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NPRR Number	322	NPRR Title	Real-Time PTP Option Modeling
Revision Description		This Nodal Protocol Revision Request (NPRR) provides that all Point-to-Point (PTP) Options will be settled in the Day-Ahead Market (DAM), unless DAM fails to execute. If a Non-Opt-In Entity (NOIE) purchases a PTP Obligation in the DAM and owns a PTP Option for the same source and sink pair, and the MWs of the PTP Obligation are not more than the MWs of the PTP Option, then the PTP Obligation will settle in Real-Time as only the positive difference between the sink and source Settlement Point Prices, much like a PTP Option. This NPRR also includes a requirement that NOIEs shape the PTP Options going to Real-Time according to their Load forecast and adds a new type of Congestion Revenue Right (CRR) to handle the treatment of PTP Obligations that are treated as PTP Options for Settlement purposes.	

Proposed Protocol Language Revision

2.1 DEFINITIONS

Congestion Revenue Right (CRR)

A financial instrument that entitles the holder to be charged or to receive compensation (*i.e.*, congestion rent), depending on the instrument, when the ERCOT Transmission Grid is congested in the DAM or in Real-Time.

Flowgate Right (FGR)

A type of CRR that entitles the holder to receive compensation and is evaluated in each CRR Auction and DAM as the positive power flows represented by the quantity of the CRR bid or offer (MW) on a flowgate (*i.e.*, predefined directional network element or a predefined bundle of directional network elements).

Point-to-Point (PTP) Obligation

A type of CRR that entitles the holder to be charged or to receive compensation and is evaluated in each CRR Auction and DAM as the positive and negative power flows on all directional network elements created by the injection and withdrawal at the specified source and sink points of the quantity represented by the CRR bid or offer (MW).

[NPRR322: Insert the following definition “Point-to-Point (PTP) Obligation with Links to an Option” upon system implementation:]

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Point-to-Point (PTP) Obligation with Links to an Option

A type of CRR that entitles a NOIE's PTP Obligation bought in the DAM to be reflective of the NOIE's PTP Option. To qualify as a PTP Obligation of this type, the source and sink pairs on both the Non-Opt-In Entity's (NOIE's) PTP Obligation and the NOIE's PTP Option shall be the same, and the MWs of the NOIE's PTP Obligations shall be less than or equal to the number of MWs of the NOIE's PTP Option. Qualified PTP Obligations with Links to an Option shall be settled as if they were a PTP Option.

Point-to-Point (PTP) Option

A type of CRR that is evaluated in each CRR Auction and DAM as the positive power flows on all directional network elements created by the injection and withdrawal at the specified source and sink points in the quantity represented by the CRR bid or offer (MW), excluding all negative flows on all directional network elements. A PTP Option entitles the holder to receive compensation equal to the positive energy price difference between the sink and the source Settlement Point Prices. A PTP Option with Refund is evaluated in the same manner and compensated as described in Section 7.4.2, PCRR Allocation Terms and Conditions.

3.2.5 Publication of Resource and Load Information

- (1) Two days after the applicable Operating Day, ERCOT shall post on the MIS Public Area for the ERCOT System and, if applicable, for each Disclosure Area, the information derived from the first complete execution of SCED in each 15-minute Settlement Interval. A "Disclosure Area" is a geographical area of the ERCOT Region defined by the TAC and approved by the ERCOT Board. The initial Disclosure Areas as of the Texas Nodal Market Implementation Date are the 2003 ERCOT Congestion Management Zones. Posting requirements will be applicable to Generation Resources physically located in the defined Disclosure Area. The information posted by ERCOT shall include:
 - (a) An aggregate energy supply curve based on non-wind Resources with Energy Offer Curves that are available to be dispatched by SCED. The energy supply curves will be calculated in 10 MW increments, beginning at the sum of the Low Sustained Limits (LSLs) and ending at the sum of the High Sustained Limits (HSLs) for non-wind Resources with Energy Offer Curves, with the dispatch for each Resource constrained between the Resource's LSL and HSL. The result will represent the ERCOT System energy supply curve economic dispatch of the non-wind Resources with Energy Offer Curves at various pricing points, not taking into consideration any physical limitations of the ERCOT System;

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- (b) An aggregate energy supply curve based on Wind-powered Generation Resources (WGRs) with Energy Offer Curves that are available to be dispatched by SCED. The energy supply curves will be calculated in ten MW increments, beginning at the sum of the LSLs and ending at the sum of the HSLs for WGRs with Energy Offer Curves, with the dispatch for each WGR constrained between the WGR's LSL and HSL. The result will represent the ERCOT System energy supply curve economic dispatch of the WGRs with Energy Offer Curves at various pricing points, not taking into consideration any physical limitations of the ERCOT System. The posting of this data by Disclosure Area shall be available no later than 180-days after the Texas Nodal Market Implementation Date;
 - (c) The sum of LSLs, sum of Output Schedules, and sum of HSLs for Generation Resources without Energy Offer Curves. The posting of this data by Disclosure Area shall be available no later than 180 days after the Texas Nodal Market Implementation Date;
 - (d) The sum of the Base Points, High Ancillary Service Limit (HASL) and Low Ancillary Service Limit (LASL) of non-wind Resources with Energy Offer Curves, sum of the Base Points, HASL and LASL of WGRs with Energy Offer Curves, and the sum of the Base Points, HASL and LASL of all remaining Resources dispatched in SCED. The posting of this data by Disclosure Area shall be available no later than 180 days after the Texas Nodal Market Implementation Date; and
 - (e) The sum of the telemetered Generation Resource net output used in SCED. The posting of this data by Disclosure Area shall be available no later than 180 days after the Texas Nodal Market Implementation Date.
- (2) Two days after the applicable Operating Day, ERCOT shall post on the MIS Public Area for the ERCOT System the following information derived from the first complete execution of SCED in each 15-minute Settlement Interval:
- (a) Each telemetered Dynamically Scheduled Resource (DSR) Load, and the telemetered Resource net output(s) associated with each DSR Load; and
 - (b) The actual ERCOT Load as determined by subtracting the Direct Current Tie (DC Tie) Resource actual telemetry from the sum of the telemetered Generation Resource net output as used in SCED.
- (3) Two days after the applicable Operating Day, ERCOT shall post on the MIS Public Area the following information for the ERCOT System and, if applicable, for each Disclosure Area from the DAM for each hourly Settlement Interval:
- (a) An aggregate energy supply curve based on all energy offers that are available to the DAM, not taking into consideration Resource Startup Offer or Minimum-Energy Offer or any physical limitations of the ERCOT System. The energy

