8.4 A Non-Performance Assessment

A Non-Performance Assessment[29] will assess performance of resources during emergency conditions. Non-Performance Assessment applies to ~~both Base Capacity Resource and~~ Capacity Performance Resource commitments. Effective with the 2022/2023 Delivery Year, the Non-Performance Assessment also applies to Price Responsive Demand commitments. ~~Base Capacity Resource commitments are exposed to Non-Performance Charges only for under-performance during Emergency Actions in summer months of June through September.~~ [A1]Capacity Performance Resource commitments and PRD commitments (effective 2022/2023 Delivery Year) are exposed to Non-Performance Charges for under-performance during Emergency Actions throughout the entire Delivery Year. Resources that fail to perform are subject to Non-Performance Charge and resources that over-perform may be eligible for Bonus Performance Credit.

Implementation of the Non-Performance Assessment will eliminate Peak Season Maintenance Compliance and Peak-Hour Period Availability Assessment for generation resources and Load Management Event Compliance for Demand Resources.

The Non-Performance Assessment will compare each Capacity Resource's Expected Performance against its Actual Performance for each Performance Assessment Interval. Performance Assessment Interval shall mean each Real-time Settlement Interval for which an Emergency Action has been declared by PJM. Performance Assessment Intervals are

29 OATT, Attachment DD, Section 10A

delineated by PJM's declaration of Emergency Actions. Emergency Actions 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 Actions. Performance is assessed for each interval that PJM declares the following actions:

- Pre-Emergency Load Management Reduction Action
- Emergency Load Management Reduction Action
- Primary Reserve Warning
- Maximum Generation Emergency Action
- Emergency Voluntary Energy Only Demand Response Reductions
- Voltage Reduction Warning and Reduction of Non-Critical Plant Load
- Curtailment of Non-Essential Business Load
- Deploy All Resources Action
- Manual Load Dump Warning
- Voltage Reduction Action
- Manual Load Dump Action
- Load Shed Directive

8.4A.1 Identification of Assessed Resources

The Non-Performance Assessment will encompass all resources located in the area defined by the Emergency Action. If the Emergency Action area is PJM-wide then External Generation Capacity Resources (prior to the 2020/2021 Delivery Year only) and Net Energy Imports are included in this assessment. Effective with the 2021/2022 Delivery Year, External Generation Capacity Resources are included in the assessment if such external resource would have helped resolve the declared Emergency Action that was the subject of the assessment. At the start of the Delivery Year, PJM will inform the Capacity Market Seller of an external resource as to which Locational Deliverability Area it has been assigned for Non-Performance Assessment purposes. QTUs will be deemed to be located in the LDA into which such upgrade increased the CETL and the QTU will be included in the Non-Performance Assessment only if, and to the extent that, the declared Emergency Action encompasses only the LDA into which the upgrade increased the CETL.

For each Performance Assessment Interval, the Actual Performance and the Expected Performance is used to calculate a Performance Shortfall that determines both the Non-Performance Charge and Bonus Performance Credit applicability.

8.4A.2 Actual Performance

For each Performance Assessment Interval, the Actual Performance is equal to:

- for each generation and storage resource (including External Generation Capacity Resources when applicable), the metered output of delivered energy plus the resource's real-time reserve

or regulation assignment[30] [A2], if any; however, the resulting MW quantity is floored at 0 MW;

- for each Demand Resource, the demand response provided plus the resource's real-time reserve or regulation assignment, if any;
- for each Energy Efficiency Resource, the load reduction quantity approved by PJM subsequent to the pre-delivery year submittal of a post-installation M&V Report[31];
- for each entity providing Net Energy Imports during a PJM-wide event, the Net Energy Import quantity excluding any energy delivered from External Generation Capacity Resources ;
- for each Qualified Transmission Upgrade, the cleared MW quantity of the QTU if it is in-service prior to the start of the day of the Performance Assessment Interval, and zero if it is not in-service prior to the start of such day; and,
- For purposes of the Non-Performance Assessment for demand resources, compliance will be measured in accordance with Section 8.6 of this manual.
- For each PRD Provider, the Actual Performance is calculated in accordance with Section 3A.6.2A.

8.4A.3 Balancing Ratio

The Balancing Ratio is used to set the Expected Performance level of Generation and storage Capacity Performance Resources within the Emergency Action Area during the Performance Assessment Interval. The Balancing Ratio for a Performance Assessment Interval represents the percentage share of total generation and storage capacity commitments needed to support the load and reserves on the system within the Emergency Action Area during the interval.

The Balancing Ratio is calculated as follows:

Balancing Ratio = (total amount of Actual Performance for all generation and storage resources + net energy imports + total Demand Response Bonus Performance + total PRD Bonus Performance effective with 2022/2023 Delivery Year) / total amount of generation and capacity storage resources committed in UCAP

Net energy imports are only included in the Balancing Ratio calculation for PJM-wide emergency events. The Balancing Ratio is capped at 1.

