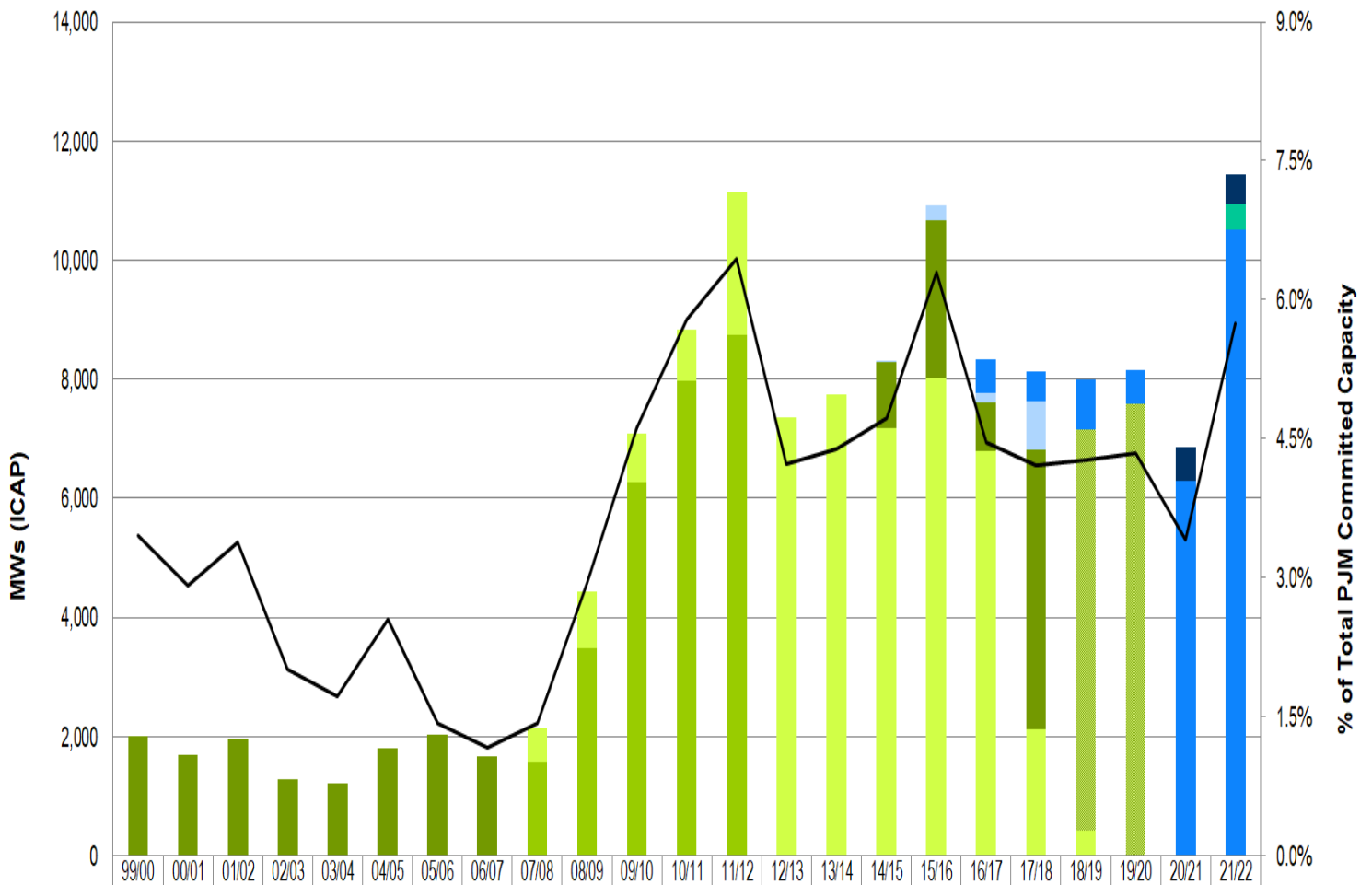
Figure 14: PJM Estimated Revenue for Economic and Load Management DR Markets



\*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).

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	
PRD																						558	510	
Summer - CP																							0	416
Annual - CP																			574	493	843	556	6296	10521
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%	3.4%	5.7%	

- Notes:
- 1) Data represents net commitment ICAP value (for each product specified) on 3/2/2021.
  - 2) RPM was implemented DY 07/08.
  - 3) DY 21/22 MWs include results from Base, First and Second Incremental Auction.
  - 4) ALM MWs are seasonal averages for Delivery Years before 07/08.

**Figure 16: 2020 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	3	2	2	1		1	
MD	PEPCO					3	3	3	3		2		2
NJ	JCPL	1						1					
	PSEG	2	2	2			4	6	4	2		1	
OH	AEP							1	1				
	ATSI							1	1				
PA	METED	3	2		1				2	3	1	1	1
	PECO	1						1	1	1	1	1	1
	PENELEC	2		2		2	2	2			1	2	2
	PPL						1	2	2				
VA	DOM							1	1	1	1	1	
WV	APS					1		2	2				
<b>Total</b>		<b>10</b>	<b>5</b>	<b>5</b>	<b>2</b>	<b>7</b>	<b>13</b>	<b>23</b>	<b>19</b>	<b>8</b>	<b>6</b>	<b>7</b>	<b>6</b>
<b>Average Unique Participating Registrations per Month:</b>		<b>9</b>											

**Figure 17: 2020 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						1	1	1	1			
MD	PEPCO												
NJ	JCPL							1					
	PSEG						2	3	2	1		1	
OH	AEP	1											
	ATSI	2	2	2									
PA	METED								1	1			
	PECO							1	1	1	1	1	1
	PENELEC	1	1			1	1	1			1	1	1
	PPL	1											
VA	DOM	1		1									
WV	APS												
<b>Total</b>		<b>6</b>	<b>3</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>4</b>	<b>7</b>	<b>5</b>	<b>4</b>	<b>2</b>	<b>3</b>	<b>2</b>
<b>Average Unique Participating Registrations per Month (Day-Ahead):</b>		<b>3</b>											