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supply curves will be calculated in 10 MW increments. The result will represent the energy supply curve at various pricing points for energy offers available in the DAM;

- (b) Aggregate minimum energy supply curves based on all Minimum-Energy Offers that are available to the DAM. The minimum energy supply curves will be calculated in ten MW increments. The posting of this data by Disclosure Area shall be available no later than 180 days after the Texas Nodal Market Implementation Date;
 - (c) An aggregate energy Demand curve based on the DAM Energy Bid curves available to the DAM, not taking into consideration any physical limitations of the ERCOT System. The energy demand curve will be calculated in ten MW increments;
 - (d) The aggregate amount of cleared energy bids and offers including cleared Minimum-Energy Offer quantities. The posting of this data by Disclosure Area shall be available no later than 180 days after the Texas Nodal Market Implementation Date;
 - (e) The aggregate Ancillary Service Offers (prices and quantities) in the DAM, for each type of Ancillary Service regardless of a Resource's On-Line or Off-Line status. For Responsive Reserve (RRS) service, ERCOT shall separately post aggregated offers from Generation Resources, Controllable Load Resources, and non-Controllable Load Resources. Linked Ancillary Service Offers will be included as non-linked Ancillary Service Offers;
 - (f) The aggregate Self-Arranged Ancillary Service Quantity, for each type of service, by hour;
 - (g) The aggregate amount of cleared Ancillary Service Offers; and
 - (h) The aggregate Point-to-Point (PTP) Obligation bids (not-to-exceed price and quantities) for the ERCOT System and the aggregate PTP Obligation bids that sink in the Disclosure Area for each Disclosure Area. The posting of this data by Disclosure Area shall be available no later than 180 days after the Texas Nodal Market Implementation Date.
- (4) Beginning 61 days after the Texas Nodal Market Implementation Date, ERCOT shall post on the MIS Public Area the following information for each Resource for each 15-minute Settlement Interval 60 days prior to the current Operating Day:
- (a) The Resource name and the Resource's Energy Offer Curve (prices and quantities) used in SCED, including the incremental/decremental Energy Offer Curves for DSRs;

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- (b) The Resource name and the Resource's Output Schedule;
- (c) The DSR Load and associated Resource name and Resource net output;
- (d) The Resource name and actual metered Resource net output;
- (e) The self-arranged Ancillary Service by service for each QSE;
- (f) The following Generation Resource data using a single snapshot during the first SCED execution in each Settlement Interval:
 - (i) The Generation Resource name;
 - (ii) The Generation Resource status;
 - (iii) The Generation Resource HSL, LSL, HASL, LASL, High Dispatch Limit (HDL), and Low Dispatch Limit (LDL);
 - (iv) The Generation Resource Base Point from SCED;
 - (v) The telemetered Generation Resource net output used in SCED;
 - (vi) The Ancillary Service Resource Responsibility for each Ancillary Service; and
 - (vii) The Generation Resource Startup Cost and minimum energy cost used in the Reliability Unit Commitment (RUC); and
- (g) The following Load Resource data using a single snapshot during the first SCED execution in each Settlement Interval:
 - (i) The Load Resource name;
 - (ii) The Load Resource status;
 - (iii) The Maximum Power Consumption (MPC for a Load Resource);
 - (iv) The Low Power Consumption (LPC for a Load Resource);
 - (v) The telemetered real power consumption; and
 - (vi) The Ancillary Service Resource Responsibility for each Ancillary Service.
- (5) Beginning 61 days after the Texas Nodal Market Implementation Date, if any Real-Time Locational Marginal Price (LMP) exceeds 50 times the Fuel Index Price (FIP) during any 15-minute Settlement Interval for the applicable Operating Day, ERCOT shall post on the MIS Public Area the portion of any Resource's Energy Offer Curve that is at or above 50

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times the FIP for each 15-minute Settlement Interval seven days after the applicable Operating Day.

