



Monitoring
Analytics

**Generation Additions and Retirements
in the PJM Capacity Market: MW and
Funding Sources for
Delivery Years 2007/2008 through
2020/2021**

The Independent Market Monitor for PJM

March 9, 2018

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Introduction

This report, prepared by the Independent Market Monitor for PJM (IMM or MMU), presents an analysis of additional generation capacity and retirements in the Reliability Pricing Model (RPM) Capacity Market, from its inception in 2007/2008 through 2020/2021.^{1 2} For prior Delivery Years (DYs) (2007/2008 through 2016/2017), additional generation capacity is defined as capacity that came into service in the specified DY including new generation resources, reactivations of previously deactivated generation resources, and uprates to existing generation resources. For the current and future DYs (2017/2018 through 2020/2021), additional generation capacity is defined as capacity that cleared an RPM Auction for the first time in the specified DY.

Summary

In summary, of the 24,889.8 MW of additional capacity from new, reactivated, and uprated generation that cleared in RPM auctions for the 2007/2008 through 2016/2017 delivery years, 18,140.5 MW (72.9 percent) were based on market funding.

In summary, of the 13,649.7 MW of additional capacity that cleared in RPM auctions for the 2017/2018 through 2020/2021 delivery years and are expected to be completed, 11,654.2 MW (85.4 percent) are based on market funding.

Analysis of PJM Generation Capacity

New Generation Capacity

Changes in Generation Capacity: 2007/2008 through 2016/2017

Table 1 shows a summary of new generation capacity internal to PJM for each DY since the implementation of RPM in the 2007/2008 Delivery Year through the 2016/2017 Delivery Year. The average new generation capacity was 2,489.0 MW, and the maximum new generation capacity for a DY was 5,906.8 MW in the 2015/2016 Delivery Year.

¹ Delivery years are from June 1 through May 31.

² This report includes all RPM auctions held prior to February 26, 2018.

Table 1 PJM internal generation capacity additions: 2007/2008 through 2016/2017

	ICAP (MW)			Total Additions
	New	Reactivations	Uprates	
2007/2008	372.8	156.8	1,238.1	1,767.7
2008/2009	812.9	6.3	1,108.9	1,928.1
2009/2010	188.1	13.0	370.4	571.5
2010/2011	1,751.2	16.0	587.3	2,354.5
2011/2012	3,095.0	138.0	553.8	3,786.8
2012/2013	266.4	79.0	364.5	709.9
2013/2014	264.7	20.9	397.9	683.5
2014/2015	3,036.0	0.0	480.4	3,516.4
2015/2016	5,497.8	0.0	409.0	5,906.8
2016/2017	2,537.8	537.0	589.8	3,664.6
Total	17,822.7	967.0	6,100.1	24,889.8

Table 2 shows a summary of decreases in generation capacity internal to PJM for each DY since the implementation of RPM in the 2007/2008 Delivery Year through the 2016/2017 Delivery Year. The average loss in generation capacity was 3,084.5 MW, and the maximum loss in generation capacity for a DY was 11,663.9 MW in the 2014/2015 Delivery Year.

Table 2 PJM internal generation capacity decreases: 2007/2008 through 2016/2017³

	ICAP (MW)		
	Deactivations	Derates	Total Losses
2007/2008	389.5	617.8	1,007.3
2008/2009	615.0	612.4	1,227.4
2009/2010	472.4	171.2	643.6
2010/2011	1,439.2	286.9	1,726.1
2011/2012	2,758.5	313.0	3,071.5
2012/2013	4,152.1	267.6	4,419.7
2013/2014	4,027.7	421.9	4,449.6
2014/2015	11,442.9	221.0	11,663.9
2015/2016	863.4	156.4	1,019.8
2016/2017	1,447.3	168.6	1,615.9
Total	27,608.0	3,236.8	30,844.8

³ The 2014/2015 derates MW value was revised from the *New Generation in the PJM Capacity Market: MW and Funding Sources for Delivery Years 2007/2008 through 2018/2019* report as a result of retroactive capacity modification changes.

