M18 and M18B Revisions
to Accommodate EE Resource Participation in RPM when EE is reflected in the Peak Load Forecast

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1.20A Energy Efficiency Resource

Energy Efficiency Resource shall mean a project, including installation of more efficient devices or equipment or implementation of more efficient processes or systems, meeting the requirements of Schedule 6 of this Agreement and exceeding then-current building codes, appliance standards, or other relevant standards, designed to achieve a continuous (during the periods described in Schedule 6 and the PJM Manuals) reduction in electric energy consumption **that is not reflected in the peak load forecast prepared for the Delivery Year for which the Energy Efficiency Resource is proposed**, and that is fully implemented at all times during such Delivery Year, without any requirement of notice, dispatch, or operator intervention. Annual Energy Efficiency Resources and Base Capacity Energy Efficiency Resources are types of Energy Efficiency Resources.

Reflection of EE in Peak Load Forecast

- An EE Resource allows for recognition of prospective EE by reducing the need to procure other resources by the amount of EE that is not yet in-service and therefore not yet recognized in the load forecast used in the RPM auction
- Unlike current model, new peak load forecast model does reflect energy efficiency measures in the peak load forecast
- To prevent double-counting EE as a resource and again as a load forecast reduction, an add-back mechanism and related changes are necessary in order to accommodate continued EE Resource participation in the capacity market when new peak load forecast model is adopted

- proposed updates to M18 (RPM) and M18B (EE M&V) describe add-back mechanism and related changes needed to avoid double-counting of EE when reflected in load forecast
  - M18 updates in sections: 2.4.5 (new section), 4.4, 8.7, & 11.2.1
  - M18B updates in sections 1.1, 1.2, & 1.3
- Updates address following aspects of EE Resource participation in the PJM capacity market:
  - Adjustment to RPM Auction Parameters for EE Resources
  - Auction participation eligibility of EE Resources based on EE installation period relative to date of forecast used in auction
  - Use of available capacity from an EE Resource as replacement capacity
  - Adjustment to FRR Entity obligation for EE Resources committed in FRR Capacity Plan

- For each BRA, the reliability requirement of the RTO and each applicable LDA used in the auction clearing will be increased by the total UCAP value of all EE Resources for which PJM approved an EE M&V Plan submitted for the BRA
- For each IA, the reliability requirement of the RTO and each applicable LDA will be adjusted by the total UCAP value of EE Resources cleared in that auction, but not until and only to the extent that the total EE resource UCAP cleared in all auctions for the DY exceeds the total EE add-back applied to the auctions for that DY. This adjustment may be negative in the 3rd IA to ensure total EE add-back equals total EE cleared across all auctions starting with the for 2019/2020 DY.
- See examples on next two slides

Example of Auction Parameter Adjustment for EE Example 1

	BRA	1st IA	2nd IA	3rd IA
PJM Reliability Requirement	160,000	163,000	161,000	160,000
EE Add-back MW*	1,600	0	0	100
Adjusted PJM Reliability Requirement	161,600	163,000	161,000	160,100
PJM Buy MW / (PJM Sell MW)	n/a	3,000	-2,000	-900
EE Cleared in Auction	1,300	150	100	150
Culmulative Cleared EE MW	1,300	1,450	1,550	1,700
Cumulative EE Add-back MW	1,600	1,600	1,600	1,700
Cumulative EE Add-back Margin	300	150	50	0

* EE Add-back quantity in BRA equal to total UCAP Value of all EE Resources for which PJM approved an EE M&V Plan for that BRA.

EE Add-back quantity in each IA equal to total UCAP Value of all EE Resources cleared in that IA but only to the extent that the total cleared EE in all auctions for that DY exceeds the total cumulative quantity of EE add-back MW for that DY. For example above:

No EE Add-back MW for 1st IA since EE cleared in 1st IA of 150 MW is less than pre-auction EE add-back margin of 300 MW,
No EE Add-back MW for 2nd IA since EE cleared in 2nd IA of 100 MW is less than pre-auction EE add-back margin of 150 MW,
100 MW EE add-back for 3rd IA since EE cleared in 3rd IA of 150 MW with pre-auction EE add-back margin of 50 MW.