- (6) Beginning 61 days after the Texas Nodal Market Implementation Date, ERCOT shall post on the MIS Public Area the offer price and the name of the Entity submitting the offer for the highest-priced offer selected or Dispatched by SCED two days after the applicable Operating Day. If multiple Entities submitted the highest-priced offers selected, all Entities shall be identified on the MIS Public Area.
- (7) ERCOT shall post on the MIS Public Area for each Operating Day the following information for each Resource:
 - (a) The Resource name;
 - (b) The names of the Entities providing information to ERCOT;
 - (c) The names of the Entities controlling each Resource. ERCOT shall determine whether the Entity is in control of each Resource in accordance with subsection (e) of P.U.C. SUBST. R. 25.502, Pricing Safeguards in Markets Operated by the Electric Reliability Council of Texas; and
 - (d) Flag for Reliability Must-Run (RMR) Resources.
- (8) Beginning 61 days after the Texas Nodal Market Implementation Date, ERCOT shall post on the MIS Public Area the following information from the DAM for each hourly Settlement Interval for the applicable Operating Day 60 days prior to the current Operating Day:
 - (a) The Generation Resource name and the Generation Resource's Three-Part Supply Offer (prices and quantities), including Startup Offer and Minimum-Energy Offer, available for the DAM;
 - (b) For each Settlement Point, individual DAM Energy-Only Offer Curves available for the DAM and the name of the QSE submitting the offer;
 - (c) The Resource name and the Resource's Ancillary Service Offers available for the DAM;
 - (d) For each Settlement Point, individual DAM Energy Bids available for the DAM and the name of the QSE submitting the bid;
 - (e) For each Settlement Point, individual Congestion Revenue Right (CRR) offers available to the DAM that sink at the Settlement Point and the QSE submitting the offer;
 - (f) For each Settlement Point, individual PTP Obligation bids available to the DAM that sink at the Settlement Point and the QSE submitting the bid;

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- (g) The awards for each Ancillary Service from DAM for each Generation Resource;
- (h) The awards for each Ancillary Service from DAM for each Load Resource;
- (i) The award of each Three-Part Supply Offer from the DAM and the name of the QSE receiving the award;
- (j) For each Settlement Point, the award of each DAM Energy-Only Offer from the DAM and the name of the QSE receiving the award;
- (k) For each Settlement Point, the award of each DAM Energy Bid from the DAM and the name of the QSE receiving the award;
- (l) For each Settlement Point, the award of each CRR offer from the DAM that sinks at the Settlement Point and the QSE submitting the offer; and
- (m) For each Settlement Point, the award of each PTP Obligation bid from the DAM that sinks at the Settlement Point and the QSE submitting the bid.

[NPRR322: Replace paragraph (8) above with the following upon system implementation:]

- (8) Beginning 61 days after the Texas Nodal Market Implementation Date, ERCOT shall post on the MIS Public Area the following information from the DAM for each hourly Settlement Interval for the applicable Operating Day 60 days prior to the current Operating Day:
 - (a) The Generation Resource name and the Generation Resource's Three-Part Supply Offer (prices and quantities), including Startup Offer and Minimum-Energy Offer, available for the DAM;
 - (b) For each Settlement Point, individual DAM Energy-Only Offer Curves available for the DAM and the name of the QSE submitting the offer;
 - (c) The Resource name and the Resource's Ancillary Service Offers available for the DAM;
 - (d) For each Settlement Point, individual DAM Energy Bids available for the DAM and the name of the QSE submitting the bid;
 - ~~(e) For each Settlement Point, individual Congestion Revenue Right (CRR) offers available to the DAM that sink at the Settlement Point and the QSE submitting the offer;~~
 - ~~(f) For each Settlement Point, individual PTP Obligation bids available to the DAM that sink at the Settlement Point and the QSE submitting the bid;~~
 - ~~(g) The awards for each Ancillary Service from DAM for each Generation~~

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Resource;

- (hg) The awards for each Ancillary Service from DAM for each Load Resource;
- (hh) The award of each Three-Part Supply Offer from the DAM and the name of the QSE receiving the award;
- (ji) For each Settlement Point, the award of each DAM Energy-Only Offer from the DAM and the name of the QSE receiving the award;
- (kj) For each Settlement Point, the award of each DAM Energy Bid from the DAM and the name of the QSE receiving the award;
- ~~(l) For each Settlement Point, the award of each CRR offer from the DAM that sinks at the Settlement Point and the QSE submitting the offer; and~~
- ~~(mk) For each Settlement Point, the award of each PTP Obligation bid from the DAM that sinks at the Settlement Point and the QSE submitting the bid. For each Settlement Point, the award of each PTP Obligation bid from the DAM that sinks at the Settlement Point, including whether or not the PTP Obligation bid was Linked to an Option, and the QSE submitting the bid.~~

4.3 QSE Activities and Responsibilities in the Day-Ahead

- (1) During the Day-Ahead, a Qualified Scheduling Entity (QSE):
 - (a) Must submit its Current Operating Plan (COP) and update its COP as required in Section 3.9, Current Operating Plan (COP); and
 - (b) May submit Three-Part Supply Offers, Day-Ahead Market (DAM) Energy-Only Offers, DAM Energy Bids, Energy Trades, Self-Schedules, Capacity Trades, Direct Current (DC) Tie Schedules, Ancillary Service Offers, Ancillary Service Trades, Self-Arranged Ancillary Service Quantities, Point-to-Point (PTP) Obligation bids, and Congestion Revenue Right (CRR) offers as specified in this Section.

[NPRR322: Replace paragraph (1)(b) above with the following upon system implementation:]

- (b) May submit Three-Part Supply Offers, Day-Ahead Market (DAM) Energy-Only Offers, DAM Energy Bids, Energy Trades, Self-Schedules, Capacity Trades, Direct Current (DC) Tie Schedules, Ancillary Service Offers, Ancillary Service Trades, Self-Arranged Ancillary Service Quantities, ~~and~~ Point-to-Point (PTP) Obligation bids, ~~and Congestion Revenue Right (CRR) offers~~ as specified in this

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- (2) By 0600 in the Day-Ahead, each QSE representing Reliability Must-Run (RMR) Units, or Black Start Resources shall submit information to ERCOT indicating availability of RMR Units, and Black Start Resources for the Operating Day, and any other information that ERCOT may need to evaluate use of the units as set forth in the applicable Agreements and this Section.