Table 3 shows a summary of the net changes in PJM internal capacity since the implementation of RPM in the 2007/2008 Delivery Year through the 2016/2017 Delivery Year. While new capacity was added, it was more than offset by deactivations and derates, for a net decrease of 5,955.0 MW since the implementation of RPM through the 2016/2017 Delivery Year. This net decrease in capacity was offset in the PJM capacity market in part by demand resources (DR) and energy efficiency (EE) resources. While DR and EE are not comparable to generation resources, PJM rules treated DR and EE as substitutes for generation capacity subject to limits in some delivery years. For example, on June 1, 2016, there were 10,248.9 unforced capacity (UCAP) MW of DR and EE Resources committed as RPM capacity.⁴

Table 3 Net changes in PJM internal generation capacity: 2007/2008 through 2016/2017

	ICAP (MW)		Net Change
	Additions	Losses	
2007/2008	1,767.7	1,007.3	760.4
2008/2009	1,928.1	1,227.4	700.7
2009/2010	571.5	643.6	(72.1)
2010/2011	2,354.5	1,726.1	628.4
2011/2012	3,786.8	3,071.5	715.3
2012/2013	709.9	4,419.7	(3,709.8)
2013/2014	683.5	4,449.6	(3,766.1)
2014/2015	3,516.4	11,663.9	(8,147.5)
2015/2016	5,906.8	1,019.8	4,887.0
2016/2017	3,664.6	1,615.9	2,048.7
Total	24,889.8	30,844.8	(5,955.0)

Table 4 shows changes in PJM capacity including capacity imports and exports and the integration of new zones into PJM. When imports and exports and the integration of new zones are included, PJM capacity increased by 19,439.8 MW since the implementation of RPM in the 2007/2008 Delivery Year through the 2016/2017 Delivery Year. A significant portion of the increase occurred in the 2011/2012 Delivery Year as a result of the ATSI Zone integration into PJM.⁵

⁴ The IMM reports DR and EE RPM commitments in the State of the Market Reports. For example, see Table 5-10 in the *2017 Quarterly State of the Market Report for PJM: January through September*, Section 5, “Capacity Market.”

⁵ In June 2011, the American Transmission Systems, Inc. (ATSI) Control Zone joined PJM. In January 2012, the Duke Energy Ohio/Kentucky Control Zone joined PJM. In June 2013, the Eastern Kentucky Power Cooperative (EKPC) joined PJM. For additional information on the integrations, their timing and their impact on the footprint of the PJM service territory prior

Table 4 PJM generation capacity changes: 2007/2008 through 2016/2017⁶

	ICAP (MW)					
	Additions	Losses	Integration	Net Change in Capacity Imports	Net Change in Capacity Exports	Net Change
2007/2008	1,767.7	1,007.3	0.0	(96.7)	143.9	519.8
2008/2009	1,928.1	1,227.4	0.0	871.1	(1,702.9)	3,274.7
2009/2010	571.5	643.6	0.0	68.6	735.9	(739.4)
2010/2011	2,354.5	1,726.1	11,821.6	187.2	(427.0)	13,064.2
2011/2012	3,786.8	3,071.5	3,607.4	262.7	(1,374.5)	5,959.9
2012/2013	709.9	4,419.7	2,680.0	841.8	(17.3)	(170.7)
2013/2014	683.5	4,449.6	0.0	2,217.2	21.6	(1,570.5)
2014/2015	3,516.4	11,663.9	0.0	859.1	73.3	(7,361.7)
2015/2016	5,906.8	1,019.8	0.0	787.6	285.1	5,389.5
2016/2017	3,664.6	1,615.9	0.0	(1,011.1)	(36.4)	1,074.0
Total	24,889.8	30,844.8	18,109.0	4,987.5	(2,298.3)	19,439.8

The changes in capacity reported here are based on resources that are in service, including approved capacity modifications and uprates. The IMM also reports on changes to in service capacity in the State of the Market Reports.⁷ Additions to in service capacity do not include proposed projects or capacity that clears in RPM auctions but is not in service in the specified delivery year.