Example of Auction Parameter Adjustment for EE Example 2

	BRA	1st IA	2nd IA	3rd IA
PJM Reliability Requirement	160,000	163,000	161,000	160,000
EE Add-back MW*	1,600	0	0	-50
Adjusted PJM Reliability Requirement	161,600	163,000	161,000	159,950
PJM Buy MW / (PJM Sell MW)	n/a	3,000	-2,000	-1,050
EE Cleared in Auction	1,300	150	100	0
Culmulative Cleared EE MW	1,300	1,450	1,550	1,550
Cumulative EE Add-back MW	1,600	1,600	1,600	1,550
Cumulative EE Add-back Margin	300	150	50	0

* EE Add-back quantity in BRA equal to total UCAP Value of all EE Resources for which PJM approved an EE M&V Plan for that BRA.

EE Add-back quantity in each IA equal to total UCAP Value of all EE Resources cleared in that IA but only to the extent that the total cleared EE in all auctions for that DY exceeds the total cumulative quantity of EE add-back MW for that DY. For example above:

- No EE Add-back MW for 1st IA since EE cleared in 1st IA of 150 MW is less than pre-auction EE add-back margin of 300 MW,
- No EE Add-back MW for 2nd IA since EE cleared in 2nd IA of 100 MW is less than pre-auction EE add-back margin of 150 MW,
- EE add-back for 3rd IA is -50 MW to reflect downward adjustment in reliability requirement to ensure that total EE add-back equals equals total cleared EE across all auctions for the delivery year.

- If a first-pass BRA solution yields a ratio of BRA EE MW add-back quantity to cleared BRA EE MW quantity that exceeds a pre-determined add-back ratio threshold, then the BRA EE add-back quantity is reset to equal the cleared EE MW quantity of the first-pass solution times the threshold ratio in a 2nd and final solution
- the threshold ratio is equal to the historic 3-year average ratio of total cleared EE MW in all auctions for a given DY divided by the cleared EE MW in the BRA for that DY
- example of application of the threshold ratio in Appendix

- Proposed Manual 18B updates to clarify that EE measures are eligible to offer into any RPM auction as an EE Resource provided the installation period of the measure is not completely contained in the history of the peak load forecast used to develop the parameters for the auction
- The time period of an EE installation and the date of the peak load forecast used to develop parameters for an RPM Auction determine eligibility for an EE installation to offer as an EE Resource into that auction

Manual 18 & 18B Updates
Auction Participation Eligibility of EE Resource (Cont.)

Auction Participation Eligibility by EE Resource Installation Year

EE Installation Period	Eligible Auctions
2015/2016	2016/17 DY (BRA, 1st IA, 2nd IA, 3rd IA) 2017/18 DY (BRA, 1st IA, 2nd IA) 2018/19 DY (BRA, 1st IA) 2019/20 DY (BRA)
DY - 1	DY (BRA, 1st IA, 2nd IA, 3rd IA) DY + 1 (BRA, 1st IA, 2nd IA) DY + 2 (BRA, 1st IA) DY + 3 (BRA)

Eligibility requirements above pertain to all RPM Auctions to be conducted after January of 2016 with the following exceptions: Installation Years 2012/13, 2013,14 and 2014/15, may offer into the 2016/17 3rd IA; Installation Years 2013/14 and 2014/15 may offer into the 2017/2018 2nd IA; and, Installation Year 2014/15 may offer into the 2018/2019 1st IA. These are the next auctions to be conducted for delivery years for which the BRA has already been conducted, and represent “transitional” auctions for which the following exceptions are permitted to recognize arrangements that an EE Provider may have prior made for Installation Years that will not be eligible after these auctions.

Manual 18 & 18B Updates
Auction Participation Eligibility of EE Resource (Cont.)