4.4.5 CRR Offers

- (1) A Congestion Revenue Right (CRR) offer is the information for an offer by a CRR Account Holder to sell CRRs that it owns in the Day-Ahead Market (DAM).
- (2) All CRRs held by CRR Account Holders are settled based on applicable DAM Settlement prices, except for Point-to-Point (PTP) Options and PTP Options with Refund that have been declared by a Non-Opt-In Entity (NOIE) before DAM execution to be settled in Real-Time and are still held by that NOIE in Real-Time.
- (3) PTP Options and PTP Options with Refund that are declared by NOIEs for Real-Time Settlement may specify an offer price (Minimum Reservation Price) in the DAM. If no Minimum Reservation Price is specified, ERCOT shall assign a default value of \$2,000 per MW per hour, as an offer in the DAM. If such an offer clears in the DAM, it is settled as part of the DAM and is not carried to Real-Time.

[NPRR339: Insert paragraph (4) below and renumber accordingly upon system implementation:]

- (4) If either the source or the sink Settlement Point identified in the CRR offer is de-energized in the base case for a given hour in the DAM, then the PTP Option or PTP Option with Refund declared in the CRR offer is settled in the DAM and is not carried to Real-Time.

(4) PTP Options that a NOIE has designated for Real-Time Settlement in the DAM shall be used for delivery of energy to a NOIE Load or a valid combination of Settlement Points that physically or contractually mitigates risk in supplying the NOIE Load.

[NPRR322: Replace Section 4.4.5 above with the following upon system implementation:]

4.4.5 [RESERVED]

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4.4.5.1 CRR Offer Criteria

- (1) A CRR offer must include the following:
 - (a) The name of the CRR Account Holder that owns the CRRs being offered;
 - (b) The unique identifier for each CRR being offered, which includes the single type of CRR being offered;
 - (c) The source Settlement Point and the sink Settlement Point for the CRR or block of CRRs being offered;
 - (d) The first hour and the last hour for which the CRR or block of CRRs is being offered;
 - (e) The quantity of CRRs in MW for which the Minimum Reservation Price is effective;
 - (f) A dollars per MW per hour for the Minimum Reservation Price; and
 - (g) For PTP Options that an NOIE has designated for Real-Time Settlement, the NOIE peak Load forecast for the Operating Day.
- (2) The CRR Account Holder for whom the CRR offer is being submitted must be shown as the owner in the ERCOT CRR registration system of the CRRs being offered.
- (3) If the CRR offer is for more than one CRR (which is 1 MW for one hour), the CRR offer must have the following characteristics:
 - (a) All CRRs must be of the same type;
 - (b) All CRRs must have the same source and sink Settlement Points, and
 - (c) A block CRR offer must have the same number of CRRs offered in each hour; and
 - (d) A block CRR offer must have contiguous hours for the CRRs offered.
- (4) For each NOIE that designated PTP Options or PTP Options with Refund for Real-Time Settlement, the designation of such CRRs to be settled in Real-Time may not exceed the lesser of:
 - (a) 110% of that NOIE's peak Load forecast; or
 - (b) 125% of the NOIE's hourly Load forecast.

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[NPRR322: Replace Section 4.4.5.1 above with the following upon system implementation:]

4.4.5.1 [RESERVED]

4.4.5.2 CRR Offer Validation

- (1) A validated CRR offer is a CRR offer that ERCOT has determined meets the criteria listed in Section 4.4.5.1, CRR Offer Criteria.
- (2) ERCOT shall continuously display on the MIS Certified Area information that allows any QSE submitting a CRR offer to view its valid CRR offers.
- (3) As soon as practicable, ERCOT shall notify each CRR Account Holder through the Messaging System of any of its CRR offers that are invalid. The CRR Account Holder may correct and resubmit any invalid CRR offer within the appropriate market timeline.

Comment [JML1]: Requesting that effective date for deletion of paragraph (1) be “Upon ERCOT Board approval.”

[NPRR322: Replace Section 4.4.5.2 above with the following upon system implementation:]

4.4.5.2 [RESERVED]

4.4.6 PTP Obligation Bids

- (1) A PTP Obligation bid is a bid that specifies the source and sink, a range of hours, and a maximum price that the bidder is willing to pay (“Not-to-Exceed Price”).
- (2) PTP Obligations that are bought in the DAM must be settled based on the applicable Real-Time Settlement Point Prices.

[NPRR322: Insert paragraph (3) below upon system implementation:]

- (3) A PTP Obligation with Links to an Option is held to be reflective of the NOIE’s PTP Option if the source and sink pairs on both the NOIE’s PTP Obligation and the NOIE’s PTP Option are the same, and the MWs of the NOIE’s PTP Obligations are less than or equal to the number of MWs of the NOIE’s PTP Option. There shall be no payment for PTP Obligations with Links to an Option acquired in the DAM.