PJM reports capacity additions based on a different metric. PJM reports capacity additions in its Base Residual Auction (BRA) report each year.⁸ The new capacity reported by PJM is based on BRA over BRA changes and does not account for in service status.⁹ The capacity additions reported by PJM for the 2016/2017 BRA and later BRAs are based on offered new capacity, and prior to the 2016/2017 BRA, the capacity additions reported by PJM included capacity modifications that were not offered. PJM does not update the reported values to account for whether the capacity is in service.

to 2015, see *2014 State of the Market Report for PJM*, Volume II, Appendix A, “PJM Geography.”

⁶ The 2013/2014 and 2014/2015 capacity import MW values were revised from the *New Generation in the PJM Capacity Market: MW and Funding Sources for Delivery Years 2007/2008 through 2018/2019* report as a result of retroactive unit specific bilateral transaction changes.

⁷ See Table 5-4 in the *2017 Quarterly State of the Market Report for PJM: January through September*, Section 5, “Capacity Market.”

⁸ For example, see PJM’s “2020/2021 Base Residual Auction Report,” <<http://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2020-2021-base-residual-auction-report.ashx?la=en>> (May 23, 2017), pp. 19-24.

⁹ The IMM also reports on BRA over BRA changes in the IMM RPM Base Residual Auction reports.

Table 5 compares the PJM and IMM reported new capacity through June 1, 2017. The IMM reported new capacity total is 10,141.5 MW lower than the PJM reported total for the same time period. The difference is a result of the fact that the IMM reports in service capacity while PJM reports offered capacity.

Table 5 Comparison between IMM and PJM reported new capacity: June 1, 2007, through June 1, 2017¹⁰

	IMM				ICAP (MW) PJM				Difference			
	New	Reactivations	Uprates	Total	New	Reactivations	Uprates	Total	New	Reactivations	Uprates	Total
2006/2007				0.0	19.0	47.0	536.0	602.0	(19.0)	(47.0)	(536.0)	(602.0)
2007/2008	372.8	156.8	1,238.1	1,767.7	93.1	131.0	500.1	724.2	279.7	25.8	738.0	1,043.5
2008/2009	812.9	6.3	1,108.9	1,928.1	476.3	0.0	796.0	1,272.3	336.6	6.3	312.9	655.8
2009/2010	188.1	13.0	370.4	571.5	1,027.7	170.7	577.8	1,776.2	(839.6)	(157.7)	(207.4)	(1,204.7)
2010/2011	1,751.2	16.0	587.3	2,354.5	2,332.5	181.0	1,062.8	3,576.3	(581.3)	(165.0)	(475.5)	(1,221.8)
2011/2012	3,095.0	138.0	553.8	3,786.8	1,108.0	0.0	785.5	1,893.5	1,987.0	138.0	(231.7)	1,893.3
2012/2013	266.4	79.0	364.5	709.9	1,320.2	0.0	417.3	1,737.5	(1,053.8)	79.0	(52.8)	(1,027.6)
2013/2014	264.7	20.9	397.9	683.5	1,100.6	9.0	473.2	1,582.8	(835.9)	11.9	(75.3)	(899.3)
2014/2015	3,036.0	0.0	480.4	3,516.4	7,658.9	0.0	548.1	8,207.0	(4,622.9)	0.0	(67.7)	(4,690.6)
2015/2016	5,497.8	0.0	409.0	5,906.8	5,314.3	21.0	1,470.7	6,806.0	183.5	(21.0)	(1,061.7)	(899.2)
2016/2017	2,537.8	537.0	589.8	3,664.6	5,388.8	991.0	473.7	6,853.5	(2,851.0)	(454.0)	116.1	(3,188.9)
Total	17,822.7	967.0	6,100.1	24,889.8	25,839.4	1,550.7	7,641.2	35,031.3	(8,016.7)	(583.7)	(1,541.1)	(10,141.5)

Future Changes in Generation Capacity

As shown in Table 6, a total of 18,030.9 MW of additional generation capacity have cleared in the RPM Auctions for the 2017/2018 through 2020/2021 Delivery Years. Of this, 3,403.8 MW are already in service.