**Figure 18: 2020 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	2	1	1			1	
MD	PEPCO					3	3	3	3		2		2
NJ	JCPL												
	PSEG						2	3	2	1			
OH	AEP							1	1				
	ATSI							1	1				
PA	METED	2	1		1				1	2	1	1	1
	PECO												
	PENELEC	1		1		1	1	1				1	1
	PPL						1	2	2				
VA	DOM							1	1	1	1	1	
WV	APS					1		2	2				
<b>Total</b>		<b>4</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>6</b>	<b>9</b>	<b>16</b>	<b>14</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>
<b>Average Unique Participating Registrations per Month (Real-Time):</b>		<b>6</b>											

**Figure 19: 2020 Economic Demand Response Monthly MWh Reductions**

State	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DE	DPL							138					
IL	COMED	17	13	18	3	21	218	1,780	1,619	209		0	
MD	PEPCO					0	0	1	1		0		0
NJ	JCPL	0						305					
	PSEG	496	115	24			231	578	64	8		0	
OH	AEP							9	9				
	ATSI							242	60				
PA	METED	61	13		6				220	76	9	9	1
	PECO	86						50	81	24	35	42	271
	PENELEC	352		20		158	409	80			0	320	377
	PPL						6	0	70				
VA	DOM							10	32	0	4	0	
WV	APS					48		86	77				
<b>Total</b>		<b>1,013</b>	<b>141</b>	<b>62</b>	<b>10</b>	<b>227</b>	<b>864</b>	<b>3,279</b>	<b>2,233</b>	<b>317</b>	<b>48</b>	<b>371</b>	<b>649</b>
<b>Total MWh:</b>		<b>9,213</b>											

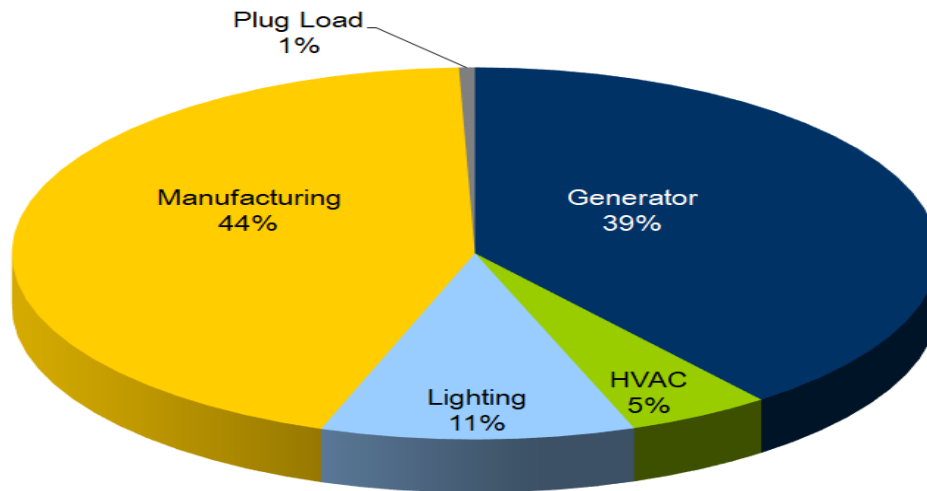
**Figure 20: 2020 Economic Demand Response Monthly MWh Reductions Day-Ahead Activity**

State	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DE	DPL												
IL	COMED						195	1,722	1,619	209			
MD	PEPCO												
NJ	JCPL	0						305					
	PSEG	496	115	24			126	371	64	8		0	
OH	AEP												
	ATSI												
PA	METED	44	9						176	57			
	PECO	86						50	81	24	35	42	271
	PENELEC	331		20		143	327	70			0	264	335
	PPL												
VA	DOM												
WV	APS												
<b>Total</b>		<b>958</b>	<b>124</b>	<b>43</b>	<b>0</b>	<b>143</b>	<b>648</b>	<b>2,518</b>	<b>1,940</b>	<b>298</b>	<b>35</b>	<b>306</b>	<b>606</b>
<b>Total Day-Ahead MWh:</b>		<b>7,620</b>											

**Figure 21: 2020 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							138					
IL	COMED	17	13	18	3	21	22	58	0			0	
MD	PEPCO					0	0	1	1		0		0
NJ	JCPL												
	PSEG						105	207	0	0			
OH	AEP							9	9				
	ATSI							242	60				
PA	METED	17	4		6				45	19	9	9	1
	PECO												
	PENELEC	21		0		15	83	11				56	42
	PPL						6	0	70				
VA	DOM							10	32	0	4	0	
WV	APS					48		86	77				
<b>Total</b>		<b>55</b>	<b>17</b>	<b>18</b>	<b>10</b>	<b>84</b>	<b>216</b>	<b>760</b>	<b>293</b>	<b>19</b>	<b>13</b>	<b>65</b>	<b>43</b>
<b>Total Real-Time MWh:</b>		<b>1,593</b>											