8.4A.4 Expected Performance

For each Performance Assessment Interval, the Expected Performance is equal to:

- for each ~~g~~Generation Capacity ~~r~~Resource and Capacity Storage Resource ~~(including External Generation Capacity Resources when applicable)~~, the resource's committed Unforced Capacity times the Balancing ~~r~~Ratio.[32] ~~of [(total amount of Actual Performance for all generation resources, plus net energy imports[33], plus total Demand Response Bonus Performance for that interval, plus total PRD Bonus Performance for that interval (effective with the 2022/2023 Delivery Year) / (total amount of committed Unforced Capacity of all Generation Capacity Resources)];~~

- for each Demand Resource and Energy Efficiency Resource, the resources' committed capacity without making any adjustment for the Forecast Pool Requirement (i.e., the actual load reduction quantity the resource committed to provide);
- for each Qualified Transmission Upgrade, the committed MW quantity; and,
- for each PRD Provider, the Expected Performance is calculated in accordance with Section 3A.6.2A.

The Expected Performance for a resource without a Capacity Performance commitment or for an entity providing net energy imports is 0 MW.

8.4A.5 Performance Shortfall

The initial Performance Shortfall for a resource or PRD Provider is calculated as Expected Performance minus the Actual Performance. If the initial Performance Shortfall for such resource or PRD Provider is a positive number, the under-performing resource or PRD Provider is subject to a Non-Performance Charge. If the Performance Shortfall is a negative number, the over- performing resource or PRD Provider may be eligible for Bonus Performance Credit.

~~30 The metered output of jointly owned generation resources is allocated to each owner pro-rata with each owner's share of the total Installed Capacity of the resource.~~

~~31 Base Capacity Energy Efficiency Resources are not included in the assessment of Performance Assessment Intervals that occur outside of the summer months of June through September, inclusive.~~

~~32 This ratio will be capped at 1.~~

~~33 Net Energy Imports are only included in this formula for PJM-wide emergency events.~~ [A3]

8.4A.6 Excused MW

For generation resources with a positive initial Performance Shortfall amount, the Performance Shortfall may be adjusted downward due to ~~exempt~~excused MW. ~~Exempt~~Excused MW consist of the following:

- Unavailable MW associated with a generator's approved planned or maintenance outage during the Performance Assessment Interval;
- MW for which the resource was not scheduled to operate by PJM; or
- MW for which the resource was on-line but was scheduled down by PJM based on the determination by PJM that such scheduling action was appropriate to the security constrained economic dispatch of the PJM Region.
- If such resource was needed by PJM and would otherwise have been scheduled by PJM to perform, but was not scheduled to operate, or was scheduled down solely due to (1) any operating parameter limitations submitted in the resource's offer or (2) submission of a market-based offer higher than its cost-based offer, then these MW will not be considered ~~exempted~~excused and will not result in a downward adjustment to the Performance Shortfall.
- ~~For purposes of the Non-Performance Assessment for demand resources, compliance will be measured in accordance with Section 8.6 of this manual.~~
- During the Performance Shortfall calculation and the ~~exempt~~excused MW determination, PJM will ensure that each energy offer complies with Manual 11, Section 2.3.7 and has the required associated information. If this information is not included, then no MW will be ~~exempt~~excused.

~~For Non-Performance Assessment purposes, the Actual Performance of any resource that has both Base Capacity Commitments and Capacity Performance Commitments will first be assigned to meet the resource's Expected Performance as a Capacity Performance Resource with any remaining Actual Performance next assigned to meet the resource's Expected Performance as a Base Capacity Resource.~~

~~For Performance Assessment Intervals occurring outside of the summer period (June - September), Generation Capacity Resources that have a Base Capacity commitment, and Base Capacity Demand Resources, are not evaluated for non-performance, but are eligible for Bonus Performance Credit. For Base Capacity Generation Resources, the Bonus Performance quantity is equal to the resource's Actual Performance minus the resource's Expected Performance. For Base Capacity Demand Resources, the Bonus Performance quantity is equal to the resource's Actual Performance.~~[A4]

8.4A.7 [A5]Allocations Due to Joint Ownership and Modeling Differences

Generation input data used in PAI settlements (e.g., real-time generation output, unit parameters, ancillary service market inputs, scheduled MW for penalty, or scheduled MW for bonus) may need to be allocated or aggregated due to joint ownership and/or resource

modeling differences that may exist between Market Gateway, Capacity Exchange, and eDART tools. If data needs to be allocated, data is allocated to joint capacity owners by ratio share of the Capacity Market Seller's Daily ICAP Owned MW adjusted by outage divided by the total Daily ICAP Owned MW adjusted by outage for all Capacity Market Sellers. If the generation resource is an Energy-only Resource, the data is allocated to joint owners by energy ownership share.

A Capacity Market Seller's Daily ICAP Owned MW adjusted by outage for a Generation Capacity Resource is calculated as the seller's installed capacity owned on the day of the event in Capacity Exchange minus the seller's allocated outage adjustment MW.