The 2018/2019 Delivery Year reflects the implementation of the Capacity Performance (CP) rules.¹¹ Since RPM auctions are held for future DYs, proposed projects can be offered and cleared in the RPM Auctions before they are in service.

Table 6 shows the cleared MW in RPM Auctions for new generation resources, reactivations, and uprates in each future DY, by current interconnection queue status. In order to be offered in a PJM BRA for a DY prior to 2019/2020, a project must have completed its System Impact Study (SIS).¹² Effective with the 2019/2020 Delivery Year, PJM rules require that a Facilities Study Agreement must be executed for proposed generation resources greater than 20 MW in order to be offered in a PJM BRA.

The SIS is the second study of three required studies for every generation project in the interconnection queue. Together, these studies determine the feasibility, impact, and cost of interconnecting new generation projects. To proceed to the status of under construction, all three studies must be completed and a project developer must have

¹⁰ The new capacity in 2006/2007 represents new capacity which PJM reported as capacity added at or prior to June 1, 2007 and is associated with the 2007/2008 BRA.

¹¹ 151 FERC ¶ 61,208 (2015).

¹² "PJM Manual 18: PJM Capacity Market," Revision 38 (July 27, 2017) at 63.

signed an Interconnection Service Agreement (ISA) and a Construction Service Agreement (CSA).

Table 6 Project status of added generation capacity that cleared MW in RPM: 2017/2018 through 2020/2021, as of January 1, 2018

Status	2017/2018		2018/2019		2019/2020		2020/2021		Total		
	Cleared		Cleared		Cleared		Cleared		Cleared		
	MW	(ICAP) Percent	MW	(ICAP) Percent	MW	(ICAP) Percent	MW	(ICAP) Percent	MW	(ICAP) Percent	
Not yet in service											
Completed SIS	New/Reactivations	0.0	0.0%	142.2	2.8%	0.0	0.0%	483.2	15.1%	625.4	3.5%
	Uprates	20.0	0.3%	0.0	0.0%	0.0	0.0%	33.2	1.0%	53.2	0.3%
Executed CSA	New/Reactivations	4,034.6	66.6%	3,699.1	71.8%	3,392.8	93.9%	2,319.9	72.4%	13,446.4	74.6%
	Uprates	17.6	0.3%	458.5	8.9%	0.0	0.0%	26.0	0.8%	502.1	2.8%
Total not in service		4,072.2	67.2%	4,299.8	83.4%	3,392.8	93.9%	2,862.3	89.3%	14,627.1	81.1%
In service	New/Reactivations	1,674.2	27.6%	721.5	14.0%	56.9	1.6%	1.5	0.0%	2,454.1	13.6%
	Uprates	311.9	5.1%	133.4	2.6%	164.3	4.5%	340.1	10.6%	949.7	5.3%
Total in service		1,986.1	32.8%	854.9	16.6%	221.2	6.1%	341.6	10.7%	3,403.8	18.9%
Total Cleared		6,058.3	100.0%	5,154.7	100.0%	3,614.0	100.0%	3,203.9	100.0%	18,030.9	100.0%

In addition to proposed generation resources and uprates, planned deactivations will also affect the PJM capacity level over the current and the next three DYs. Table 7 shows the net effect of proposed generation resources that cleared an RPM Auction that are not yet in service and proposed deactivations that have not yet occurred.¹³

Table 7 Proposed net change in generation capacity: 2017/2017 through 2020/2021

	ICAP (MW)				
	2017/2018	2018/2019	2019/2020	2020/2021	Total
New generation and uprates (not yet in service)	4,072.2	4,299.8	3,392.8	2,862.3	14,627.1
Deactivations	(601.1)	(3,758.0)	(2,544.0)	0.0	(6,903.1)
Total	3,471.1	541.8	848.8	2,862.3	7,724.0

Based on the history of units in the queue, all the projects not yet in service in Table 7 will not go into service. Experience with units with comparable development status provides a guide to the proportion of projects that will go into service. The likelihood of completion rises significantly as projects proceed through the planning process. Analysis of historical interconnection queue data shows that 29.0 percent of MW for projects that completed a SIS went into service and 72.0 percent of MW that executed a Construction Service Agreement (CSA) went into service.