**Figure 22: 2020 Estimated Economic DR Load Reduction MWh by Load Reduction Method**

**Figure 23: 2020 Economic Demand Response Monthly Energy Market Revenue**

State	Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DE	DPL							\$10,800					
IL	COMED	\$421	\$252	\$237	\$62	\$391	(\$997)	\$61,540	\$56,777	\$6,716		\$14	
MD	PEPCO					\$0	\$16	\$24	\$57		\$0		\$0
NJ	JCPL	\$1,876						\$11,022					
	PSEG	\$12,880	\$2,066	\$461			\$6,038	\$17,347	\$3,018	\$296		(\$19)	
OH	AEP							\$341	\$540				
	ATSI							\$22,673	\$3,498				
PA	METED	\$1,960	\$333		\$135				\$8,836	\$2,608	\$209	\$341	\$50
	PECO	\$3,509						\$2,160	\$3,307	\$1,045	\$1,364	\$1,650	\$14,779
	PENELEC	\$9,653		\$475		\$4,798	\$11,402	\$2,377			\$330	\$9,674	\$11,475
	PPL						\$137	\$0	\$3,580				
VA	DOM							\$506	\$1,600	\$0	\$121	\$0	
WV	APS					\$972		\$7,770	\$3,614				
<b>Total</b>		<b>\$30,300</b>	<b>\$2,651</b>	<b>\$1,173</b>	<b>\$197</b>	<b>\$6,161</b>	<b>\$16,596</b>	<b>\$136,560</b>	<b>\$84,827</b>	<b>\$10,665</b>	<b>\$2,025</b>	<b>\$11,661</b>	<b>\$26,304</b>
<b>Total CSP Credits:</b>		<b>\$329,119</b>											

**Figure 24: 2020 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						(\$1,553)	\$60,012	\$56,777	\$6,716			
MD	PEPCO												
NJ	JCPL	\$1,876						\$11,022					
	PSEG	\$12,880	\$2,066	\$461			\$3,646	\$12,075	\$3,018	\$296		(\$19)	
OH	AEP												
	ATSI												
PA	METED	\$1,439	\$251						\$6,997	\$2,083			
	PECO	\$3,509						\$2,160	\$3,307	\$1,045	\$1,364	\$1,650	\$14,779
	PENELEC	\$9,205		\$475		\$4,315	\$9,045	\$2,115			\$330	\$8,433	\$10,631
	PPL												
VA	DOM												
WV	APS												
<b>Total</b>		<b>\$28,908</b>	<b>\$2,317</b>	<b>\$936</b>	<b>\$0</b>	<b>\$4,315</b>	<b>\$11,138</b>	<b>\$87,384</b>	<b>\$70,100</b>	<b>\$10,140</b>	<b>\$1,694</b>	<b>\$10,064</b>	<b>\$25,410</b>
<b>Total Day-Ahead CSP Credits:</b>		<b>\$252,407</b>											

**Figure 25: 2020 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							\$10,800					
IL	COMED	\$421	\$252	\$237	\$62	\$391	\$555	\$1,528	\$0			\$14	
MD	PEPCO					\$0	\$16	\$24	\$57		\$0		\$0
NJ	JCPL												
	PSEG						\$2,393	\$5,272	\$0	\$0			
OH	AEP							\$341	\$540				
	ATSI							\$22,673	\$3,498				
PA	METED	\$522	\$82		\$135				\$1,838	\$525	\$209	\$341	\$50
	PECO												
	PENELEC	\$449		\$0		\$483	\$2,357	\$262				\$1,241	\$844
	PPL						\$137	\$0	\$3,580				
VA	DOM							\$506	\$1,600	\$0	\$121	\$0	
WV	APS					\$972		\$7,770	\$3,614				
<b>Total</b>		<b>\$1,391</b>	<b>\$335</b>	<b>\$237</b>	<b>\$197</b>	<b>\$1,846</b>	<b>\$5,458</b>	<b>\$49,176</b>	<b>\$14,727</b>	<b>\$525</b>	<b>\$331</b>	<b>\$1,596</b>	<b>\$894</b>
<b>Total Real-Time CSP Credits:</b>		<b>\$76,712</b>											

**Figure 26: 2020 Economic Demand Response Energy Market Cost Allocation by Zone**

Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AECO	\$307	\$22	\$12	\$2	\$53	\$228	\$2,043	\$1,160	\$167	\$22	\$120	\$312
AEP	\$4,802	\$459	\$191	\$31	\$1,004	\$2,311	\$19,229	\$12,532	\$1,535	\$319	\$1,910	\$4,221
APS	\$1,908	\$180	\$74	\$13	\$386	\$917	\$7,600	\$4,913	\$573	\$121	\$737	\$1,683
ATSI	\$2,392	\$229	\$103	\$16	\$547	\$1,219	\$10,584	\$6,779	\$814	\$173	\$943	\$2,082
BGE	\$1,244	\$110	\$40	\$8	\$236	\$745	\$5,554	\$3,445	\$433	\$73	\$464	\$1,092
COMED	\$3,134	\$256	\$141	\$24	\$654	\$1,852	\$16,491	\$9,534	\$1,134	\$241	\$1,061	\$2,149
DAY	\$725	\$64	\$26	\$4	\$141	\$350	\$2,803	\$1,773	\$225	\$45	\$279	\$573
DEOK	\$945	\$94	\$39	\$6	\$224	\$542	\$4,407	\$2,762	\$359	\$66	\$388	\$850
DOM	\$3,927	\$364	\$133	\$25	\$792	\$2,134	\$17,423	\$10,897	\$1,465	\$236	\$1,496	\$3,500
DPL	\$698	\$50	\$24	\$3	\$97	\$386	\$3,345	\$1,854	\$274	\$41	\$206	\$631
DUQ	\$468	\$45	\$20	\$3	\$118	\$276	\$2,370	\$1,515	\$172	\$33	\$184	\$401
EKPC	\$526	\$53	\$18	\$3	\$98	\$236	\$1,931	\$1,243	\$161	\$32	\$195	\$487
JCPL	\$762	\$61	\$30	\$4	\$170	\$544	\$4,680	\$2,710	\$357	\$52	\$295	\$728
METED	\$587	\$46	\$22	\$4	\$115	\$344	\$2,531	\$1,661	\$197	\$38	\$225	\$508
OVEC	\$4.40	\$0	\$0	\$0	\$1	\$2	\$12	\$8	\$1	\$0	\$2	\$4
PECO	\$1,374	\$93	\$53	\$7	\$230	\$804	\$6,804	\$3,878	\$539	\$91	\$470	\$1,279
PENELEC	\$574	\$56	\$25	\$5	\$134	\$306	\$2,540	\$1,628	\$193	\$45	\$225	\$541
PEPCO	\$1,146	\$102	\$39	\$7	\$210	\$646	\$4,968	\$3,133	\$407	\$67	\$430	\$973
PPL	\$1,319	\$113	\$59	\$11	\$296	\$825	\$6,248	\$4,041	\$481	\$101	\$586	\$1,351
PSEG	\$1,456	\$123	\$59	\$8	\$318	\$927	\$7,906	\$4,689	\$615	\$104	\$556	\$1,365
RECO	\$47	\$4	\$2	\$0	\$12	\$35	\$317	\$183	\$22	\$3	\$19	\$45
Exports	\$1,955	\$127	\$62	\$11	\$325	\$967	\$6,772	\$4,488	\$539	\$121	\$871	\$1,528
<b>TOTAL</b>	<b>\$30,300</b>	<b>\$2,651</b>	<b>\$1,173</b>	<b>\$197</b>	<b>\$6,161</b>	<b>\$16,596</b>	<b>\$136,560</b>	<b>\$84,827</b>	<b>\$10,665</b>	<b>\$2,025</b>	<b>\$11,661</b>	<b>\$26,304</b>

