



M18 Updates for Capacity Performance Filing

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MRC Meeting
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- M18 updates for Capacity Performance filing of 12/12/2014 introduced at 2/26/2015 MRC Meeting
- MRC webinar dedicated to first reading of M18 updates held on 3/3/2015
- M18 version posted with today's material includes updates made based on comments received at and since the webinar



Summary of Updates since March 9, 2015 Webinar

Update	Impacted M-18 Section
Correction: the “sum of installed capacity” to “sum of unforced capacity” in the following business rule: The unforced capacity value of the Aggregate Resource may not exceed the sum of the unforced capacity values of the individual resources that are being combined to form the Aggregate Resources.	4.9 Aggregate Resource
Added description of method for determining a valid quantity of UCAP MWs that may be offered as Capacity Performance for intermittent and capacity storage resources.	5.3.1 Resource Specific Sell Offer Requirements
Added Voltage Reduction Action in the list of Emergency Actions	8.4A Non-Performance Assessment
Added language to clarify that a resource’s <u>maximum daily</u> UCAP commitment during the month the Non-Performance Charge was assessed is used in calculating maximum monthly Non-Performance Charges (i.e., Monthly stop loss).	8.4A Non-Performance Assessment
Added language to clarify that a resource’s <u>maximum daily</u> UCAP commitment by the resource during the period of June 1 of the Delivery Year through the end of the month for which the Non-Performance Charge was assessed is used in calculating maximum annual Non-Performance Assessment Charges (i.e., Annual stop loss).	8.4 A Non-Performance Assessment
Added language to provide ability to request retroactive replacement capacity transactions meeting certain requirements within three business days after any delivery day that includes a Performance Assessment Hour. Allows for over-performing uncommitted capacity in a sellers account to replace under-performing committed capacity in that same account.	8.7 Replacement Resources
Added a resource that is also subject to Non-Performance Assessment Charge, shall be assessed the greater of the daily resource deficiency/upgrade delay penalty/rating test failure charge or the Non-Performance Assessment Charges for the Performance Assessment Hours occurring during the day of the daily shortage.	9.1.3 Capacity Resource Deficiency Charge 9.1.4 Transmission Upgrade Delay Penalty Charge 9.1.5 Generation Resource Rating Test Failure Charge

Updates since March 9, 2015 Webinar are highlighted in yellow in M-18.

Appendix

- Proposed revisions for Capacity Performance filing (ER15-623), filed December 12, 2014.
- Capacity Performance filing proposes a number of reforms to ensure that resources committed to meet the PJM Region's reliability needs will deliver the promised energy and reserves when called upon in emergencies.
- PJM requested an effective date of April 1, 2015.

Summary of Proposed M-18 Updates

Proposed Revision	Impacted M-18 Sections
<p>Update capacity product definition</p> <ul style="list-style-type: none"> Recognize two product types, Capacity Performance (new product type) and Base Capacity (redefined summer product), effective 2018/2019 & 2019/2020 Delivery Years. Transition solely to Capacity Performance product type effective 2020/2021 Delivery Year. 	<ul style="list-style-type: none"> 1.1 Overview of PJM Capacity Market 1.5 Transition to Capacity Performance (new section) 2.3.4 Capacity Import Limits 4.1 Overview of Supply in Reliability Pricing Model 4.3.1 Requirements of Load Management Products in RPM 4.3.3 Demand Resources 4.3.5 Pre-Emergency and Emergency Load Response Registration 4.4 Energy Efficiency Resources 4.4.1 Determination of Nominated Value of EE Resources 4.5 Qualified Transmission Upgrades 4.6.2 Entering Unit-Specific Bilateral Transactions 4.6.6 Auction Specific MW Transactions 4.6.7 Cleared Buy Bid Transactions 4.6.8 Locational UCAP Transactions 5.3.1 Resource-specific Sell Offer Requirements 5.4 Buy Bids in RPM 8.7 Replacement Resources 11.4.1 Resource Portfolio (FRR) Attachment B: Authorization to Self-Schedule Capacity
<p>Revise definition of Existing generation - remove the treatment of generation that is not yet in service but has cleared an RPM Auction as Existing generation.</p>	<ul style="list-style-type: none"> 1.2.2 Participation of Resource Providers 5.3.4 Sell Offer Caps 5.6.1 Participation in the Base Residual Auction 5.7.1 Participation in the Incremental Auctions