Table 8 shows that based on historical completion rates, 181.3 MW of the New/Reactivation MW with a completed SIS (.290 * 625.4) and 15.4 MW of the Uprates

¹³ The list of completed and pending generating unit deactivations can be found at: <http://www.pjm.com/planning/services-requests/gen-deactivations.aspx>.

MW with a completed SIS (.290 * 53.2) are expected to go into service. Additionally, 9,687.4 MW of the New/Reactivation MW with an executed CSA (.720 * 13,446.4) and 361.7 MW of the Uprates MW with an executed CSA (.720 * 502.1) are expected to go into service. Based on historical completion rates, of the total projects not yet in service, a total of 10,245.9 MW of the 14,627.1 MW are expected to go into service.

Table 8 Project status of added generation capacity that cleared MW in RPM (Adjusted for expected rate of completion): 2017/2018 through 2020/2021, as of January 1, 2018

Status	2017/2018		2018/2019		2019/2020		2020/2021		Total		
	Cleared		Cleared		Cleared		Cleared		Cleared		
	MW	(ICAP) Percent	MW	(ICAP) Percent	MW	(ICAP) Percent	MW	(ICAP) Percent	MW	(ICAP) Percent	
Not yet in service											
Completed SIS	New/Reactivations	0.0	0.0%	41.2	1.4%	0.0	0.0%	140.1	7.6%	181.3	1.8%
	Uprates	5.8	0.2%	0.0	0.0%	0.0	0.0%	9.6	0.5%	15.4	0.2%
Executed CSA	New/Reactivations	2,906.7	99.4%	2,665.0	87.8%	2,444.3	100.0%	1,671.4	90.8%	9,687.4	94.5%
	Uprates	12.7	0.4%	330.3	10.9%	0.0	0.0%	18.7	1.0%	361.7	3.5%
Total not in service		2,925.2	100.0%	3,036.6	100.0%	2,444.3	100.0%	1,839.8	100.0%	10,245.9	100.0%

Table 9 shows the net annual capacity that is expected to be actually installed based on the total cleared generation MW in Table 7 adjusted for the historical expected rate of completion as shown in Table 8 and considering the planned unit deactivations.

Table 9 Expected net change in generation capacity: 2017/2018 through 2020/2021

	ICAP (MW)				Total
	2017/2018	2018/2019	2019/2020	2020/2021	
New generation and uprates (not yet in service)	2,925.2	3,036.6	2,444.3	1,839.8	10,245.9
Deactivations	(601.1)	(3,758.0)	(2,544.0)	0.0	(6,903.1)
Total	2,324.1	(721.4)	(99.7)	1,839.8	3,342.8

The total 10,245.9 MW expected to go into service are 70.0 percent of the 14,627.1 MW not yet in service. Adding the 3,403.8 MW already in service, 13,649.7 MW, or 75.7 percent (13,649.7/18,030.9), of new generation capacity that cleared MW in RPM (18,030.9 MW), as shown in Table 6, are expected to go into service through the 2020/2021 Delivery Year. Table 9 shows that net of expected deactivations, the net increase in capacity through the 2020/2021 Delivery Year is expected to be 3,342.8 MW based on current information.

Sources of Funding

Developers use a variety of sources to fund their projects, which can be categorized as one of two funding types: market and nonmarket. Market funding is from private investors bearing the investment risk without guarantees or support from any public sources, subsidies or guaranteed payment by ratepayers. Providers of market funding rely entirely on market revenues. Nonmarket funding is from guaranteed revenues, including cost of service rates for a regulated utility and subsidies. Table 10 shows the

ICAP MW of new, reactivated, and uprate generation capacity in PJM by supplier type and by whether the funding was market or nonmarket, from the implementation of RPM in the 2007/2008 Delivery Year through the 2016/2017 Delivery Year. The supplier types are: merchant; municipal and cooperative utilities; and vertically integrated utilities. These supplier types use a mix of funding sources.