Total Zonal Charges: \$329,119

**Figure 27: 2020 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	\$355	\$35	\$16	\$0	\$31	\$202	\$730	\$1,082	\$164	\$50	\$131	\$230
AEP	\$5,620	\$669	\$224	\$0	\$553	\$3,641	\$6,549	\$11,401	\$1,496	\$734	\$2,128	\$3,217
APS	\$2,228	\$266	\$88	\$0	\$211	\$1,346	\$2,609	\$4,392	\$557	\$279	\$821	\$1,281
ATSI	\$2,776	\$333	\$119	\$0	\$308	\$1,872	\$3,586	\$6,148	\$797	\$395	\$1,044	\$1,589
BGE	\$1,424	\$155	\$51	\$0	\$131	\$803	\$1,932	\$3,123	\$422	\$168	\$516	\$834
COMED	\$3,687	\$345	\$167	\$0	\$382	\$3,068	\$5,612	\$9,869	\$1,098	\$565	\$1,144	\$1,849
DAY	\$829	\$91	\$31	\$0	\$80	\$539	\$963	\$1,636	\$219	\$105	\$312	\$440
DEOK	\$1,100	\$138	\$46	\$0	\$126	\$846	\$1,516	\$2,545	\$349	\$151	\$431	\$649
DOM	\$4,608	\$511	\$165	\$0	\$431	\$3,034	\$6,007	\$9,846	\$1,426	\$549	\$1,627	\$2,660
DPL	\$818	\$79	\$31	\$0	\$62	\$296	\$1,180	\$1,752	\$267	\$94	\$240	\$477
DUQ	\$546	\$66	\$23	\$0	\$67	\$409	\$814	\$1,357	\$168	\$75	\$205	\$304
EKPC	\$622	\$78	\$22	\$0	\$53	\$375	\$663	\$1,141	\$157	\$73	\$219	\$371
JCPL	\$874	\$93	\$39	\$0	\$97	\$514	\$1,684	\$2,495	\$347	\$125	\$322	\$549
METED	\$690	\$66	\$29	\$0	\$67	\$350	\$889	\$1,494	\$191	\$88	\$252	\$387
OVEC	\$5.11	\$1	\$0	\$0	\$0	\$2	\$4	\$7	\$1	\$1	\$2	\$3
PECO	\$1,618	\$148	\$68	\$0	\$145	\$686	\$2,406	\$3,618	\$525	\$209	\$540	\$969
PENELEC	\$710	\$78	\$33	\$0	\$73	\$438	\$870	\$1,464	\$188	\$104	\$246	\$419
PEPCO	\$1,330	\$146	\$48	\$0	\$116	\$765	\$1,719	\$2,845	\$397	\$155	\$480	\$747
PPL	\$1,646	\$171	\$76	\$0	\$168	\$835	\$2,180	\$3,614	\$466	\$233	\$658	\$1,029
PSEG	\$1,680	\$184	\$75	\$0	\$181	\$852	\$2,800	\$4,275	\$598	\$251	\$626	\$1,043
RECO	\$54	\$6	\$2	\$0	\$7	\$41	\$113	\$167	\$22	\$8	\$21	\$34
Exports	\$2,174	\$181	\$68	\$0	\$169	\$1,257	\$2,300	\$3,918	\$531	\$321	\$920	\$1,181
<b>TOTAL</b>	<b>\$35,396</b>	<b>\$3,838</b>	<b>\$1,420</b>	<b>\$0</b>	<b>\$3,458</b>	<b>\$22,171</b>	<b>\$47,126</b>	<b>\$78,190</b>	<b>\$10,384</b>	<b>\$4,733</b>	<b>\$12,884</b>	<b>\$20,262</b>

