

# Intermittent Resources in RPM

Sept 21, 2015

- Capacity Performance Resources must be capable of sustained, predictable operation that allows resource to be available to provide energy and reserves during performance assessment hours throughout the Delivery Year
- Subject to Non-Performance Charge assessed during emergency conditions throughout entire Delivery Year

- Base Capacity Resources are those capacity resources that are not capable of sustained, predictable operation throughout the entire Delivery Year; but are capable of providing energy and reserves during hot weather operations.
- Subject to Non-Performance Charge assessed during emergency conditions during June through September

- All Existing Generation Capacity Resources must-offer available UCAP MWs into all RPM auctions, including external generation capacity that has CIL exception
  - Includes Planned generation not yet in-service but has cleared a prior auction
- Must-offer exceptions meeting specified requirements permitted with request submitted no later than 120 days prior to auction

- All Generation Capacity Resources that are capable or can reasonably become capable of qualifying as CP must be offered as CP (including external Generation Capacity Resources with CIL exception)
  - Intermittent Resources, Capacity Storage Resources, Demand Resources and EE Resources are categorically exempt from the CP must-offer requirement
- Exceptions are permitted if seller can demonstrate that resource is reasonably expected to be physically incapable of meeting CP requirements
- A resource that requires substantial investment to qualify as CP is not excused from CP must-offer requirement but is expected to include such costs in its CP sell offer

- The “default” CP MSOC for a CP Generation Capacity Resource is the Net CONE of the zonal LDA in which the resource resides multiplied by Balancing Ratio of 0.85
- Market Sellers may qualify to submit a CP offer above the default CP MSOC by submitting ACR/APIR data to the IMM and PJM
- A Generation Capacity Resource having a CP must-offer requirement and an accepted CP MSOC greater than the applicable default CP MSOC must submit a coupled sell offer as both a CP and a Base Capacity Resource if offering CP above the default MSOC

- Intermittent Resources and Capacity Storage Resources must offer their full UCAP value into each auction but are exempt from requirement to offer as CP
- Such resources may offer as CP all or any portion of their UCAP value that qualifies as CP with remaining portion offered as Base Capacity
- The quantity of UCAP value that may qualify as CP for such resources may be based on expected output during summer and winter peak conditions

Intermittent Resources are generation capacity resources with output that can vary as a function of its energy source, such as wind, solar, landfill gas, run of river hydroelectric power and other renewable resources.

Capacity Storage Resources include any hydroelectric power plant, flywheel, battery storage, or other such facility solely used for short term storage and injection of energy at a later time.

### Solar Resource

Nameplate Capacity	100 MW
UCAP Value (CIRs)	38 MW
Avg output: summer performance hours	38 MW
Avg output: winter performance hours	2 MW
Avg output: all performance hours	20 MW
Acceptable CP MW Range	0-20 MW
Required Total Offer MW (Base + CP)	38 MW

Expected performance hours:

- Winter: hours ending 6 -9 & 18-21 in months of January & February.
- Summer: hours ending 15-20 in months of June, July, & August.

Averaging hourly output from all peak-hour defined above is one acceptable method for determining CP quantity of intermittent resources. This approach, however, may result in significant non-performance risk for a resource with average expected seasonal output that varies significantly from the average expected output across all hours in peak-hour period.

- Example solar resource could acceptably offer from 0 MW to 20 MW as CP with increasing non-summer performance risk
- For 18/19 and 19/20 delivery years, that portion of the 38 MW UCAP value that is not offered as CP must be offered as Base Capacity



Wind Resource	
Nameplate Capacity	100 MW
UCAP Value (CIRs)	13 MW
Avg output: summer performance hours	13 MW
Avg output: winter performance hours	40 MW
Avg output: all performance hours	26 MW
Acceptable CP MW Range	0-13 MW
Required Total Offer MW (Base + CP)	13 MW

Expected performance hours:

- Winter: hours ending 6 -9 & 18-21 in months of January & February.
- Summer: hours ending 15-20 in months of June, July, & August.

- Example wind resource could reasonably offer up to the full 13 MW UCAP value as CP (cannot offer MW quantities above the resource's CIR value)
- For 18/19 and 19/20 delivery years, that portion of the full 13 MW UCAP value that is not offered as CP must be offered as Base Capacity

- Effective with 2018/2019 Delivery Year, Capacity Resources which may not, alone, meet the requirements of a Capacity Performance product, may combine their capabilities and offer as a single Aggregate Resource
  - Applies to Intermittent Resources, Capacity Storage Resources, Demand Resources, Energy Efficiency Resources, and environmentally limited resources
  - Resources being combined must be located in the same modeled LDA and reside in a single Capacity Market Seller account
- Seller may offer the Aggregate Resource as Capacity Performance at a UCAP value that is representative of a capacity performance product (not to exceed the UCAP value of the individual resources that make up the aggregate)