The total outage adjustment for a Generation Capacity Resource is calculated as follows:

Total outage adjustment = Maximum of (total Daily ICAP Owned MW based on Capacity Exchange data - installed capacity MW amount that is not on outage based on eDART data, 0 MW).

The total outage adjustment MW is allocated to each Capacity Market Seller of the Generation Resource by the ratio share of the seller's Daily ICAP owned MW to total Daily ICAP owned MW for all sellers to determine the seller's allocated outage adjustment MW.

8.4A.8 Final Performance Shortfall or Bonus MW

For purposes of calculating Bonus Performance quantity, the Actual Performance for a dispatchable resource shall not exceed the MW level at which such resource was scheduled and dispatched by PJM during the Performance Assessment Interval. During the Bonus Performance quantity calculation, PJM will ensure that each energy offer complies with Manual 11, Section 2.3.7 and has the required associated information associated. If this information is not included, then the Bonus Performance quantity will be zero. For self-scheduled generation resources not dispatchable by PJM, the Actual Performance will not exceed the LMP Desired MW value as calculated by PJM based upon the higher of the cost or price schedules submitted for the resource, and will be zero if the LMP Desired MW is less than the lowest point on the higher of the cost or price schedules submitted for the resource.

8.4A.9 Non-Performance Charges and Bonus Performance Credits

The interval Non-Performance Charge is calculated as Performance Shortfall multiplied by the Non-Performance Charge Rate. The Non-Performance Charge Rate for Capacity Performance commitments is equal to {[the modeled LDA Net CONE ($/MW-day in installed capacity terms) for which the resource resides times number of days in the Delivery Year] divided by 30} divided by the number of Real-Time Settlement Intervals in an hour. The modeled LDAs and their respective Net CONE are provided in the Delivery Year BRA Planning Parameters posted on the PJM website.

~~The interval Non-Performance Charge Rate for Base Capacity commitments is equal to [(Weighted Average Resource Clearing Price ($/MW-day) for such resource times number of days in the Delivery Year) divided by 30] divided by the number of Real-Time Settlement Intervals in an hour. The number 30 is intended to represent the number of hours during a year that Emergency Actions could reasonably be expected to be in effect. Stop-loss provisions limit the total Non-Performance Charge that can be assessed on each Capacity Resource~~[A6]~~.~~

For Capacity Performance Resources or PRD Providers, the maximum yearly Non-Performance Charge is 1.5 times the modeled LDA Net CONE ($/MW-day in installed capacity terms) times number of days in Delivery Year times the maximum daily unforced capacity committed by the resource or PRD Provider during June 1 of the Delivery Year through the end of the month for which the Non-Performance Charge was assessed. For Seasonal Capacity Performance Resources, the maximum yearly Non-Performance Charge is based the number of days of the applicable season and the maximum daily unforced capacity committed by the resource for such season. The modeled LDAs and their respective Net CONE are provided in the Delivery Year BRA Planning Parameters posted on the PJM website.

~~For Base Capacity Resources, there is an annual limit on total Non-Performance Charges, equal to the total capacity revenues due to the resource for the Delivery Year.~~

Revenue collected from payment of Non-Performance Charges will be distributed to resources (of any type, even if they are not Capacity Resources) and PRD Providers that perform above expectations. A resource or PRD Provider with Actual Performance above its Expected Performance is considered to have provided Bonus Performance, and will be assigned a share of the collected Non-Performance Charge revenues in the form of a Bonus Performance Credit. This credit is based on the ratio of its Bonus Performance quantity to the total Bonus Performance quantity (from all resources or PRD Providers) for the same Performance Assessment Interval.

The billing of any Non-Performance Charges incurred in any given month will be done within three calendar months after the calendar month that included such Performance Assessment Intervals and such billing of charges will be spread over the remaining months in the Delivery Year. Bonus Performance Credits will follow the same billing methodology as Non- Performance Charges.

8.8 Replacement Resources

Participants may specify replacement resources in order to avoid or reduce resource

performance assessment shortfalls and the associated deficiency/penalty charges. Participants may not specify replacement resources in order to avoid or reduce performance assessment shortfalls and associated deficiency/penalty charges related to price responsive demand.