Auction Participation Eligibility of EE Resource Installation Year for 2019/2020 DY Auctions

	Auction	2019/2020 BRA	2019/2020 1st IA	2019/2020 2nd IA	2019/2020 3rd IA
	Conducted in:	May 2016	Sep 2017	July 2018	Feb 2019
	Peak Load Forecast Vintage	Jan 2016	Jan 2017	Jan 2018	Jan 2019
	Most Recent Complete Install Year included in Load History	2014/2015	2015/2016	2016/2017	2017/2018
EE Resource Installation Year	2015/2016	X			
	2016/2017	X	X		
	2017/2018	X	X	X	
	2018/2019	X	X	X	X

X denotes that the indicated EE Resource Installation Year is eligible to offer into that auction

Use of available capacity from an EE Resource as Replacement Capacity

- Available capacity from an EE Resource may be utilized to replace the commitment of another EE Resource without limit because such EE Resource commitments were accompanied by the add-back adjustment that is required to avoid double-counting
- The total available capacity from EE Resources that may be utilized to replace the commitment of non-EE capacity resources is limited to the difference, if any, in quantity between the EE related add-back of all auctions of a given DY and the EE quantity cleared in all auctions of that DY
  - Above rule is effective with the 2019/20 Delivery Year; for "transitional" DYs of 16/17, 17/18 and 18/19, such replacement is permitted without limit
  - to mitigate double-counting concern for these "transitional" DYs, an additional add-back is applied in each 3rd IA to recognize the potential quantity of such replacement capacity transactions.
  - This add-back is set equal to sum of the EE Resource quantity cleared in all auctions conducted for that DY plus the total UCAP Value of all EE Resource(s) for which PJM accepted an EE M&V Plan for that 3rd IA, multiplied by the ratio of the quantity of non-EE Resource commitments replaced by EE Resources divided by the total EE Resource UCAP quantity cleared in all auctions from the then current Delivery Year (for 2016/2017 3rd IA, this ratio is .28 – see appendix)

Adjustment to FRR Entity obligation for EE Resources

- The UCAP Obligation of an FRR Entity is equal to the forecasted peak load served by the entity times the Forecast Pool Requirement (FPR)
- The FRR Entity must commit sufficient capacity in UCAP terms to meet this obligation
- Similar to Auction add-back, the UCAP Obligation of the FRR Entity will be increased by the MW quantity of any EE Resources committed to the FRR Capacity Plan in order to avoid double-counting when new forecast model is employed

Appendix

Example of Application of BRA Add-Back Threshold

	1st Pass BRA	2nd Pass BRA
PJM Reliability Requirement	160,000	160,000
EE Add-back MW*	2,000	1,703
Adjusted PJM Reliability Requirement	162,000	161,703
EE Cleared in BRA	1,300	1,250
EE Add-back MW / EE Cleared MW Ratio	1.54	1.36
Threshold Ratio	1.31	

1st-pass solution yields ratio of 1.54 which exceeds pre-defined threshold of 1.31. 2nd-pass addback set equal to 1,300 MW times 1.31.

* EE Add-back quantity in 1st-pass BRA solution set equal to total UCAP Value of all EE Resources for which PJM approved an EE M&V Plan for that BRA. The 1st-pass solution is the final BRA solution if Add-back MW to Cleared MW ratio is less than the pre-determined BRA add-back ratio threshold. If 1st-pass ratio exceeds the threshold ratio then a 2nd-pass BRA solution is made with the EE Add-back quantity set equal to the cleared EE MW (of 1st pass) times the threshold ratio. The 2nd-pass solution is the final solution regardless of resultant add-back MW to cleared MW ratio.

	Total Cleared EE UCAP MW			
Delivery Year	BRA	All IAs	Total	Total / BRA Ratio
2015/2016	922.5	267.1	1,189.6	1.29
2014/2015	822.1	254.9	1,077.0	1.31
2013/2014	679.4	224.8	904.2	1.33
			3-year Avg	1.31

- As describe on slide 11, an additional add-back is applied in the 3rd IA of the 16/17, 17/18 and 18/19 DYs to recognize the potential quantity of replacement of non-EE Resource commitments by EE Resources
- This add-back is set equal to sum of the EE Resource quantity cleared in all auctions conducted for that DY plus the total UCAP Value of all EE Resource(s) for which PJM accepted an EE M&V Plan for that 3rd IA, multiplied by the ratio of the quantity of non-EE Resource commitments replaced by EE Resources divided by the total EE Resource UCAP quantity cleared in all auctions from the then current Delivery Year
- for 2016/2017 3rd IA, this ratio is .28 based on data for 2015/16 DY

Delivery Year	Total EE Cleared MW (all auctions)	EE Replacement MW of Non-EE Resource	Replacement MW to Total Cleared MW Ratio
2015/2016	1,189.6	335.9	0.28