Summary of Proposed M-18 Updates

Proposed Revision	Impacted M-18 Sections
Eliminate Short Term Resource Procurement Target	<ul style="list-style-type: none"> 1.3 Definition and Purpose of RPM 3.3 Parameters of Variable Resource Requirement 3.4 & 3.4.1 Plotting the Variable Resource Requirement Curve 3.5 Demand Curves in the Incremental Auctions 5.3 RPM Auction Parameters 5.7 Incremental Auctions
Conduct Transition Incremental Auction for 2016/2017 & 2017/2018 Delivery Years to procure Capacity Performance Resources	<ul style="list-style-type: none"> 1.5 Transition to Capacity Performance (new section) 5.1 Overview of RPM Auctions 5.7 Incremental Auctions
Eliminate forced outage rates that are outside management control (OMC) from Pool-wide average EFORd and a unit's EFORd.	<ul style="list-style-type: none"> 2.1.3 Pool-wide average EFORd 4.2.5 Equivalent Demand Forced Outage Rate (EFORd)
Replace Limited Resource Constraint & Sub-Annual Resource Constraint (to be effective for 2017/2018 only) with Base Capacity Demand Resource Constraint and Base Capacity Resource Constraint (effective 2018/2019 & 2019/2020 Delivery Years)	<ul style="list-style-type: none"> 2.4.3A Limited Resource Constraint & Sub-Annual Resource Constraint 2.4.3B Base Capacity Demand Resource Constraint and Base Capacity Resource Constraint (new section) 2.4.4 Adjustments to RPM Auction Parameters for PRD 5.3 RPM Auction Parameters 5.6.2 Auction Clearing Mechanism – Base Residual Auction 5.7.5 Auction Clearing Mechanism – Incremental Auctions 11.1.3 Participation in FRR Alternative 11.3 Capacity Plan (FRR) 11.4.1 Resource Portfolio (FRR)

Summary of Proposed M-18 Updates

Proposed Revision	Impacted M-18 Sections
<p>Allow Aggregate Resources effective 2018/2019 Delivery Year</p> <ul style="list-style-type: none"> • May combine Intermittent Resources, Capacity Storage Resources, Demand Resources, or Energy Efficiency Resources in same LDA to form single Aggregate Resource that satisfies Capacity Performance requirements. 	<p>4.1 Overview of Supply in the Reliability Pricing Model 4.6.2 Entering Unit-Specific Bilateral Transactions 4.6.6 Auction Specific MW Transactions 4.6.8 Locational UCAP Transactions 4.9 Aggregate Resources (new section) 5.3.1 Resource-specific Sell Offer Requirements</p>
<p>Replace minimum requirement of Impact Study Agreement to minimum requirement of Facilities Study Agreement for planned generation that is greater than 20 MW (effective 2019/2020 Delivery Year)</p>	<p>4.2.3 Planned Generation Resources –Internal 4.2.4 Planned Generation Resources –External</p>
<p>Revise capacity cost allocation methodology and basis for Peak Load Contributions (PLCs) (proposed revision in December 12, 2014 filing; however, this provision may be deferred for further stakeholder discussion)</p>	<p>4.3.7 Determination of Nominated Values for Load Management 7.2.2 Base Unforced Capacity Obligations 7.2.3 Final Unforced Capacity Obligations 7.3 RPM Scaling Factors 7.3.1 Zonal Weather Normalized Summer Peaks 7.3.1A Zonal Obligation Peak Load (new section) 7.3.2 Base Zonal RPM Scaling Factor 7.3.2 Final Zonal RPM Scaling Factor</p>
<p>Elimination of DR Factor effective 2018/2019 Delivery Year</p>	<p>4.3.8 Determination of UCAP Value of Load Management 4.4.2 Determination of UCAP Value of EE Resource 4.7.2 Resource Position for Demand Resources 5.3 RPM Auction Parameters</p>