Replacement capacity for generation resources, Demand Resources, Energy Efficiency Resources, or Qualifying Transmission Upgrades committed to RPM may be specified via the Capacity Exchange system by entering a "Replacement Capacity" transaction before the start of the Delivery Day. However, upon a request to PJM made no later than three business days after a Delivery Day containing a Performance Assessment Interval, Replacement Capacity Transactions may be permitted retroactively effective with the Delivery Day provided such transaction meets the following criteria: (1) the replacement resource must have already been in the same sub-account as the resource being replaced on the Delivery Day, (2) the replacement resource must have been included in the same Performance Assessment Intervals as the resource being replaced, (3) the replacement resource must have the same or better temporal availability characteristics as the resource being replaced, (4) the replacement resource must be located in the same LDA (or a more constrained child LDA) as the resource being replaced, and (5) the resulting total Daily Resource Commitments (RPM and FRR) (in UCAP terms) on a generation resource used as a replacement resource cannot exceed such replacement resource's Actual Performance during the Performance Assessment Intervals. A request for a retroactive replacement capacity transaction is submitted through the Capacity Exchange system and ~~–~~[A7] ~~Such requests~~ must ~~be submitted~~ specify ~~to rpm_hotline@pjm.com and include~~ the start date and end date, resource being replaced, replacement resource, and the desired change in Daily RPM Commitments (in UCAP terms) for the resource being replaced. ~~and product type (i.e., Base Generation, Base DR/ EE, or Capacity Performance) of the commitment being replaced~~[A8].

Through the "Replacement Capacity" transaction functionality in Capacity Exchange, PJM will provide participants with a list of the available capacity for each generation or demand resource in their portfolio as well as a list of cleared buy bids from any Incremental Auction via the Capacity Exchange system and a list of resources with RPM Resource Commitments. Participants will have the ability to match a generation, Demand Resource, Energy Efficiency

Resource or Qualifying Transmission Upgrade resource committed to RPM that they would like to replace with available capacity from a generation resource, demand resource, cleared buy bids in an Incremental Auction, or from Locational UCAP transactions. Effective with the 2019/2020 Delivery Year, available capacity from an EE Resource may be utilized to replace the commitment of only another EE Resource because such commitments are accompanied by the adjustment that is required to avoid double-counting of energy efficiency measures as described in section 2.4.5 of this manual.

The following are business rules that apply to Replacement Resources for Resources Committed to RPM:

- The start date and end date of the replacement must be specified.
- The Delivery Year commitment of a Generation Capacity Resource may not be replaced until after the EFORd for the Delivery Year has been locked in the Capacity Exchange system (November 30 prior to the Delivery Year). After November 30 prior to the Delivery Year and prior to the conduct of the Third Incremental Auction for the Delivery Year, the commitment of such a resource may be replaced but only up to the quantity of any commitment deficiency of the resource caused by the differences between sell offer EFORd and Final EFORd, and/or derating.
- Any or all of a Delivery Year commitment of a Generation Capacity Resource, Demand Resource, or Energy Efficiency Resource may be replaced any time prior to the conduct of the Third Incremental Auction for that Delivery Year when the owner of the replaced resource provides transparent and verifiable evidence to support the expected final physical position of the resource at the time of request. Such requests shall be submitted in writing simultaneously to PJM rpm_hotline@pjm.com and the Independent Market Monitor rpmacr@monitoringanalytics.com documenting the reason for the early replacement. PJM will approve or deny a request for early Replacement Capacity, based upon the below criteria, with input from the Market Monitor, within 15 days of receiving a completed early Replacement Capacity request.
    - Acceptable reasons for early replacement are:
        - Generator Deactivation (properly noticed to PJM and posted to the website)
        - A pending request to PJM for removal of Generation Capacity Resource status (in accordance with Manual 18, section 5.4.7, and subject to PJM approval)
        - Withdrawal of generation queue position / cancellation of generation project (accompanied by written notification to PJM Interconnection Projects manager)
        - Generation delayed in-service date (accompanied by written notification to PJM Interconnection Projects manager)
        - Permanent departure of load used as a basis for an existing DR or EE resource at the time of commitment
    - Generation replaced may not be recommitted for the Delivery Year. Therefore, the resource may not resell the replaced MW in a subsequent RPM auction for the applicable Delivery Year, and has no requirement to submit a Must-Offer Exception request for such auctions.

  - DR/EE sites replaced may not be registered or committed for the Delivery Year.