Total Day-Ahead Zonal Charges: \$239,861

**Figure 28: 2020 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	-\$48	-\$13	-\$4	\$2	\$22	\$26	\$1,312	\$78	\$4	-\$29	-\$10	\$82
AEP	-\$818	-\$210	-\$33	\$31	\$450	-\$1,331	\$12,680	\$1,131	\$39	-\$416	-\$217	\$1,004
APS	-\$320	-\$86	-\$14	\$13	\$174	-\$429	\$4,991	\$521	\$15	-\$158	-\$84	\$402
ATSI	-\$384	-\$104	-\$16	\$16	\$240	-\$652	\$6,997	\$631	\$17	-\$223	-\$102	\$493
BGE	-\$180	-\$45	-\$11	\$8	\$106	-\$58	\$3,622	\$322	\$12	-\$95	-\$52	\$258
COMED	-\$552	-\$89	-\$26	\$24	\$272	-\$1,216	\$10,879	-\$335	\$36	-\$324	-\$83	\$301
DAY	-\$104	-\$27	-\$4	\$4	\$61	-\$189	\$1,840	\$137	\$5	-\$59	-\$33	\$133
DEOK	-\$155	-\$44	-\$7	\$6	\$98	-\$304	\$2,891	\$217	\$9	-\$85	-\$43	\$201
DOM	-\$681	-\$147	-\$32	\$25	\$361	-\$900	\$11,416	\$1,051	\$39	-\$313	-\$131	\$840
DPL	-\$120	-\$29	-\$7	\$3	\$36	\$90	\$2,165	\$102	\$7	-\$53	-\$34	\$154
DUQ	-\$78	-\$21	-\$3	\$3	\$51	-\$133	\$1,556	\$159	\$4	-\$43	-\$21	\$97
EKPC	-\$96	-\$25	-\$3	\$3	\$45	-\$139	\$1,268	\$103	\$4	-\$41	-\$24	\$116
JCPL	-\$112	-\$32	-\$9	\$4	\$72	\$30	\$2,996	\$214	\$10	-\$73	-\$28	\$179
METED	-\$103	-\$20	-\$6	\$4	\$48	-\$6	\$1,642	\$166	\$6	-\$50	-\$27	\$120
OVEC	-\$0.71	\$0	\$0	\$0	\$0	-\$1	\$8	\$1	\$0	\$0	\$0	\$1
PECO	-\$244	-\$55	-\$15	\$7	\$85	\$118	\$4,398	\$260	\$15	-\$118	-\$71	\$310
PENELEC	-\$137	-\$22	-\$7	\$5	\$61	-\$131	\$1,671	\$164	\$5	-\$59	-\$22	\$122
PEPCO	-\$184	-\$44	-\$9	\$7	\$94	-\$119	\$3,249	\$288	\$11	-\$88	-\$50	\$227
PPL	-\$327	-\$57	-\$17	\$11	\$128	-\$10	\$4,068	\$427	\$15	-\$131	-\$72	\$323
PSEG	-\$224	-\$61	-\$16	\$8	\$137	\$75	\$5,106	\$414	\$18	-\$147	-\$70	\$322
RECO	-\$7	-\$2	-\$1	\$0	\$5	-\$6	\$203	\$16	\$1	-\$5	-\$2	\$11
Exports	-\$219	-\$54	-\$6	\$11	\$156	-\$290	\$4,472	\$569	\$8	-\$200	-\$49	\$347
<b>TOTAL</b>	<b>-\$5,096</b>	<b>-\$1,187</b>	<b>-\$247</b>	<b>\$197</b>	<b>\$2,703</b>	<b>-\$5,575</b>	<b>\$89,434</b>	<b>\$6,637</b>	<b>\$281</b>	<b>-\$2,708</b>	<b>-\$1,223</b>	<b>\$6,042</b>

Total Real-Time Zonal Charges: \$89,258

**Figure 29: 2020 Load Management Demand Response Monthly Capacity Revenue from RPM**

Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AECO	\$451,066	\$421,965	\$451,066	\$436,515	\$451,066	\$353,042	\$364,810	\$364,810	\$353,042	\$364,810	\$353,042	\$364,810
AEP	\$3,565,436	\$3,335,408	\$3,565,436	\$3,450,422	\$3,565,436	\$2,885,206	\$2,981,379	\$2,981,379	\$2,885,206	\$2,981,379	\$2,885,206	\$2,981,379
APS	\$2,361,289	\$2,208,948	\$2,361,289	\$2,285,119	\$2,361,289	\$1,732,456	\$1,790,204	\$1,790,204	\$1,732,456	\$1,790,204	\$1,732,456	\$1,790,204