Summary of Proposed M-18 Updates

Proposed Revision	Impacted M-18 Sections
<p>Update RPM Auction Credit Rates</p> <ul style="list-style-type: none"> Retain current RPM Auction Credit Rates for planned non-Capacity Performance Resources and propose new Auction Credit Rates for planned Capacity Performance Resources. Specify Auction Credit Rate for QTU is based on LDA in which upgrade was to increase CETL. 	<p>4.8.3 Auction Credit Rates</p>
<p>Clarify RPM Credit Adjustment Factor for planned external generation resources.</p> <ul style="list-style-type: none"> Factor reduced to 50% once the equivalent of Interconnection Service Agreement has been executed and 50% or more of firm transmission service has been secured. Factor reduced to 0% when resource commences Interconnection Service and 100% of the MWs of firm transmission service for complete transmission path has been secured. 	<p>4.8.2 RPM Credit Requirement</p>
<p>Allow Coupled Offers - may submit separate, but coupled Base and Capacity Performance sell offer segments for a capacity resource</p>	<p>5.3.1 Resource-specific Sell Offer Requirements</p>
<p>Include Capacity Performance Must-Offer Requirement (excludes Intermittent Resources, Capacity Storage Resources, Demand Resources, and Energy Efficiency Resources)</p>	<p>5.3.1 Resource-specific Sell Offer Requirements</p>

Summary of Proposed M-18 Updates

Proposed Revision	Impacted M-18 Sections
Set sell offer cap for Capacity Performance Generation Resource to be Net CONE for zonal LDA in which resource resides	5.3.1 Resource-specific Sell Offer Requirements
Include Sell Offer Representation for Capacity Performance Offer Segment	5.3.1A Sell Offer Representation for Capacity Performance Offer Segment (new section)
Replace Limited Resource Price Decrement and Sub-Annual Resource Price Decrement (to be effective for 2017/2018 only) with Base Capacity Demand Resource Price Decrement and Base Capacity Resource Price Decrement (effective 2018/2019 & 2019/2020 Delivery Years)	5.6.2 Auction Clearing Mechanism – Base Residual Auction 5.7.5 Auction Clearing Mechanism – Incremental Auctions 5.6.1 Zonal Capacity Prices
Include Non-Performance Assessment <ul style="list-style-type: none"> • Effective 2018/2019 Delivery Year for all resources and effective 2016/2017 & 2017/2018 Delivery Year for generation resources with Capacity Performance commitments from a Transitional Incremental Auction. • Non-Performance Assessment replaces Peak Hour Period Availability, PSM Compliance, and Load Management Event Compliance effective 2018/2019 Delivery Year. 	8.1 Overview of Resource Performance Assessments 8.4 Generating Unit Peak-Hour Period Availability 8.4A Non-Performance Assessment (new section) 8.4.7 Peak Season Maintenance (PSM) Compliance 8.5 Load Management Event Compliance 9.1.11 Non-Performance Assessment Charge/Bonus Performance Credit (new section) 11.3 Capacity Plan (FRR)

- New capacity products
 - Capacity Performance
 - Base Capacity
- Transition to Capacity Performance
 - Base Capacity for 2018/19 and 2019/2020 DYs
 - CP only starting 2020/2021 DY
 - CP Transition Incremental Auction for 2016/17 and 2017/18 DYs

- New capacity product
- Capacity Performance Resource shall provide energy and reserves when called upon by PJM during emergencies during entire Delivery Year
- Subject to new Non-Performance Charge
- Eligible to offer into RPM Auctions effective 2018/2019 Delivery Year*
- Sole capacity product beginning 2020/2021 Delivery Year

**Generation Capacity Performance Resources may offer into proposed Transitional Incremental Auctions for 16/17 & 17/18 Delivery Years.*

- Redefined summer capacity product
- Base Capacity Resources are those capacity resources which provide enhanced assurance of delivery and reserves during hot weather operations
- Subject to Non-Performance Charge only when they fail to perform under emergency conditions during June through September
- Eligible to offer into RPM Auctions for 2018/2019 & 2019/2020 Delivery Years only

Capacity Performance - Capacity resource must be capable of sustained, predictable operation that allows the resource to be available throughout the Delivery Year to provide energy and reserves whenever PJM determines an emergency condition exists.

Base Capacity - Capacity resource that is not capable of sustained, predictable operation that allows the resource to be available throughout the entire Delivery Year; however, the resource is capable of providing enhanced assurance to provide energy and reserves during hot weather operations.