- A Replacement Resource used to reduce a Demand Resource commitment shall be specified for no less than the balance of the Delivery Year. An available Demand Resource may only be used as a Replacement Resource when the start date of the Replacement Capacity transaction is from June 1 through September 30th unless the Demand Resource can demonstrate through the prior summer's event or test compliance data that the Demand Resource met both its Summer Average RPM Commitment and the new daily RPM commitment level that would result if the Replacement Capacity transaction was approved.
- The desired change in Daily RPM Resource Commitments (in UCAP terms) for the resource being replaced and the replacement resource must be specified. The change in Daily RPM Resource Commitments cannot result in a negative value for the Daily RPM Resource Commitments for the resource being replaced. Effective for the 2016/2017 Delivery Year, the desired change in Daily RPM Resource Commitments (in UCAP terms) for the resource being replaced must also indicate the product type (i.e., Base Generation, Base DR/EE, or Capacity Performance) of the commitment being replaced.
- The replacement resource must be located in the same sub-account as the resource that is being replaced.
- The replacement resource must be located in the same LDA as the resource that is being replaced or reside in the Sink LDA of the Qualifying Transmission Upgrade being replaced. However, if there is remaining import capability into the LDA after the Third Incremental Auction, a replacement resource may be located in a parent LDA, subject to the following restrictions. The ability to submit a replacement transaction from a parent LDA into a child LDA is limited by the import capability remaining into the LDA. In addition, the ability to use available capacity of a Base Capacity Demand Resource or a Base Capacity EE Resource as replacement capacity for commitments located outside of the modeled LDA in which the resource resides is subject to the Base Capacity DR/EE Resource Constraint and/or the Base Capacity Resource Constraint for each LDA, and, the ability to use available capacity of a Base Capacity Generation Capacity Resource as replacement capacity for commitments located outside of the modeled LDA in which the resource resides is subject to the Base Capacity Resource Constraint for each LDA. After the Third Incremental Auction, the remaining import capability of each LDA, and, the remaining commitment capability of Base Capacity DR/EE Resources and Base Capacity Generation Resources of each LDA is posted on the pjm website.
- Resources located in a constrained LDA can serve as replacement capacity for a generation resource located in a less constrained parent LDA.
- The replacement resource must have the same or better temporal availability characteristics as the resource that is being replaced.
- Capacity Performance Resource commitments can only be replaced by available capacity from a capacity resource that is eligible to be committed as CP, or by cleared Buy Bids or Locational UCAP of the Capacity Performance product type.
- Base Capacity commitments on a Generation Resource can only be replaced by available capacity from a generation resource that is eligible to be committed as Base,

available capacity from a capacity resource that is eligible to be committed as CP, or by cleared Buy Bids or Locational UCAP for Base Generation product type or Capacity Performance product type.

- Base Capacity commitments on Demand Resource or Energy Efficiency Resources can be replaced by available capacity from a capacity resource that is eligible to be committed as Base or CP, or by cleared Buy Bids or Locational UCAP for Base Generation product type, Base DR/EE product type or Capacity Performance product type.
- If a generation, demand, or EE resource is used as replacement capacity, a decrease in the Daily RPM Resource Commitments for the resource that is being replaced will result and a corresponding increase in the Daily RPM Resource Commitments for the replacement generation, demand, or EE resource will result during the time period specified for replacement. A change in the Daily RPM Resource Commitments for a generation resource will result in a change in the Total Unit ICAP Commitment Amount for the generation resource.
- If cleared buy bids from an Incremental Auction or Locational UCAP transactions are used as replacement capacity, a decrease in the Daily RPM Commitments for the resource that is being replaced will result during the time period specified for replacement. A change in the Daily RPM Commitments for a generation resource will result in a change in the Total Unit ICAP Commitment Amount for the generation resource.

Replacement resources for Generation Capacity Resources, QTU, Energy Efficiency Resources, or Demand Resources committed to FRR Capacity Plan are specified by an FRR Entity through the update of the FRR Entity's FRR Capacity Plan prior to the start of the Delivery Day. FRR Entities may update their FRR Capacity Plan to reduce the FRR Capacity Plan Commitment on the resource being replaced and increase the FRR Capacity Plan Commitment on a replacement resource. The change in the Daily FRR Capacity Plan Commitments for a generation resource will result in a change in the Total Unit ICAP Commitment Amount for the generation resource.

8.8.1 Excess Commitment Credits

LSEs may receive credits when Reliability Requirements decrease resulting in an excess capacity.

The Excess Capacity Credits will be the PJM Sell Offers in the Scheduled Incremental Auctions that do not clear less the PJM Buy Bids in Incremental Auctions that do not clear. The Excess Capacity Credits in PJM will be allocated to LDAs pro rata based on the reduction in LDA peak load forecast from BRA to the time of Third Incremental Auction, provided the amount allocated does not exceed the reduction in the corresponding LDA Reliability Requirement. There will not be an allocation to LDA with an increase in load forecast.

The amount allocated to LDA will be further allocated to LSEs that are charged a Locational Reliability Charge, based on the Daily Unforced Capacity Obligation of the LSEs as of June 1 of the Delivery Year, and the credits will be constant for the entire Delivery Year. Excess Commitment Credits may be used as Replacement Capacity or traded bilaterally.

11.3 Capacity Plan

The most important requirement in electing FRR Alternative is for the FRR Entity to commit Capacity Resources to meet their daily unforced capacity obligations, any applicable Percentage of Internal Resources Required in an LDA, plus any additional threshold if the FRR Entity plans to sell capacity. Failure to commit the required resources would result in FRR Commitment Insufficiency Charge and ineligibility to continue the FRR Alternative. An FRR Capacity Plan is the long-term plan for the commitment of Capacity Resources to satisfy the daily zonal unforced capacity obligations of an LSE that has elected the FRR Alternative in an FRR Service Area and any applicable Percentage of Internal Resources Required in a Locational Deliverability Area (LDA).

If the LSE intends to sell capacity resources to a direct or indirect purchaser that may use such a resource in any RPM Auctions or as a replacement resource in RPM, the LSE must also maintain a Threshold Quantity in its FRR Capacity Plan prior to the Delivery Year.