	Wind	Solar
Nameplate Capacity	100 MW	100 MW
UCAP Value (CIRs)	13 MW	38 MW
Avg output: summer performance hours	13 MW	38 MW
Avg output: winter performance hours	40 MW	2 MW
Avg output: all performance hours	26 MW	20 MW
Acceptable CP MW Range	0-13 MW	0-20 MW
Required Total Offer MW (Base + CP)	13 MW	38 MW

Aggregate Resource	
UCAP Value	51 MW
Acceptable CP MW Range	0-46 MW
Required Total Offer MW (Base + CP)	51 MW

- Aggregate Resource could reasonably offer up to 46 MW as CP (at significantly lower risk versus individual resource offers)
- For 18/19 and 19/20 delivery years, that portion of the full 51 MW UCAP value that is not offered as CP must be offered as Base Capacity

- Market Seller that intends to create an Aggregate Resource must submit a written email request to [rpm\\_hotline@pjm.com](mailto:rpm_hotline@pjm.com) at least two weeks prior to the opening of the RPM.
  - Requests due no later than July 24, 2015 for 2018/2019 BRA
- Requests must specify:
  - ✓ Capacity resources that are being combined to form the Aggregate Resource
  - ✓ Installed capacity owned on each generation resource
  - ✓ Nominated DR Value for each Demand Resource
  - ✓ Nominated EE Value for each EE Resource
  - ✓ Requested UCAP value for Aggregate Resource
- Requests should include explanation of how aggregation allows one or more of the resources that are being combined to realize a higher level of CP (in UCAP MWs) than the individual resources could provide themselves, supporting data for the CP level of the aggregate resource & initial MW allocation among component resources
- PJM will review requests and provide notification to Market Seller of the UCAP value approved for the Aggregate Resource.
- PJM will model the Aggregate Resource in the eRPM system for the relevant Delivery Year.
- Once Aggregate Resource is modeled, the Market Seller will not be able to offer into RPM Auction or transact bilaterally for the relevant Delivery Year those individual resources that make up the Aggregate Resource.

- The total committed quantity of an Aggregate Resource must be allocated by product type (Base, Base DR/EE, and Capacity Performance) to the underlying capacity resources prior to the start of the Delivery Year with adjustments permitted up to 12 noon EPT of the day preceding the delivery day
- Daily commitment allocations used in the calculation of Expected Performance for the underlying capacity resources in Non-Performance Assessment in order to properly determine Performance Shortfall/Bonus Performance of the Aggregate Resource
- Sum of the Performance Shortfall/Bonus Performance calculated for the underlying capacity resources that were required to perform during the Performance Assessment Hour establishes the Performance Shortfall/Bonus Performance for the Aggregate Resource for such Performance Assessment Hour.
- Non-Performance Assessment Charges/Credits will be assessed to the Aggregate Resource.

Example #1: Aggregate Resource clears 42 MW of CP and 9 MW of Base Capacity.  
Emergency Action in EMAAC in Summer

DATE: July 1, DY		Daily Commitment Allocation (UCAP MW)	
Resource	Location	CP	Base
Solar	JCPL	31	7
Wind	PECO	11	2
<b>Aggregate</b>	<b>EMAAC</b>	<b>42</b>	<b>9</b>

Daily commitment allocation used to determine Expected Performance

Performance Assessment Hour in EMAAC: July 1, DY HR Ending 16:00  
Assume Balancing Ratio = 1.0

Resource	Location	Output (MW)	Product	Expected Performance (MW)	Actual Performance (MW)	Performance Shortfall* (MW)
Solar	JCPL	48	CP	31	41	-10
			Base	7	7	0
Wind	PECO	8	CP	11	8	3
			Base	2	0	2
<b>Aggregate</b>	<b>EMMAC</b>					<b>-5</b>

\*Negative Performance Shortfall represents over performance (Bonus Performance).

Example #2: Aggregate Resource clears 42 MW of CP and 9 MW of Base Capacity.  
Emergency Action in EMAAC in Winter

DATE: February 1, DY		Daily Commitment Allocation (UCAP MW)	
Resource	Location	CP	Base
Solar	JCPL	2	0
Wind	PECO	40	9
<b>Aggregate</b>	<b>EMAAC</b>	<b>42</b>	<b>9</b>

Daily commitment allocation used to determine Expected Performance

**Performance Assessment Hour in EMAAC: February 1, DY HR Ending 08:00**  
Assume Balancing Ratio = 1.0

Resource	Location	Output (MW)	Product	Expected Performance (MW)	Actual Performance (MW)	Performance Shortfall*(MW)
Solar	JCPL	1	CP	2	1	1
			Base	0	0	0
Wind	PECO	45	CP	40	40	0
			Base	9	5	0**
<b>Aggregate</b>	<b>EMMAC</b>					<b>1 (CP)</b>

\*Negative Performance Shortfall represents over performance (Bonus Performance).

\*\*Performance Shortfall set to zero for Base generation resource commitments in non-summer period.