- Replace Limited and Sub-Annual Resource Constraints with Base Capacity Demand Resource Constraint and Base Capacity Resource Constraint effective 2018/2019 DY
- **Base Capacity Demand Resource Constraint** – maximum amount of Base Capacity Demand Resources and Base Capacity Energy Efficiency Resources that may clear in RPM Auctions for the Delivery Year
- **Base Capacity Resource Constraint** – maximum amount of Base Capacity Demand Resources, Base Capacity Energy Efficiency Resources, and Base Capacity Generation Resources that may clear in RPM Auctions for the Delivery Year
- Constraints still determined for PJM Region and each modeled LDA



Section 3: Demand in the Reliability Pricing Model

- Elimination of the Short-Term Resource Procurement Target effective 2018/19 DY
- Replace Limited and Sub-Annual Resource Constraints with Base Capacity Demand Resource Constraint and Base Capacity Resource Constraint in Incremental Auction set-up

- Replace minimum requirement of Impact Study Agreement to Facilities Study Agreement for planned generation greater than 20 MW (effective 2019/2020 DY)
- Elimination of forced outages that are outside management control (OMC) from pool-wide average EFORd and individual resource EFORd
- Base Capacity DR and Capacity Performance DR replace Limited, Extended Summer and Annual DR
- Base Capacity EE and Capacity Performance EE replace Annual EE
- Elimination of DR Factor in determination of DR and EE UCAP Value
- Recognize CP and Base products in bilateral and buy bids
- Auction Credit Rate for CP Resources
- Aggregate Resources (discuss in more detail in Section 5 review)



Demand Resource Requirements

Requirement	Limited DR	Extended Summer DR	Annual DR	Base Capacity Demand Resource (18/19 & 19/20 DY only)	Capacity Performance Demand Resource (Effective 18/19 DY)
Availability	Any weekday, other than NERC holidays, during June – Sept. period of DY	Any day during June-October period and following May of DY	Any day during DY (unless on an approved maintenance outage during Oct. - April)	Any day during June-September of DY	Any day during DY (unless on an approved maintenance outage during Oct.-April)
Maximum Number of Interruptions	10 interruptions	Unlimited	Unlimited	Unlimited	Unlimited
Hours of Day Required to Respond (Hours in EPT)	12:00 PM – 8:00 PM	10:00 AM – 10:00 PM	Jun – Oct. and following May: 10 AM – 10 PM Nov. – April: 6 AM- 9 PM	10:00 AM – 10:00 PM	Jun – Oct. and following May: 10 AM – 10 PM Nov. – April: 6 AM- 9 PM
Maximum Duration of Interruption	6 Hours	10 Hours	10 Hours	10 Hours	No limit

Current Limited, Extended Summer, & Annual DR product definitions eliminated effective 2018/2019 DY.



RPM Auction Credit Rates

- Retain current RPM Auction Credit Rates for planned Base Capacity Resources and propose new RPM Auction Credits Rates for planned Capacity Performance Resources

Auction Credit Rate	Current RPM Auction Credit Rates (apply to planned Base Capacity Resources)	Proposed RPM Auction Credit Rates (apply to planned Capacity Performance Resources)
Pre-BRA	greater of (i) \$20/ MW-day or (ii) $.3 * \text{RTO Net CONE}$ (in \$/MW-day), times the number of days in the Delivery Year.	greater of (i) $0.5 * \text{PJM RTO Net CONE}$ (\$/MW-day) or (ii) \$20/MW-day, times number of days in the DY.
Post-BRA	greater of (i) \$20/MW-day or (ii) $.2 * \text{applicable BRA RCP}$ (\$/MW-day), times the number of days in the Delivery Year.	greater of the following daily rates, times number of days in DY: <ul style="list-style-type: none"> \$20/MW-day 0.20 times applicable BRA RCP (\$/MW-day) Lesser of (i) $0.5 * \text{RTO Net CONE}$ or (ii) $1.5 * \text{RTO Net CONE}$ (in ICAP terms) minus the applicable BRA RCP.
Pre-IA	greater of (i) $0.3 * \text{RTO Net CONE}$ or (ii) 0.24 times the applicable BRA RCP (\$/W w-day), or (iii) \$20 per MW-day, times the number of days in the Delivery Year.	greater of (i) $0.5 * \text{RTO Net CONE}$ (\$/MW-day) or (ii) \$20/MW-day, times number of days in the DY.
Post IA	greater of (i) \$20/MW-day or (ii) $0.2 * \text{the applicable IA RCP}$, but no greater than the pre-clearing Incremental Auction Credit Rate for such Incremental Auction, times the number of days in the Delivery Year.	greater of the following daily rates, times number of days in DY: <ul style="list-style-type: none"> \$20/MW-day 0.20 times applicable IA RCP (\$/MW-day) Lesser of (i) $0.5 * \text{RTO Net CONE}$ or (ii) $1.5 * \text{RTO Net CONE}$ (in ICAP terms) minus the applicable IA RCP.