The Threshold Quantity is equal to the Preliminary Daily Unforced Capacity Obligation plus the lesser of (a) 0.03 * Preliminary Daily Unforced Capacity Obligation or (b) 450 MW.

An LSE must submit an initial FRR Capacity Plan at least one month prior to the conduct of the Base Residual Auction for the first Delivery Year by demonstrating that it has sufficient capacity resources in its FRR resource portfolio in Capacity Exchange to satisfy:

- LSE’s Preliminary Daily Unforced Capacity Obligations by zone for its FRR Service Area;
- any applicable Percentage of Internal Resources Required in LDA;
- Limited Resource Constraint and Sub-Annual Resource Constraint (effective for 2017/2018 Delivery Year and 2018/2019 Delivery Year for FRR Entities);

- ~~Base Capacity Demand Resource Constraint and Base Capacity Resource Constraint (effective for 2019/2020 Delivery Year)~~[A9]
- Threshold Quantity, if applicable.

If the initial FRR Capacity Plan does not satisfy the LSE's Preliminary Daily Zonal Unforced Capacity Obligations, any applicable Percentage of Internal Resources Required in LDA, any applicable product type requirements or constraints, and Threshold Quantity, if applicable, by the posted Deadline for FRR Capacity Plan Submittal, the LSE's election of the FRR Alternative will not be approved by PJM. The LSE will be required to serve its entire load in the FRR Service Area under the RPM for the Delivery Year such election was to be effective.

An LSE must annually demonstrate through the Capacity Exchange system no later than one month prior to the Base Residual Auction for each succeeding Delivery Year that it has extended the commitment of sufficient capacity resources to satisfy:

- LSE's Preliminary Daily Unforced Capacity Obligations by zone for its FRR Service Area;
- any applicable Percentage of Internal Resources Required in LDA;
- Limited Resource Constraint and Sub-Annual Resource Constraint (Effective for 2017/2018 Delivery Year and 2018/2019 Delivery Year for FRR Entities);
- Base Capacity Demand Resource Constraint and Base Capacity Resource Constraint (effective for 2019/2020 Delivery Years); and
- Threshold Quantity, if applicable.

If the FRR Capacity Plan for a succeeding Delivery Year does not satisfy the LSE's Preliminary Daily Unforced Capacity Obligations, any applicable Percentage of Internal Resources Required in LDA, any applicable product type requirements or constraints, and Threshold Quantity, if applicable, by the posted Deadline for FRR Capacity Plan Submittal, the LSE will be assessed an FRR Commitment Insufficiency Charge for any shortage of unforced capacity in meeting the Percentages of Internal Resources Required in LDA, applicable product type requirements or constraints, or the Preliminary Daily Unforced Capacity Obligations (including any Threshold Quantity) for any remainder of the minimum term of the FRR election. The FRR Commitment Insufficiency Charge in a zone is equal to two times the Cost of New Entry ($/MW-Year) in the zone times the shortage of unforced capacity resources in meeting the obligation. The shortage is defined as the shortage in meeting the Percentage of Internal Resources Required in LDA plus any additional shortage in meeting the Preliminary Daily Unforced Capacity Obligation including any Threshold Quantity Requirement. The shortage amount identified in the first delivery year that this charge is to be assessed is to be applied in the remaining delivery years that the charge is to be assessed.

FRR Commitment Insufficiency Charges are allocated on a pro-rata basis to all other LSEs (including RPM LSEs) in the RTO based on their Daily Unforced Capacity obligations.

Existing generation, planned generation, bilateral contracts for unit-specific capacity resources, existing demand resources, planned demand resources, energy efficiency resources, Aggregate Resources (effective 2019/2020 Delivery Year), and Seasonal Capacity Performance Resources (effective 2020/2021 Delivery Year) may be used in the FRR Capacity Plan if these resources meet the requirements specified in the PJM Agreements and Business Rules.

Existing generation that is located outside of the PJM market footprint may be used in the FRR Capacity Plan if the external generation meets the requirements specified in PJM Agreements and Section 4 of this manual.

Effective with the 2020/2021 Delivery Year, Capacity Performance Resources or Seasonal Capacity Performance Resources may be included in the FRR Capacity Plan.

At the FRR Entity's election, the UCAP MW quantity of generation resources that are committed to the initial FRR Capacity Plan will be determined using the lower of the generation resources' EFORd calculated based on outage data for the 12 months ending September 30th prior to the Base Residual Auction or the 5 Year Average EFORd based on outage data for the 12 months ending September 30th prior to the Base residual Auction.

At the FRR Entity's election and only for the purposes of evaluation of the initial FRR Capacity Plan, the 5 Year Average EFORd for a generation resource having an effective EFORd of 25% or higher may be recalculated excluding outage data for the most recent one year period.

The EFORd applied to the Final FRR Capacity Plan evaluated prior to the Delivery Year will be determined by PJM using the forced outage data for the 12 months ending September 30th prior to the Delivery Year.