ATSI	\$2,422,538	\$2,266,246	\$2,422,538	\$2,344,392	\$2,422,538	\$1,821,792	\$1,882,518	\$1,882,518	\$1,821,792	\$1,882,518	\$1,821,792	\$1,882,518
BGE	\$651,153	\$609,143	\$651,153	\$630,148	\$651,153	\$453,083	\$468,186	\$468,186	\$453,083	\$468,186	\$453,083	\$468,186
COMED	\$9,961,211	\$9,318,552	\$9,961,211	\$9,639,882	\$9,961,211	\$8,192,693	\$8,465,782	\$8,465,782	\$8,192,693	\$8,465,782	\$8,192,692	\$8,465,782
DAY	\$551,678	\$516,086	\$551,678	\$533,882	\$551,678	\$450,951	\$465,983	\$465,983	\$450,951	\$465,983	\$450,951	\$465,983
DEOK	\$628,567	\$588,015	\$628,567	\$608,291	\$628,567	\$567,208	\$586,115	\$586,115	\$567,208	\$586,115	\$567,208	\$586,115
DOM	\$1,818,792	\$1,701,451	\$1,818,792	\$1,760,122	\$1,818,792	\$1,733,857	\$1,791,652	\$1,791,652	\$1,733,857	\$1,791,652	\$1,733,857	\$1,791,652
DPL	\$1,171,216	\$1,095,654	\$1,171,216	\$1,133,435	\$1,171,216	\$940,665	\$972,021	\$972,021	\$940,665	\$972,021	\$940,665	\$972,021
DUQ	\$619,442	\$579,478	\$619,442	\$599,460	\$619,442	\$370,874	\$383,237	\$383,237	\$370,874	\$383,237	\$370,874	\$383,237
EKPC	\$431,396	\$403,564	\$431,396	\$417,480	\$431,396	\$317,579	\$328,165	\$328,165	\$317,579	\$328,165	\$317,579	\$328,165
JCPL	\$626,062	\$585,671	\$626,062	\$605,867	\$626,062	\$791,309	\$817,686	\$817,686	\$791,309	\$817,686	\$791,309	\$817,686
METED	\$801,598	\$749,882	\$801,598	\$775,740	\$801,598	\$624,134	\$644,939	\$644,939	\$624,134	\$644,939	\$624,134	\$644,939
PECO	\$1,635,718	\$1,530,188	\$1,635,718	\$1,582,953	\$1,635,718	\$2,064,206	\$2,133,013	\$2,133,013	\$2,064,206	\$2,133,013	\$2,064,206	\$2,133,013
PENELEC	\$857,760	\$802,420	\$857,760	\$830,090	\$857,760	\$800,092	\$826,762	\$826,762	\$800,092	\$826,762	\$800,092	\$826,762
PEPCO	\$147,322	\$137,817	\$147,322	\$142,570	\$147,322	\$418,494	\$432,443	\$432,443	\$418,494	\$432,443	\$418,494	\$432,443
PPL	\$1,862,026	\$1,741,895	\$1,862,026	\$1,801,961	\$1,862,026	\$1,542,983	\$1,594,416	\$1,594,416	\$1,542,983	\$1,594,416	\$1,542,983	\$1,594,416
PSEG	\$1,196,021	\$1,118,858	\$1,196,021	\$1,157,439	\$1,196,021	\$1,840,640	\$1,901,994	\$1,901,994	\$1,840,640	\$1,901,994	\$1,840,639	\$1,901,994
RECO	\$31,919	\$29,860	\$31,919	\$30,889	\$31,919	\$21,883	\$22,613	\$22,613	\$21,883	\$22,613	\$21,883	\$22,613
<b>Total</b>	<b>\$31,792,211</b>	<b>\$29,741,101</b>	<b>\$31,792,211</b>	<b>\$30,766,656</b>	<b>\$31,792,211</b>	<b>\$27,923,146</b>	<b>\$28,853,918</b>	<b>\$28,853,918</b>	<b>\$27,923,146</b>	<b>\$28,853,918</b>	<b>\$27,923,146</b>	<b>\$28,853,918</b>