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4.4.6.1 PTP Obligation Bid Criteria

- (1) A PTP Obligation bid must be submitted by a QSE and must include the following:
 - (a) The name of the QSE submitting the PTP Obligation bid;
 - (b) The source Settlement Point and the sink Settlement Point for the PTP Obligation or block of PTP Obligations being bid;
 - (c) The first hour and the last hour for which the PTP Obligation or block of PTP Obligations is being bid;
 - (d) The quantity of PTP Obligations in MW for which the Not-to-Exceed Price is effective; and
 - (e) A dollars per MW per hour for the Not-to-Exceed Price.
- (2) If the PTP Obligation bid is for more than one PTP Obligation (which is one MW for one hour), the block bid must:
 - (a) Include the same number of PTP Obligations in each hour of the block;
 - (b) Be for PTP Obligations that have the same source and sink Settlement Points; and
 - (c) Be for contiguous hours.
- (3) A PTP Obligation bid shall not contain a source Settlement Point and a sink Settlement Point that are Electrically Similar Settlement Points.
- (4) PTP Obligation bids shall not be submitted in combination with PTP Obligation bids or with DAM-Energy Only Offer Curves and DAM Energy bids to create the net effect of a single PTP Obligation bid containing a source Settlement Point and a sink Settlement Point that are Electrically Similar Settlement Points for the QSE or for any combination of QSEs within the same Counter-Party.

[NPRR322: Insert paragraphs (5) through (8) below, as applicable, upon system implementation:]

(5) For each NOIE or QSE representing NOIEs that designated PTP Obligations with Links to an Option, the designation of such CRRs to be settled in Real-Time may not exceed the lesser of:

(a) 110% of that NOIE's peak Load forecast; or

(b) 125% of the NOIE's hourly Load forecast.

(6) PTP Obligations with Links to an Option shall be used for delivery of energy to a NOIE

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Load or a valid combination of Settlement Points that physically or contractually mitigates risk in supplying the NOIE Load. This applies to each NOIE or QSE representing NOIEs.

(7) In addition to the criteria above for other PTP Obligations, PTP Obligations with Links to an Option must further include the following:

(a) The name of the CRR Account Holder that owns the CRRs being offered;

(b) The unique identifier for each CRR being offered;

(8) For PTP Obligations with Links to an Option, the CRR Account Holder for whom the PTP Obligations with Links to an Option are being submitted must be shown in the ERCOT CRR registration system as the owner of the CRRs being linked to the PTP Obligation.

4.4.6.2 PTP Obligation Bid Validation

- (1) A validated PTP Obligation bid is a bid that ERCOT has determined meets the criteria listed in Section 4.4.6.1, PTP Obligation Bid Criteria, with the exception of paragraphs (3) and (4). The ERCOT Operator will remove bids that do not meet the criteria in paragraph (3) of Section 4.4.6.1 to avoid DAM awards for those bids.

[NPRR322 and NPRR343: Replace applicable portions of paragraph (1) above with the following upon system implementation:

- (1) A validated PTP Obligation bid is a bid that ERCOT has determined meets the criteria listed in Section 4.4.6.1, PTP Obligation Bid Criteria, with the exception of paragraphs (3), ~~and (4)~~, (5) and (6). Bids that do not meet the criteria in paragraph (3) of Section 4.4.6.1 will not be awarded in the DAM.

- (2) ERCOT shall continuously display on the MIS Certified Area information that allows any QSE submitting a PTP Obligation bid to view its valid PTP Obligation bid.
- (3) As soon as practicable, ERCOT shall notify each QSE through the Messaging System of any of its PTP Obligation bids that are invalid. The QSE may correct and resubmit any invalid PTP Obligation bid within the appropriate market timeline.

4.4.10 Credit Requirement for DAM Bids and Offers

- (1) Each QSE's ability to bid and offer in the DAM is subject to credit exposure from the QSE's bids and offers being within the credit limit for DAM participation established for the entire Counter-Party of which the QSE is part, as specified in item (1) of Section

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16.11.4.6.2, Credit Requirements for DAM Participation, and taking into account the credit exposure of accepted DAM bid and offers of the Counter-Party's other QSEs.

- (2) DAM bids and offers of all QSEs of the Counter-Party are accepted in the order submitted while ensuring that the credit exposure from accepted bids and offers do not exceed the Counter-Party's credit limit for DAM participation.
- (3) ERCOT shall reject the QSE's individual bids and offers whose credit exposure, as calculated in item (6) below, exceeds the Counter-Party's credit limit for DAM participation as described in items (1) and (2) above, and shall notify the QSE through the MIS Certified Area as soon as practicable.
- (4) The QSE may revise and resubmit such rejected bids and offers described in item (3) above, provided that the resubmitted bids and offers are valid and within the Counter-Party's credit limit for DAM participation adjusted for all accepted DAM bids and offers of the Counter-Party's QSE's limit and that such resubmission occurs prior to 1000 of the Operating Day.
- (5) The DAM shall use the Counter-Party's credit limit for DAM participation provided and adjusted for accepted bids and offers for DAM transactions cleared, until a new credit limit for DAM participation is available.
- (6) ERCOT shall calculate credit exposure for bids and offers in the DAM as follows:
 - (a) For each DAM Energy Bid, the credit exposure shall be calculated as the quantity of the bid multiplied by a bid exposure price that is calculated as follows:
 - (i) For each MW portion of the DAM Energy Bid where the price is less than or equal to zero, the bid exposure price for that MW portion will equal zero.
 - (ii) For each MW portion of the DAM Energy Bid where the price is greater than zero, the bid exposure price for that MW portion will equal the greater of zero or the sum of (A) and (B):
 - (A) The lesser of:
 - (1) The "d"th percentile of the Day-Ahead Settlement Point Price for the hour over the previous 30 days; and
 - (2) The bid price.
 - (B) "e1" times (bid price minus (A)) when the bid price is greater than (A).
 - (b) For each MW portion of a DAM Energy Only Offer:

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- (i) That has an offer price that is less than or equal to the “a”th percentile of the Day-Ahead Settlement Point Price for the hour over the previous 30 days, the sum of (A) and (B) shall apply.
 - (A) Credit exposure will be:
 - (1) Reduced (when the “b”th percentile Settlement Point Price for the hour is positive). The reduction shall be the quantity of the offer multiplied by the “b”th percentile of the Day-Ahead Settlement Point Price for the hour over the previous 30 days times “e2”; or
 - (2) Increased (when the “b”th percentile Settlement Point Price for the hour is negative). The increase shall be the quantity of the offer multiplied by the “b”th percentile of the Day-Ahead Settlement Point Price for the hour over the previous 30 days.
 - (B) Credit exposure will be increased by the product of the quantity of the offer times the 90th percentile of any positive hourly difference of Real-Time Settlement Point Price and Day-Ahead Settlement Point Price over the previous 30 days for the hour times “e3.”
 - (ii) That has an offer price that is greater than the “a”th percentile of the Day-Ahead Settlement Point Price for the hour over the previous 30 days, credit exposure will be increased by the product of the quantity of the offer times the 90th percentile of any positive hourly difference of Real-Time Settlement Point Price and Day-Ahead Settlement Point Price over the previous 30 days for the hour times “e3.”
- (c) For each MW portion of the Energy Offer Curve of a Three-Part Supply Offer:
- (i) That has an offer price that is less than or equal to the “y”th percentile of the Day-Ahead Settlement Point Price for the hour over the previous 30 days, credit exposure will be reduced (when the “z”th percentile Settlement Point Price is positive) or increased (when the “z”th percentile Settlement Point Price is negative) by the quantity of the offer multiplied by the “z”th percentile of the Day-Ahead Settlement Point Price for the hour over the previous 30 days.
 - (ii) That has an offer price that is greater than the “y”th percentile of the Day-Ahead Settlement Point Price for the hour over the previous 30 days, the credit exposure will be zero.
- (d) For PTP Obligation Bids, the sum of the quantity of bid multiplied by the bid price, if positive, plus the “u”th percentile of the hourly positive price difference

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between the source Real-Time Settlement Point Price minus the sink Real-Time Settlement Point Price over the previous 30 days.

- (e) For Ancillary Services not self-arranged, the product of the quantity of Ancillary Service not self-arranged times the “pth” percentile of the hourly Market Clearing Price for Capacity (MCPC) for that Ancillary Service over the previous 30 days for that hour.
- (f) Variables “e1,” “e2,” or “e3,” which are applicable to items (a) through (c) above, under conditions described below, will be determined and applied at ERCOT’s sole discretion. Within the application parameters identified below, ERCOT shall establish values for “e1,” “e2,” and “e3” and provide notice to an affected Counter-Party of any changes to “e1,” “e2,” or “e3” before 0900 generally two Bank Business Days prior to the normally scheduled DAM 1000 by a minimum of two of these methods: written, electronic, or telephonic. However, ERCOT may adjust any “e” factor immediately if, in its sole discretion, ERCOT determines that the “e” factor(s) set for a Counter-Party do not adequately match the financial risk created by that Counter-Party’s activities in the market. ERCOT shall review the values for “e1,” “e2,” or “e3” for each Counter-Party no less than once every two weeks. ERCOT shall provide written or electronic notice to the Counter-Party of the basis for ERCOT’s assessment, or change of assessment, of the exposure adjustment variable established for the Counter-Party and the impact of the adjustment.
 - (i) The value of each exposure adjustment “e1,” “e2,” and “e3” is a value between zero and one, rounded to the nearest hundredth decimal place, set by ERCOT by Counter-Party. The values ERCOT establishes for “e1,” “e2,” and “e3” for a Counter-Party shall be applied equally to the portfolio of all QSEs represented by such Counter-Party.
 - (ii) A TAC-recommended and ERCOT Board-approved procedure (“Procedures for Setting Nodal Day-Ahead Market Credit Requirement Parameters”), which will be reviewed at least annually and posted on the MIS Public Area, will be used to define and modify the values of “e1,” “e2,” and “e3.”
- (7) The variables to define the pre-DAM credit validation process referenced in item (6) above (including the standard setting for the “e1,” “e2,” and “e3,” if any) shall be posted on the MIS Public Area. TAC shall review these variables at least annually and may recommend to the ERCOT Board, changes to these values. If changes to these values are approved by the ERCOT Board, such revised values shall be posted on the MIS Public Area within three Business Days of ERCOT Board approval.
- (8) Upon the Texas Nodal Market Implementation Date, ERCOT will use the variables listed below for inputs in item (6) above. Furthermore, upon ERCOT obtaining Real-Time

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and/or Day-Ahead Settlement Point Prices, the data associated with the earliest remaining pre-nodal market date reference will be replaced.

- (a) ERCOT will load the previous 30 days of zonal Market Clearing Price for Energy (MCPE) in order to determine DAM Settlement Point Prices.
 - (i) ERCOT will calculate the hourly average of all 15-minute interval zonal MCPE prices when determining DAM Settlement Point Prices.
 - (ii) ERCOT will map nodal Settlement Points (Resource Nodes, Load Zones, NOIE Load Zones, DC Tie zones) to zonal congestion zones and nodal Hubs to zonal Hubs based on the proximity of the node within zonal boundaries defined elsewhere in the Protocols.
- (b) ERCOT will load 10% of the simple average of the Real-Time Settlement Point Price obtained within the first seven days of the nodal market's inception as a proxy for the hourly difference of Real-Time Settlement Point price and Day-Ahead Settlement Point Price or ERCOT will load 10% of the simple average of the zonal Load Zone hourly MCPE for 30 days prior to the Texas Nodal Market Implementation Date as a proxy for the hourly difference of Real-Time Settlement Point Price and Day-Ahead Settlement Point Price.