Qualifying Transmission Upgrades may be used to reduce the Percentage of Internal Resources Required in an LDA for the FRR LSE if the Qualifying Transmission Upgrade meets the requirements specified in the PJM Agreements and Section 4 of this manual.

A capacity resource used in an FRR Capacity Plan must be on a unit-specific basis, and may not include "slice of system" or similar agreements that are not unit-specific.

An LSE's FRR Capacity Plan for the Delivery Year shall not include any capacity resource that cleared in any RPM Auction for such Delivery Year.

Any capacity resource that was not offered or offered but did not clear in any RPM Auction for such Delivery Year may be included in an FRR Capacity Plan.

An LSE's FRR Capacity Plan for the Delivery Year may include resources that are committed for less than a full Delivery Year; however, the FRR Capacity Plan in aggregate must satisfy all obligations for the Delivery Year.

If an LSE has committed capacity to meet a Threshold Quantity, the LSE shall maintain such resources until the Delivery Year's Final Unforced Capacity Obligation and final requirements (Percentage of Internal Resources Required in LDA, Limited Resource Constraints and Sub-Annual Resource Constraints (2017/2018 and 2018/2019 Delivery Years), Base Capacity Demand Resource Constraints and Base Capacity Resource Constraints (2019/2020 Delivery Year) are known. The LSE may use such resources during the Delivery Year to meet any increased capacity obligation resulting from an increase in Final Obligation Peak Load from Base Obligation Peak Load, or sell the resources to another FRR Entity in PJM or to an External Party.

All generation resources that have a FRR Capacity Plan Commitment must offer into PJM's Day Ahead Energy Market. Demand Resources that have an FRR Capacity Plan Commitment must be registered to participate in the Full Program Option or Capacity Only Option of the Emergency or Pre-Emergency Load Response Program and thus be available for dispatch during PJM-declared emergency event.

Prior to the start of each Delivery Year, the FRR entity must elect whether it seeks to be subject to the Non-Performance Charge or to physical non-performance assessments for its FRR commitments for such Delivery Year. If an FRR Entity also has RPM commitments on a resource, the resource's final Performance Shortfall or final Bonus Performance quantity due to RPM commitments are only subject to a Non-Performance Charge or Bonus Performance Credit and may not be included in a FRR Entity's election of the physical non-performance assessment[A10]. An FRR Entity may not elect the physical non-performance assessment option for its FRR commitments if such FRR Entity will not be an FRR Entity for the following Delivery Year and will be serving their load ~~their~~ under the RPM. If such FRR Entity opted to be subject to physical non-performance assessments for its FRR commitments, the FRR Entity will be required to update their FRR Capacity Plan for the following Delivery Year with additional MW of Capacity Performance Resources for each MW of FRR net Performance Shortfall for each Performance Assessment Interval in accordance with Section 11.8.7. Such FRR Entity shall not be eligible for, or subject to, Bonus Performance Credits for a final Bonus Performance quantity due to FRR commitments.

For an FRR Entity with a Capacity Resource that has both RPM and FRR commitments, a resource's final Performance Shortfall or final Bonus Performance quantity will be allocated pro-rata based on the ratio of the RPM and FRR UCAP commitment amount to the total UCAP commitment amount to determine a final Performance Shortfall or final Bonus Performance quantity for RPM and a final Performance Shortfall or final Bonus Performance quantity for FRR.

11.8.6 Non-Performance Charge/Bonus Performance Credit (Effective with 2019/2020 Delivery Year)

An FRR Entity that elected to be subject to financial non-performance assessment for its FRR commitments as opposed to physical non-performance assessments for its FRR commitments will be subject to Non-Performance Assessment Charge for each resource committed to the FRR Capacity Plan or price responsive demand committed to reduce the FRR Entity's unforced capacity obligation (effective with the 2022/2023 Delivery Year) that had a Performance Shortfall for a Performance Assessment Interval. If a resource committed to the FRR Capacity Plan or price responsive demand committed to reduce the FRR Entity's unforced capacity obligation (effective with the 2022/2023 Deliver Year) had Bonus Performance for a Performance Assessment Interval, such resource or price responsive demand will be eligible for Bonus Performance Credits.

~~If an FRR Entity has base capacity commitments for both RPM and FRR for the 2019/2020 Delivery Year, the interval Performance Shortfall associated with Base Capacity commitments may be further allocated into a shortfall for RPM commitments and a shortfall for FRR commitments. The interval Performance Shortfall associated with Base Capacity commitments shall be allocated on a pro-rata basis based on amount of base commitments for RPM and FRR (in unforced terms). The Non-Performance Charge Rate for RPM Base Capacity commitments is equal to {(Weighted Average Resource Clearing Price ($/MW-day) for such resource times number of days in Delivery Year) divided by 30} divided by the number of Real-Time Settlement Intervals in an hour. The Non-Performance Charge Rate for FRR Base Capacity commitments is equal to the [(Weighted Average Resource Clearing Price ($/MW-day) for the~~

~~LDA encompassing the zone of the FRR Entity times number of days in Delivery Year) divided by 30] divided by the number of Real-Time Settlement Intervals in an hour~~[A11].