- Net CONE as market seller offer cap for CP; submittal of ACR data 120 days prior to auction for caps greater than Net CONE
- CP must-offer requirement (& exceptions)
- Coupled Sell Offers for Base and CP Resources
- For mitigation and must-offer purposes, revise definition of Existing Generation to no longer include generation that is not yet in service but has cleared an RPM auction
- Replace Limited and Sub-Annual price decrements with Base Capacity DR and Base Capacity Resource price decrements in Auction Clearing Results sub-sections

- 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 CP must-offer requirement
- Exceptions are permitted if seller can demonstrate that resource is reasonably expected to be physically incapable of meeting CP requirements with such request submitted no later than 120 days prior to auction

- A Generation Capacity Resource having a CP must-offer requirement may submit a coupled sell offer as both a CP and a Base Capacity Resource with price difference reflective of cost necessary to qualify as CP
- A Generation Capacity Resource having a CP must-offer requirement and an accepted CP market seller offer cap above Net CONE must submit a coupled sell offer as both a CP and a Base Capacity Resource if offering above Net CONE

Intermittent & Capacity Storage Resource Sell Offers

- 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 shall mean 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.

Wind Resource	
Nameplate Capacity	100 MW
UCAP Value (CIRs)	13 MW
Weighted average output during expected performance hours in DY	26 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 from 0 MW to 13 MW as CP with any residual UCAP value offered as Base Capacity.



Example of Offering Solar Resource

Solar Resource	
Nameplate Capacity	100 MW
UCAP Value (CIRs)	38 MW
Weighted average output during expected performance hours in DY	20 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 solar resource could reasonably offer from 0 MW to 20 MW as CP with any residual UCAP value offered as Base Capacity.

Demand Resource and EE Resource Sell Offers

- DR Resources that meet the CP DR product requirements are eligible to offer as CP but are not required to offer as CP
- EE Resources that meet the CP EE product requirements are eligible to offer as CP but are not required to offer as CP
- Such Resources may offer as CP, or as Base Capacity or submit a coupled sell offer for both

- 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, and Energy Efficiency Resources only
- Resources being combined must be located in the same 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 Resource	
Net Maximum Capacity	100 MW
UCAP Value (CIRs)	13 MW
Weighed average output during expected performance hours in DY	26 MW

Solar Resource	
Net Maximum Capacity	100 MW
UCAP Value (CIRs)	38 MW
Weighed average output during expected performance hours in DY	20 MW



Aggregate Resource	
UCAP Value	51 MW
Weighted average output during expected performance hours in DY	46 MW

- As individual resources, total CP MW capability was 33 MW
- As an Aggregate, CP MW capability is 46 MW



Section 8: Resource Performance Assessments

Section 9: Settlements

- New Performance assessment replaces DR Event Compliance for Demand Resources, and replaces Peak-Hour Period Availability Assessment & Peak Season Maintenance Compliance for generation

- New Performance Assessment that replaces DR Event Compliance for Demand Resources, and replaces Peak-Hour Period Availability Assessment & Peak Season Maintenance Compliance for generation
- Assesses performance of capacity resources during emergency conditions
- Applies to both Base Capacity Resources and Capacity Performance Resources
- Base Capacity Resources exposed to Non-Performance Charges only for performance during Emergency Actions in summer months

- Compare a resource's Expected Performance against Actual Performance for each Performance Assessment Hour
- Performance Assessment Hours delineated by PJM's declaration of Emergency Actions
- Demand Resource's performance will be evaluated if dispatched during Performance Assessment Hour
- Evaluate performance and calculate shortfall/excess for each Performance Assessment Hour separately
- Shortfall subject to Non-Performance Charge
- Excess (Bonus Performance) may be eligible for Performance Credit

Performance is assessed for each hour (or partial hour) that PJM declares the following actions:

- Pre-Emergency Load Management Reduction Action
- Emergency Load Management Reduction Action
- Primary Reserve Warning
- Maximum Emergency Generation, Maximum Emergency Generation Action Trans
- Emergency Voluntary Energy Only Demand Response
- Voltage Reduction Warning
- Manual Load Dump Warning
- Manual Load Dump Action

Emergency Action shall mean any emergency action for locational or system-wide capacity shortages that either utilizes pre-emergency mandatory load management reductions or other emergency capacity, or initiates a more severe action, including but not limited to, a Voltage Reduction Warning, Voltage Reduction Action, Manual Load Dump Warning, or Manual Load Dump Action.