From 2007/2008 to 2016/2017, capacity from new units based on market funding was 12,527.9 MW (70.3 percent) and capacity from new units based on nonmarket funding was 5,294.8 MW (29.7 percent). Solar and wind projects accounted for 1,516.2 MW (8.5 percent) of all new generation from 2007/2008 to 2016/2017, with 1,363.6 MW from market funding and 152.6 MW from non-market funding. The grand total of 17,822.7 MW for new capacity is equal to the total capacity from new units during this period (Table 1).

Reactivated capacity from reactivated units based on market funding was 892.0 MW (92.2 percent) and reactivated capacity from reactivated units based on nonmarket funding was 75.0 MW (7.8 percent) from 2007/2008 to 2016/2017. Solar and wind projects accounted for 0.0 MW (0.0 percent) of the reactivated generation from 2007/2008 to 2016/2017. The total of 967.0 MW is equal to the total reactivated capacity from reactivated units during this period. (Table 1)

Uprate capacity to existing units based on market funding was 4,720.6 MW (77.4 percent) and uprate capacity to existing units based on nonmarket funding was 1,379.5 MW (22.6 percent) from 2007/2008 to 2016/2017. Solar and wind projects accounted for 227.1 MW (3.7 percent) of the uprate generation from 2007/2008 to 2016/2017. The total of 6,100.1 MW is equal to the total uprate capacity to existing units during this period. (Table 1)

In summary, of the 24,889.8 MW of additional capacity that cleared in RPM auctions for the 2007/2008 through 2016/2017 delivery years, 18,140.5 MW (72.9 percent) were based on market funding.

Table 10 New, reactivated, and uprate generation capacity resources by funding and supplier type: 2007/2008 through 2016/2017¹⁴

Funding and Supplier Type			ICAP (MW)				Total Additions	Total Percent
	New	Percent	Reactivations	Percent	Uprates	Percent		
Market								
Merchant								
Solar and Wind	1,021.9	5.7%	0.0	0.0%	117.7	1.9%	1,139.6	4.6%
Other	9,341.7	52.4%	691.2	71.5%	1,661.4	27.2%	11,694.3	47.0%
Total	10,363.6	58.1%	691.2	71.5%	1,779.1	29.2%	12,833.9	51.6%
Utility								
Solar and Wind	341.7	1.9%	0.0	0.0%	72.9	1.2%	414.6	1.7%
Other	1,822.6	10.2%	200.8	20.8%	2,868.6	47.0%	4,892.0	19.7%
Total	2,164.3	12.1%	200.8	20.8%	2,941.5	48.2%	5,306.6	21.3%
Market Total	12,527.9	70.3%	892.0	92.2%	4,720.6	77.4%	18,140.5	72.9%
Non Market								
Municipal/Coop								
Solar and Wind	-	-	0.0	0.0%	-	-	0.0	0.0%
Other	758.4	4.3%	17.0	1.8%	131.7	2.2%	907.1	3.6%
Total	758.4	4.3%	17.0	1.8%	131.7	2.2%	907.1	3.6%
Utility								
Solar and Wind	-	-	0.0	0.0%	36.4	0.6%	36.4	0.1%
Other	4,536.4	25.5%	58.0	6.0%	1,211.4	19.9%	5,805.8	23.3%
Total	4,536.4	25.5%	58.0	6.0%	1,247.8	20.5%	5,842.2	23.5%
Non Market Total	5,294.8	29.7%	75.0	7.8%	1,379.5	22.6%	6,749.3	27.1%
Grand Total	17,822.7	100.0%	967.0	100.0%	6,100.1	100.0%	24,889.8	100.0%