Please see Section 9.1.11 of this manual for details on Non-Performance Charge/Bonus Performance Credit.

11.8.7 Physical Non-Performance Assessment

An FRR Entity that elected to be subject to physical non-performance assessment for resources committed to the Delivery Year FRR Capacity Plan or price responsive demand committed to reduce the FRR Entity's unforced capacity obligation (effective with the 2022/2023 Delivery Year) as opposed to financial non-performance assessment for its FRR commitments~~such resources~~ will be required to update the subsequent Delivery Year's FRR Capacity Plan and commit additional Capacity Performance Resources or Seasonal Capacity Performance Resources beyond the amount of Capacity Performance Resources required for the subsequent Delivery Year as a penalty for those resources committed to the FRR Capacity Plan that experienced Performance Shortfalls for Performance Assessment Interval during the relevant Delivery Year.

For each Performance Assessment Interval, the Actual Performance and Expected Performance of each resource contained in an FRR Entity' Capacity Plan will be determined according to the rules and formulas described in the Non-Performance Assessment section 8.4A,and for such interval, an FRR Entity's net Performance Shortfall, based on the sum of the FRR Entity's total Performance Shortfalls for FRR commitments minus the FRR Entity's total Bonus Performance Quantities for FRR commitments, shall be determined. ~~separately for Capacity Performance Resources and for Base Capacity Resources. If the combined Actual Performance of all Capacity Performance Resources committed to the FRR Entity's Capacity Plan exceeds the Expected Performance of such resources, then such over-performance may be applied to any positive Performance shortfall experienced by such FRR Entity's Base Capacity Resources during the Performance Assessment Interval. If the combined Actual Performance of all Base Capacity Resources committed to the FRR Entity's Capacity Plan exceeds the Expected Performance of such resources, then such over-performance may be applied to any positive Performance Shortfall experienced by such FRR Entity's Capacity Performance Resources during the Performance Assessment Interval.~~ [A12]Effective with the 2020/2021 Delivery Year, the net Performance Shortfall for Capacity Performance Resources shall include the performance of Seasonal Capacity Performance Resources included in the FRR Capacity Plan. Effective with the 2022/2023 Delivery Year, the net Performance Shortfall for Capacity Performance Resources shall include the performance of price responsive demand committed to reduce the FRR Entity's unforced capacity obligation.

The FRR Entity's net positive Performance Shortfall among Capacity Performance Resources and price responsive demand (effective with the 2022/2023 Delivery Year), if any, for each Performance Assessment Interval shall by multiplied by a rate of 0.00139 MW/Performance Assessment Interval [i.e., 0.5 MW/30 PAHs/12 intervals per hour]] to establish the additional MW of Capacity Performance Resources that such FRR Entity must add to its FRR Capacity Plan for the following Delivery Year. The maximum additional MW required by the FRR Entity as a result of non-performance from the FRR Entity's Capacity Performance Resources during a Delivery Year shall not exceed 50% of the MW quantity of the Capacity Performance Resources committed in the FRR Capacity Plan for such Delivery Year and price responsive demand committed for such Delivery Year (effective with the 2022/2023 Delivery Year).

~~The FRR Entity's net Performance Shortfall among Base Capacity Resources, if any, for each Performance Assessment Interval shall by multiplied by a rate of [(0.00139MWs/Performance~~

~~Assessment Interval) times (the Base Capacity Resource clearing prices across all RPM Auctions for the Delivery Year for the LDA encompassing the zone of the FRR Entity, weighted by the quantities cleared in the RPM Auctions divided by the Net CONE established for such LDA for the Delivery Year)] to establish the additional MW of Capacity Performance Resources that such FRR Entity must add to its FRR Capacity Plan for the following Delivery Year. The maximum additional MW required by the FRR Entity as a result of non-performance from the FRR Entity's Base Capacity Resources during a Delivery Year shall not exceed a MW quantity equal to [(0.5 times the MW quantity of the Base Capacity Resources committed in the FRR Capacity Plan for such Delivery Year) times (the Base Capacity Resource clearing prices across all RPM Auctions for the Delivery Year for the LDA encompassing the zone of the FRR Entity, weighted by the quantities cleared in the RPM Auctions divided by the Net CONE established for such LDA for the Delivery Year)]~~[A13]

The additional MW of Capacity Performance Resources required for Performance Assessment Intervals (PAIs) that occur during February through May of the Delivery Year shall be committed to the FRR Entity's FRR Capacity Plan for the remainder of the following Delivery Year by established deadlines below.

- February PAIs: by July 1 of the following Delivery Year
- March PAIs: by August 1 of the following Delivery Year
- April PAIs: by September 1 of the following Delivery Year
- May PAIs: by October 1 of the following Delivery Year