[NPRR323, NPRR322 & NPRR316: Replace or insert applicable paragraphs of Section 4.4.10 above with the following upon system implementation:]

4.4.10 Credit Requirement for DAM Bids and Offers

- (1) Each QSE's ability to bid and offer in the DAM is subject to credit exposure from the QSE's bids and offers being within the credit limit for DAM participation established for the entire Counter-Party of which the QSE is part, as specified in item (1) of Section 16.11.4.6.2, Credit Requirements for DAM Participation, and taking into account the credit exposure of accepted DAM bid and offers of the Counter-Party's other QSEs.
- (2) DAM bids and offers of all QSEs of the Counter-Party are accepted in the order submitted while ensuring that the credit exposure from accepted bids and offers do not exceed the Counter-Party's credit limit for DAM participation.
- (3) ERCOT shall reject the QSE's individual bids and offers whose credit exposure, as calculated in item (6) below, exceeds the Counter-Party's credit limit for DAM participation as described in items (1) and (2) above, and shall notify the QSE through the MIS Certified Area as soon as practicable.
- (4) The QSE may revise and resubmit such rejected bids and offers described in item (3) above, provided that the resubmitted bids and offers are valid and within the Counter-Party's credit limit for DAM participation adjusted for all accepted DAM bids and offers

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of the Counter-Party's QSE's limit and that such resubmission occurs prior to 1000 of the Operating Day.

- (5) The DAM shall use the Counter-Party's credit limit for DAM participation provided and adjusted for accepted bids and offers for DAM transactions cleared, until a new credit limit for DAM participation is available.
- (6) ERCOT shall calculate credit exposure for bids and offers in the DAM as follows:
 - (a) For a DAM Energy Bid, the credit exposure shall be calculated as the quantity of the bid multiplied by a bid exposure price that is calculated as follows:
 - (i) If the price of the DAM Energy Bid is less than or equal to zero, the bid exposure price for that quantity will equal zero.
 - (ii) If the price of the DAM Energy Bid is greater than zero, the bid exposure price for that quantity will equal the greater of zero or the sum of (A) and (B):
 - (A) The lesser of:
 - (1) The "d"th percentile of the Day-Ahead Settlement Point Price for the hour over the previous 30 days; and
 - (2) The bid price.
 - (B) "e1" multiplied by (bid price minus (A)) when the bid price is greater than (A).
 - (iii) For DAM Energy Bids of curve quantity type, the credit exposure shall be the credit exposure, as calculated above, at the price and MW quantity of the bid curve that produces the maximum credit exposure for the DAM Energy Bid. A QSE is expected to submit any DAM Energy Bids of curve quantity type in such a way as to not negatively impact market timeline and system performance of the DAM. If an Entity negatively impacts ERCOT system performance or market timelines through its submission behavior more than once in a six month period, ERCOT may, in its sole discretion, make a QSE ineligible to receive the credit exposure calculated in this paragraph for submissions after 0700 and may use the calculations in paragraphs (6)(a)(i) and (6)(a)(ii) above instead until ERCOT is assured, in its sole discretion, that the QSE will adjust its submission behavior accordingly. The QSE will be notified one Operating Day prior to ERCOT changing the QSE eligibility.
 - (b) For each MW portion of a DAM Energy-Only Offer:

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- (i) That has an offer price that is less than or equal to the “a”th percentile of the Day-Ahead Settlement Point Price for the hour over the previous 30 days, the sum of (A) and (B) shall apply.
 - (A) Credit exposure will be:
 - (1) Reduced (when the “b”th percentile Settlement Point Price for the hour is positive). The reduction shall be the quantity of the offer multiplied by the “b”th percentile of the Day-Ahead Settlement Point Price for the hour over the previous 30 days multiplied by “e2”; or
 - (2) Increased (when the “b”th percentile Settlement Point Price for the hour is negative). The increase shall be the quantity of the offer multiplied by the “b”th percentile of the Day-Ahead Settlement Point Price for the hour over the previous 30 days.
 - (B) Credit exposure will be increased by the product of the quantity of the offer multiplied by the 90th percentile of any positive hourly difference of Real-Time Settlement Point Price and Day-Ahead Settlement Point Price over the previous 30 days for the hour multiplied by “e3.”
 - (ii) That has an offer price that is greater than the “a”th percentile of the Day-Ahead Settlement Point Price for the hour over the previous 30 days, credit exposure will be increased by the product of the quantity of the offer multiplied by the 90th percentile of any positive hourly difference of Real-Time Settlement Point Price and Day-Ahead Settlement Point Price over the previous 30 days for the hour multiplied by “e3.”
 - (iii) ERCOT may, in its sole discretion, use a percentile other than the 90th percentile of any positive hourly difference of Real-Time Settlement Point Price and Day-Ahead Settlement Point Price over the previous 30 days of the hour in determining credit exposure per this paragraph (6)(b) in evaluating DAM Energy-Only Offers.
- (c) For each MW portion of the Energy Offer Curve of a Three-Part Supply Offer:
- (i) That has an offer price that is less than or equal to the “y”th percentile of the Day-Ahead Settlement Point Price for the hour over the previous 30 days, credit exposure will be reduced (when the “z”th percentile Settlement Point Price is positive) or increased (when the “z”th percentile Settlement Point Price is negative) by the quantity of the offer multiplied by the “z”th percentile of the Day-Ahead Settlement Point Price for the hour over the

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previous 30 days.