Total Capacity Credits: \$355,069,500

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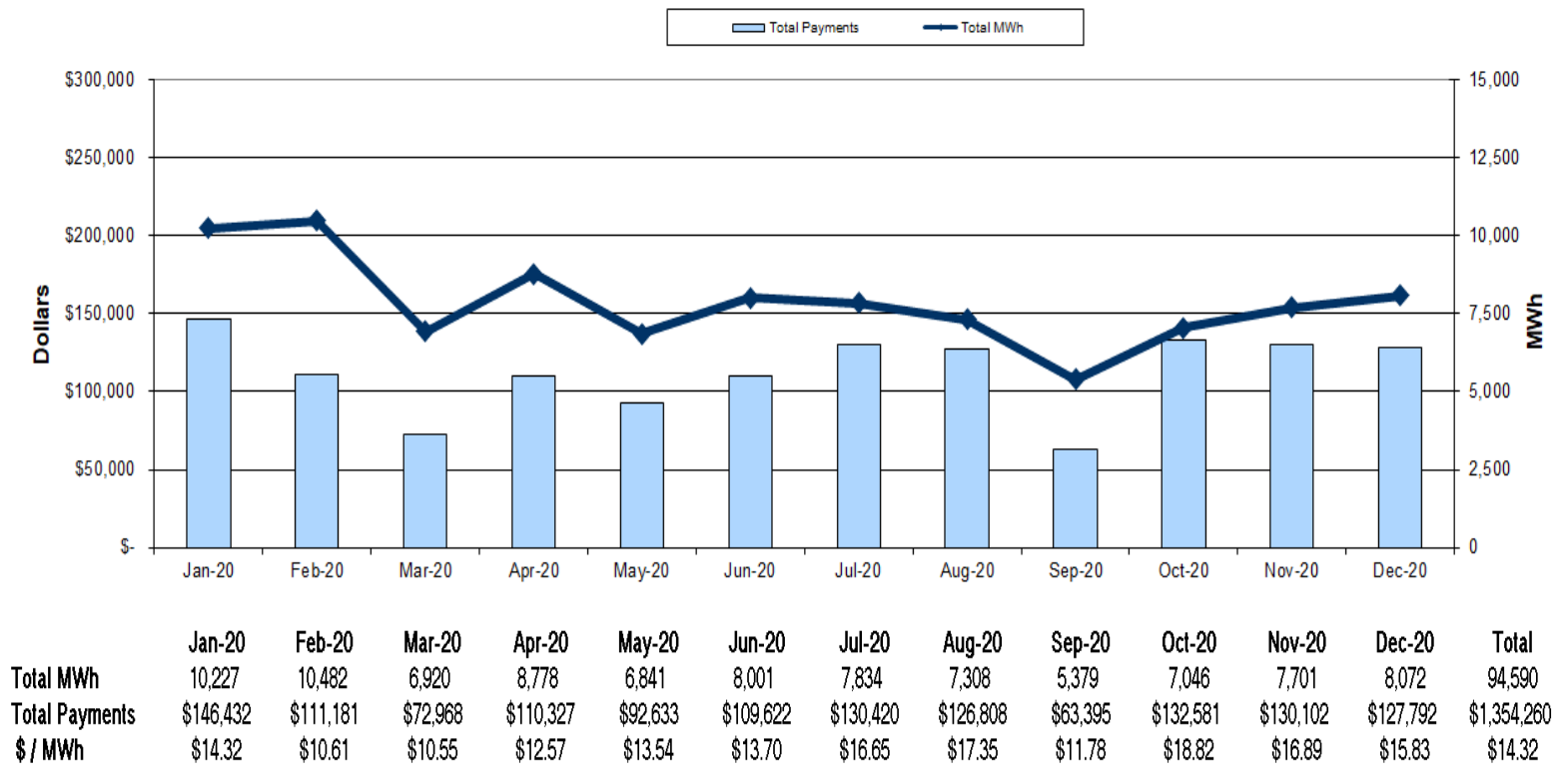
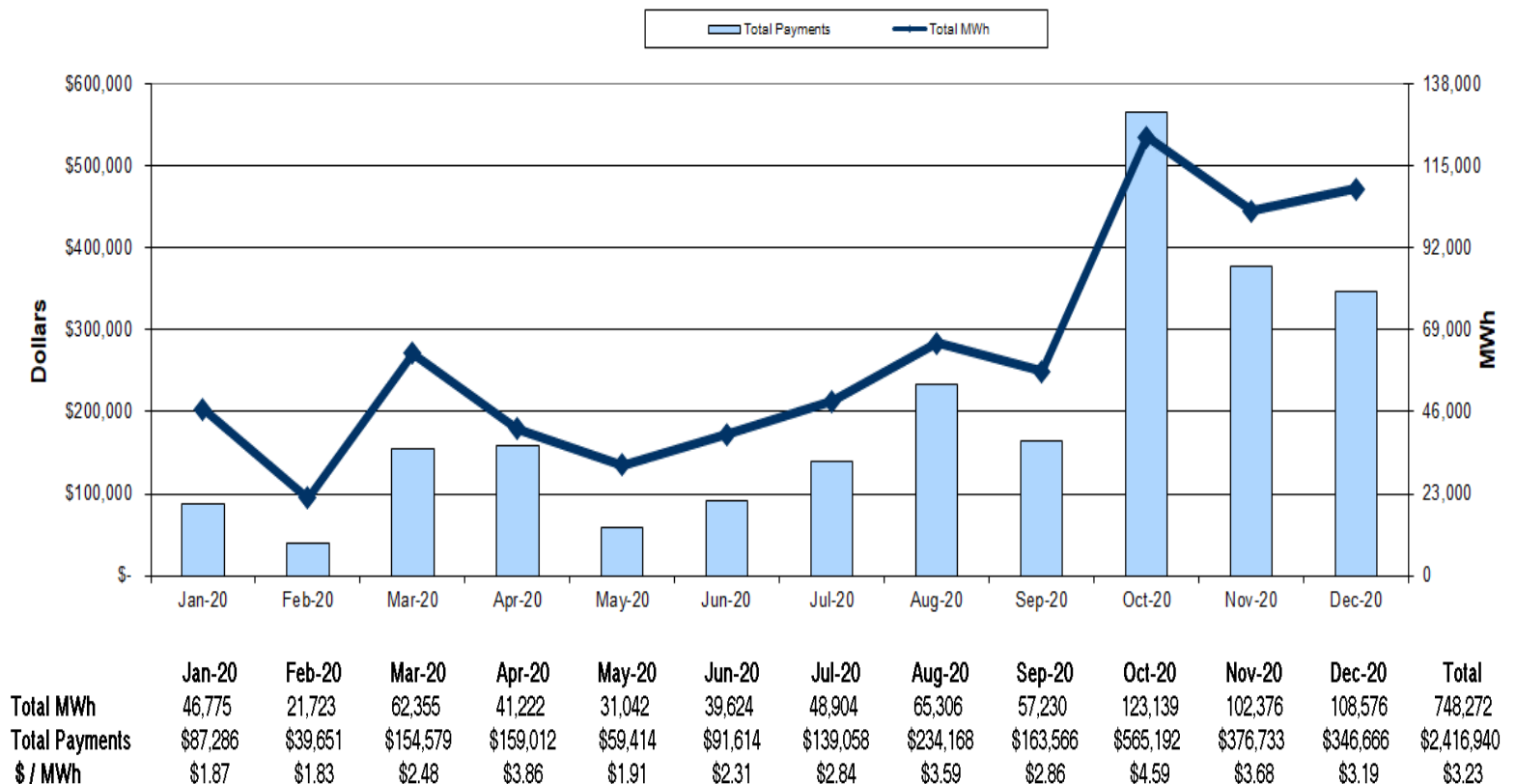