Expected Performance vs. Actual Performance

		Summer Performance Assessment Hour (June - Sept)		Non-Summer Performance Assessment Hour	
Resource Type	Product	Expected Performance	Actual Performance	Expected Performance	Actual Performance
Generation/Storage	Capacity Performance	Committed UCAP * Balancing Ratio	Metered Energy Output + Reserve/Regulation Assignment	Committed UCAP * Balancing Ratio	Metered Energy Output + Reserve/Regulation Assignment
Generation/Storage	Base	Committed UCAP * Balancing Ratio	Metered Energy Output + Reserve/Regulation Assignment	Committed UCAP * Balancing Ratio; <i>0 for Performance Shortfall calculation</i>	Metered Energy Output + Reserve/Regulation Assignment
Demand Response	Capacity Performance	Committed ICAP	Load Reduction + Reserve/Regulation Assignment	Committed ICAP	Load Reduction (CBL Method) + Reserve/Regulation Assignment
Demand Response	Base	Committed ICAP	Load Reduction + Reserve/Regulation Assignment	0	Load Reduction (CBL Method) + Reserve/Regulation Assignment
Energy Efficiency	Capacity Performance	Committed ICAP	PJM Approved Post-Installation Load Reduction	Committed ICAP	PJM Approved Post-Installation Load Reduction
Energy Efficiency	Base	Committed ICAP	PJM Approved Post-Installation Load Reduction	N/A	N/A
Qualifying Trans. Upgrade (QTU)	Capacity Performance	Committed UCAP	Committed UCAP if In-Service; otherwise 0	Committed UCAP	Committed UCAP if In-Service; otherwise 0
Energy Only Resources	N/A	0	Metered Energy Output + Reserve/Regulation Assignment	0	Metered Energy Output + Reserve/Regulation Assignment
Energy Imports	N/A	0	Net Energy Import	0	Net Energy Import

$$\text{Balancing Ratio} = \frac{\text{Total Generation \& Storage Actual Performance} + \text{Net PJM Energy Imports} + \text{DR Bonus Performance}}{\text{Total Generation \& Storage Committed UCAP}}$$

- Non- Performance Charge Rate is based on yearly Net CONE (Capacity Performance Resources) or yearly Resource Clearing Price (Base Capacity Resources) and a small divisor (i.e., an assumed 30 Emergency Action hours per year).
- Non-Performance Charge Rate for CP Resources (\$/MWh) = [LDA Net CONE (\$/MW-day) * number of days in Delivery Year]/30
 - If LDA Net CONE = \$300/MW-day, the Non-Performance Charge Rate = [\$300/MW-day * 365 days]/30 = \$3,650/MWh
- Non-Performance Charge Rate for Base Capacity Resources (\$/MW-hr) = [Weighted Average Resource Clearing Price (\$/MW-day) for such resource * number of days in Delivery Year]/30

- Stop-Loss provision limits the total Non-Performance Charges assessed
- Limits maximum charges for calendar month and for a calendar year
 - Capacity Performance Resources:
 - For a month, the maximum Non-Performance Charge is $0.5 * \text{Net CONE} * \text{UCAP commitment on the resource}$
 - where UCAP commitment is the maximum daily UCAP commitment on resource during the calendar month for which charge is assessed
 - For a year, the Non-Performance Charge is $1.5 \text{ Net CONE} * \text{UCAP commitment on the resource}$
 - where UCAP commitment is the maximum daily UCAP commitment on resource during June 1 through the calendar month for which the charge is assessed
 - Base Capacity Resources
 - For year, the maximum Non-Performance Charge = total capacity revenues due to resource for Delivery Year