Table 11 shows the projected additional generation capacity (new resources, reactivated resources, and uprates) by queue status and funding type for future DYs from 2017/2018 through 2020/2021. Projected additional capacity based on market funding is 12,085.1 MW (82.6 percent) of the proposed, not yet in service generation that cleared at least one RPM auction for one of the four future DYs. Projected additional capacity based on nonmarket funding is 2,542.0 MW (17.4 percent) of the proposed, not yet in service generation that cleared at least one RPM Auction for one of the four future DYs.¹⁵ Additional capacity based on market funding is 3,239.6 MW (95.2 percent) of the in service generation that cleared at least one RPM Auction for one of the four future DYs. Additional capacity based on nonmarket funding is 164.2 MW (4.8 percent) of the proposed, in service generation that cleared at least one RPM auction for one of the four future DYs.

¹⁴ Some funding and supplier types were not split into separate solar and wind/other categories in order to comply with PJM confidentiality rules. See “PJM Manual 33: Administrative Services for the PJM Interconnection Operating Agreement,” Revision 12 (March 31, 2016) at 26.

¹⁵ Solar and wind projects account for 128.7 MW of the 12,085.1 MW from market funding, and 0.0 MW of the 2,542.0 MW from non-market funding for proposed projects not yet in service.

Table 11 Projected new generation capacity resources by funding type: 2017/2018 through 2020/2021¹⁶

Status	Funding Type	Cleared MW (ICAP)	Percent
Not yet in service			
Completed SIS	Market	678.6	3.8%
	Non Market	0.0	0.0%
Executed CSA	Market	11,406.5	63.3%
	Non Market	2,542.0	14.1%
Total not in service		14,627.1	81.1%
In service	Market	3,239.6	18.0%
	Non Market	164.2	0.9%
Total in service		3,403.8	18.9%
Total Cleared		18,030.9	100.0%

The likelihood of completion increases significantly as projects proceed through the planning process. In order to be offered in a PJM BRA for a DY prior to 2019/2020, a project must have completed its SIS, which follows the Feasibility Study.¹⁷ Effective with the 2019/2020 Delivery Year, PJM rules require that a Facilities Study Agreement must be executed for proposed generation resources greater than 20 MW in order to be offered in a PJM BRA. Based on historical interconnection queue data, 29.0 percent of MW for projects that completed a SIS went into service, and 72.0 percent of MW that executed a Construction Service Agreement (CSA) went into service.

Of the 18,030.9 MW of the additional generation capacity that cleared in RPM auctions for DYs 2017/2018 through 2020/2021, as shown in Table 6 and Table 11, 15,324.7 MW (85 percent; 3,239.6 MW already in service) has market funding and 2,706.2 MW (15 percent; 164.2 MW already in service) has nonmarket funding. The expectation based on historical data is that 196.7 MW of the market funded cleared MW with a completed SIS ($.28993 \times 678.6$) and 8,217.8 MW of the market funded MW with an executed CSA ($.72045 \times 11,406.5$), or a total of 8,414.6 MW, will go into service. The total projected 8,414.6 MW based on market funding expected to go into service are 69.6 percent of the total 12,085.1 MW not yet in service based on market funding. Adding the 3,239.6 MW already in service from market funded sources, 11,654.2 MW, or 76.0 percent of market funded cleared MW, are expected to go into service. Similarly, 1,831.4 MW, or 72.0 percent, of non-market funded projects not yet in service are expected to go into service.

¹⁶ Categories of funding source have been combined in order to comply with PJM confidentiality rules. See “PJM Manual 33: Administrative Services for the PJM Interconnection Operating Agreement,” Revision 12 (March 31, 2016) at 26.

¹⁷ “PJM Manual 18: PJM Capacity Market,” Revision 38 (July 27, 2017) at 63.

Together, 13,649.7 MW, or 75.7 percent, of total added generation capacity that cleared MW in RPM auctions for DYs from 2017/2018 through 2020/2021, including in service MW, are expected to go into service through the 2020/2021 Delivery Year. Of the 13,649.7 MW, 11,654.2 MW are market funded and 1,995.6 MW are non-market funded.