**Figure 30: 2020 Economic Demand Response Dispatched vs Settled Real-Time Energy Market Summary**

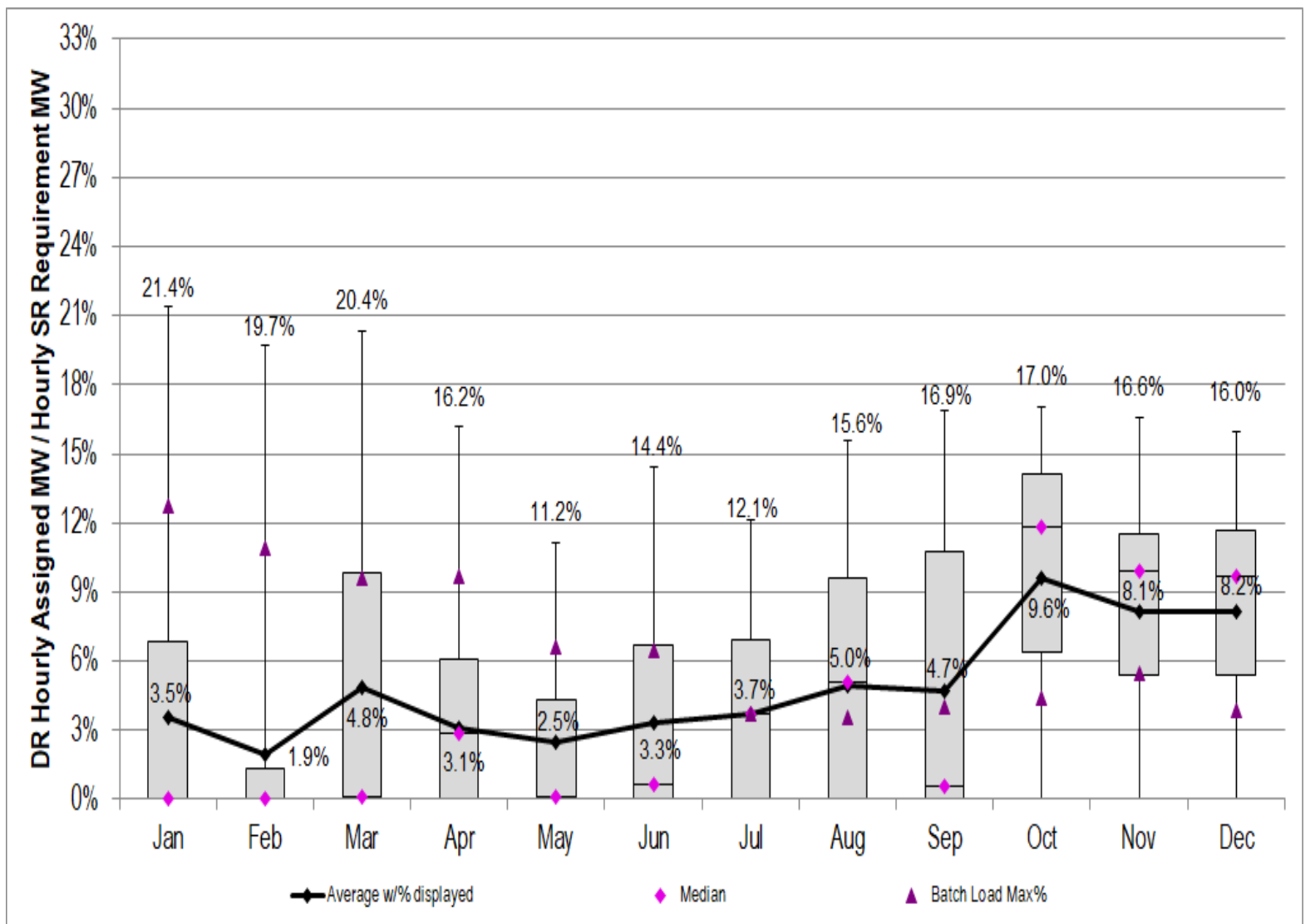
Time		CSPs		Zone		Registrations			MWh			Registration Hours		
Year	Month	Dispatched	Settled	Dispatched	Settled	Dispatched	Settled	%	Dispatched	Settled	%	Dispatched	Settled	%
2020	1	3	3	3	3	4	4	100%	54	55	102%	178	178	100%
2020	2	2	2	2	2	2	2	100%	12	17	149%	86	86	100%
2020	3	2	2	2	2	2	2	100%	15	18	120%	57	57	100%
2020	4	2	2	2	2	2	2	100%	7	10	145%	24	24	100%
2020	5	4	4	4	4	6	6	100%	104	84	80%	177	177	100%
2020	6	3	3	5	5	9	9	100%	232	216	93%	358	358	100%
2020	7	4	4	10	10	16	16	100%	1,160	760	66%	736	736	100%
2020	8	5	5	9	9	14	14	100%	366	293	80%	152	152	100%
2020	9	3	3	3	3	4	4	100%	39	19	50%	34	34	100%
2020	10	3	3	3	3	4	4	100%	11	13	113%	24	24	100%
2020	11	3	3	4	4	4	4	100%	82	65	80%	42	42	100%
2020	12	3	3	3	3	4	4	100%	37	43	115%	31	31	100%
<b>YTD Totals</b>						<b>71</b>	<b>71</b>	<b>100%</b>	<b>2,118</b>	<b>1,593</b>	<b>75%</b>	<b>1,899</b>	<b>1,899</b>	<b>100%</b>
<b>YTD Average</b>		<b>3</b>		<b>4</b>										

**Figure 31: 2020 Economic Demand Response Cleared vs Settled Day-Ahead Energy Market Summary**

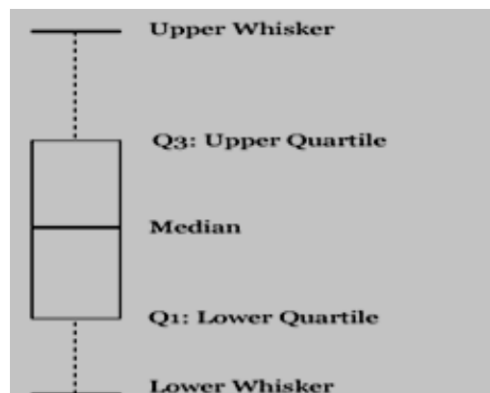
Time		CSPs		Zone		Registrations			MWh			Registration Hours		
Year	Month	Cleared	Settled	Cleared	Settled	Cleared	Settled	%	Cleared	Settled	%	Cleared	Settled	%
2020	1	5	5	5	5	6	6	100%	1,159	958	83%	269	269	100%
2020	2	3	3	2	2	3	3	100%	201	124	62%	59	59	100%
2020	3	3	3	2	2	3	3	100%	62	43	70%	15	15	100%
2020	4													
2020	5	1	1	1	1	1	1	100%	119	143	120%	34	34	100%
2020	6	3	3	3	3	4	4	100%	738	648	88%	191	191	100%
2020	7	5	5	5	5	7	7	100%	1,226	2,518	205%	445	445	100%
2020	8	5	5	4	4	5	5	100%	2,081	1,940	93%	289	289	100%
2020	9	4	4	4	4	4	4	100%	321	298	93%	56	56	100%
2020	10	2	2	2	2	2	2	100%	138	35	25%	30	30	100%
2020	11	3	3	3	3	3	3	100%	442	306	69%	102	102	100%
2020	12	2	2	2	2	2	2	100%	555	606	109%	125	125	100%
<b>YTD Totals</b>						<b>40</b>	<b>40</b>	<b>100%</b>	<b>7,041</b>	<b>7,620</b>	<b>108%</b>	<b>1,615</b>	<b>1,615</b>	<b>100%</b>
<b>YTD Average</b>		<b>3</b>		<b>3</b>										

**Figure 32: 2020 Economic Demand Response Regulation Market Participation**

**Figure 33: 2020 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 2020**

**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