- Non-Performance Charges will be distributed to resources (of any type, even if not Capacity Resources) that perform above expectations
- Bonus Performance will be assigned a share of the collected Non-Performance Charge revenues based on the ratio of its Bonus Performance to total Bonus Performance from all resources for the same Performance Assessment Hour
- All performance from a resource with no capacity commitment is considered Bonus Performance



Summer Performance Assessment Hour Example

Emergency Action called for entire RTO during Summer period

- Sample capacity resources below dispatched to their full MW capability except:
 - GEN RES 1 is backed down 30 MW by PJM for a transmission constraint
 - GEN RES 2 and 4 are on Partial and Full Forced Outages respectively
- Applicable LDA Net CONE (ICAP): \$300/MW-day; WARCP: \$150/MW-day
- Non-Performance Charge Rate for Capacity Performance Resources: \$3,650/MWh
- Non-Performance Charge Rate for Base Resources: \$1,825/MWh
- Generation & Storage Balancing Ratio: 80%

Resource	Product	Committed MW	Expected Performance	Actual Performance	Notes	Exempt MW	Performance Shortfall	Charge Rate (\$/MWh)	Total Charges (\$)	Bonus Performance	Total Credits (\$)
GEN RES 1	CP	125.0	100.0	95.0	Dispatched down 30 MW for transmission constraint	5	0.0			0.0	
GEN RES 2	CP	125.0	100.0	44.0	Partial Forced Outage		56.0	\$ 3,650.00	\$204,400.00	0.0	
GEN RES 3	CP	100.0	80.0	100.0			0.0			20.0	\$55,480.00
GEN RES 4	Base	80.0	64.0	0.0	Full Forced Outage		64.0	\$ 1,825.00	\$116,800.00	0.0	
DR RES 5	CP	30.0	30.0	28.0			2.0	\$ 3,650.00	\$7,300.00	0.0	
DR RES 6	Base	20.0	20.0	25.0			0.0			5.0	\$13,870.00
EE RES 7	CP	20.0	20.0	15.0			5.0	\$ 3,650.00	\$18,250.00	0.0	
GEN RES 8	Energy	0.0	0.0	100.0			0.0			100.0	\$277,400.00
							127.0		\$346,750.00	125.0	\$346,750.00



Winter Performance Assessment Hour Example

Emergency Action called for entire RTO during Winter period

- Sample capacity resources below dispatched to their full MW capability except:
 - GEN RES 1 is backed down 30 MW by PJM for a transmission constraint
 - GEN RES 2 and 4 are on Partial Forced Outages
- Applicable LDA Net CONE (ICAP): \$300/MW-day; WARCP: \$150/MW-day
- Non-Performance Charge Rate for Capacity Performance Resources: \$3,650/MWh
- Non-Performance Charge Rate for Base Resources: N/A
- Generation & Storage Balancing Ratio: 77%

Resource	Product	Committed MW	Expected Performance	Actual Performance	Notes	Exempt MW	Performance Shortfall	Charge Rate (\$/MWh)	Total Charges (\$)	Bonus Performance	Total Credits (\$)
GEN RES 1	CP	125.0	96.2	95.0	Dispatched down 30 MW for transmission constraint	1.2	0.0			0.0	
GEN RES 2	CP	125.0	96.2	75.0	Partial Forced Outage		21.2	\$ 3,650.00	\$77,380.00	0.0	
GEN RES 3	CP	100.0	77.0	100.0			0.0			23.0	\$77,036.47
GEN RES 4	Base	80.0	61.6	50.0	Partial Forced Outage		N/A			0.0	
DR RES 5	CP	30.0	30.0	25.0			5.0	\$ 3,650.00	\$18,250.00	0.0	
DR RES 6	Base	20.0	0.0	1.0			N/A			1.0	\$3,349.41
EE RES 7	CP	20.0	20.0	15.0			5.0	\$ 3,650.00	\$18,250.00	0.0	
GEN RES 8	Energy	0.0	0.0	10.0			0.0			10.0	\$33,494.12
							31.2		\$113,880.00	34.0	\$113,880.00

- Replace Limited Resource and Sub-Annual Resource Constraints with Base Capacity DR and Base Capacity Resource Constraints in FRR Capacity Plan
- One-time election of non-performance charge or physical non-performance assessment

- CP Transition Incremental Auction for 2016/17 and 2017/18 DYs
- review separate business rule document