Conclusions

For the period from the introduction of the RPM capacity market design in the 2007/2008 Delivery Year through the 2016/2017 Delivery Year, internal installed capacity decreased by 5,955.0 MW after accounting for new capacity resources, reactivations, and uprates (24,889.8 MW) and capacity deactivations and derates (30,844.8 MW). (See Table 3) PJM maintained a reserve margin in excess of the target reserve margin throughout this period. Substantial demand side resources were also added to the capacity market during this time period.

Looking ahead, based on expected completion rates of cleared new generation capacity (13,649.7 MW) and pending deactivations (6,903.1 MW), PJM capacity is expected to increase by 6,746.6 MW for the 2017/2018 through 2020/2021 delivery years. (See Table 7 and Table 9)

Between 2007/2008 and 2020/2021 DYs, internal PJM capacity will have increased by 791.6 MW of capacity from new units, reactivations, and uprates offset by deactivations (-5,955.0 MW for the 2007/2008 Delivery Year through the 2016/2017 Delivery Year plus 6,746.6 MW for the 2017/2018 Delivery Year through the 2020/2021 Delivery Year).

New generation capacity from the 2007/2008 DY through the 2016/2017 DY totaled 17,822.7 MW (71.6 percent of all additions), with 12,527.9 MW from market funding and 5,294.8 MW from nonmarket funding. Reactivated generation capacity from the 2007/2008 DY through the 2016/2017 DY totaled 967.0 MW (3.9 percent of all additions), with 892.0 MW from market funding and 75.0 MW from non-market funding. Uprates to existing generation capacity from the 2007/2008 DY through the 2016/2017 DY totaled 6,100.1 MW (24.5 percent of all additions), with 4,720.6 MW from market funding and 1,379.5 MW from nonmarket funding (Table 10).

In summary, of the 24,889.8 MW of additional capacity from new, reactivated, and uprated generation that cleared in RPM auctions for the 2007/2008 through 2016/2017 delivery years, 18,140.5 MW (72.9 percent) were based on market funding.

Of the 14,627.1 MW of the additional generation capacity (new resources, reactivated resources, and uprates) that cleared in RPM auctions for the 2017/2018 through 2020/2021 delivery years, that are not yet in service, as shown in Table 6 and Table 11, 12,085.1 MW (82.6 percent) have market funding and 2,542.0 MW (17.4 percent) have non-market funding. Applying the historical completion rates, 8,414.6 MW, or 69.6 percent, of the market funded projects are expected to go into service. Similarly, 1,831.4 MW, or 72.0 percent, of nonmarket funded projects are expected to go into service. Together, 10,245.9 MW, or 70.0 percent, of additional generation capacity that cleared

MW in RPM and are not yet in service are expected to go into service through the 2020/2021 Delivery Year.

Of the 3,403.8 MW of the additional generation capacity that cleared in RPM auctions for the 2017/2018 through 2020/2021 delivery years and are already in service, 3,239.6 MW (95.2 percent) are based on market funding. In summary, 15,324.7 MW (85.0 percent) of the additional generation capacity (3,239.6 MW in service and 12,085.1 MW not yet in service) that cleared in RPM auctions for the 2017/2018 through 2020/2021 delivery years are based on market funding. Capacity additions based on non-market funding are 2,706.2 MW (15.0 percent) of proposed generation that cleared at least one RPM auction for the 2017/2018 through 2020/2021 delivery years. When historical completion rates are applied, 13,649.7 MW (10,245.9 MW not yet in service; 3,403.8 MW in service) of additional capacity are expected to be in service in the 2017/2018 through 2020/2021 delivery years.

In summary, of the 13,649.7 MW of additional capacity that cleared in RPM auctions for the 2017/2018 through 2020/2021 delivery years and are expected to be completed, 11,654.2 MW (8,414.6 MW not yet in service; 3,239.6 MW in service), 85.4 percent, are based on market funding.