- (ii) That has an offer price that is greater than the “y”th percentile of the Day-Ahead Settlement Point Price for the hour over the previous 30 days, the credit exposure will be zero.
 - (iii) For a Combined Cycle Generation Resource with Three-Part Supply Offers for multiple generator configurations, the reduction in credit exposure will be the maximum credit exposure reduction created by the individual Three-Part Supply Offers’ Offer Curves (when the “z”th percentile Settlement Point Price is positive). If the Three-Part Supply Offer causes a credit increase (when the “z”th percentile Settlement Point Price is negative), the increase in credit exposure will be the maximum credit exposure increase created by the individual Three-Part Supply Offers.
- (d) For PTP Obligation Bids:
- (i) That have a bid price greater than zero, the sum of the quantity of the bid multiplied by the bid price, plus the “u”th percentile of the hourly positive price difference between the source Real-Time Settlement Point Price minus the sink Real-Time Settlement Point Price over the previous 30 days multiplied by the quantity of the bid.
 - (ii) That have a bid price less than or equal to zero, the “u”th percentile of the hourly positive price difference between the source Real-Time Settlement Point Price minus the sink Real-Time Settlement Point Price over the previous 30 days multiplied by the quantity of the bid.
 - (iii) Each tenth of a MW quantity (0.1 MW) of an expiring CRR for a Counter-Party can provide credit reduction for only one-tenth of a MW (0.1 MW) of a PTP Obligation bid for that Counter-Party.
 - (A) The QSE must submit the PTP Obligation bid at the same source and sink pair for the same hour, for the same operating date where the QSE submitting the PTP Obligation bid is represented by the same Counter-Party as the CRR Account Holder that is the owner of record for an expiring CRR, or group of CRRs. To reduce both market timeline and system performance impact, the QSE is expected to submit these PTP Obligation bids by 0630 of the Day-Ahead. If an Entity negatively impacts ERCOT system performance or market timelines through its submission behavior more than once in a six month period, ERCOT may, in its sole discretion disclose the names of entities negatively impacting performance and/or make a QSE ineligible to receive CRR credit

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exposure offsetting for submissions after 0700 until ERCOT is assured, in its sole discretion, that a QSE will adjust its submission behavior accordingly. The QSE will be notified one Operating Day prior to ERCOT changing the QSE eligibility.

- (B) A portion or all of the PTP Obligation bid quantity must be less than or equal to the total of the quantity of all expiring CRRs at the specified source and sink pair and delivery period, less all valid previously submitted PTP Obligation bids at the specified source and sink pair and delivery period.
- (iv) For qualified PTP Obligation bids, ERCOT shall reduce the credit exposure in paragraph (6)(d)(i) above, by the product of the bid price, if positive, and the quantity of the bid less than or equal to the quantity of the total of all expiring CRRs at the specified source and sink pair and delivery period, less all valid previously submitted PTP Obligation bids at the specified source and sink pair and delivery period multiplied by a factor initially set at 80% and to be reviewed by TAC and approved by the ERCOT Board at least annually. The factor can be adjusted up or down at ERCOT's sole discretion with at least two Bank Business Day's notice. ERCOT may adjust this factor up with less notice, if needed. The expiring CRR may be PTP Options and/or PTP Obligations. If a QSE later cancels the PTP Obligation bid then the amount of exposure credited back to the Counter-Party will be treated as though this PTP Obligation bid was previously offset by expiring CRRs if a matching CRR source and sink pair exists up to the maximum expiring CRR quantity. If a QSE updates the PTP Obligation bid then it will be treated as a cancel followed by a new submission for purposes of credit exposure calculation. Outcome of this calculation is dependent of the sequence of submittals for updates and cancels.

(e) For PTP Obligation bids with Links to an Option:

- (i) That have a bid price greater than zero, the sum of the quantity of the bid multiplied by the bid price, multiplied by one minus the reduction factor in paragraph (6)(d)(iv) above.
 - (ii) That have a bid price less than or equal to zero, zero.
- (ef) For Ancillary Service Obligations not self-arranged, the product of the quantity of Ancillary Service Obligation not self-arranged multiplied by the “t”th percentile of the hourly Market Clearing Price for Capacity (MCPC) for that Ancillary Service over the previous 30 days for that hour. For negative Self-Arranged Ancillary Service Quantities, the absolute value of the product of the quantity of the negative Self-Arranged Ancillary Service Quantity times the “t”th percentile of

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the hourly MCPC for that Ancillary Service over the previous 30 days for that hour.

- (fg) Variables “e1,” “e2,” or “e3,” which are applicable to items (a) through (c) above, under conditions described below, will be determined and applied at ERCOT’s sole discretion. Within the application parameters identified below, ERCOT shall establish values for “e1,” “e2,” and “e3” and provide notice to an affected Counter-Party of any changes to “e1,” “e2,” or “e3” before 0900 generally two Bank Business Days prior to the normally scheduled DAM 1000 by a minimum of two of these methods: written, electronic, or telephonic. However, ERCOT may adjust any “e” factor immediately if, in its sole discretion, ERCOT determines that the “e” factor(s) set for a Counter-Party do not adequately match the financial risk created by that Counter-Party’s activities in the market. ERCOT shall review the values for “e1,” “e2,” or “e3” for each Counter-Party no less than once every two weeks. ERCOT shall provide written or electronic notice to the Counter-Party of the basis for ERCOT’s assessment, or change of assessment, of the exposure adjustment variable established for the Counter-Party and the impact of the adjustment.
- (i) The value of each exposure adjustment “e1,” “e2,” and “e3” is a value between zero and one, rounded to the nearest hundredth decimal place, set by ERCOT by Counter-Party. The values ERCOT establishes for “e1,” “e2,” and “e3” for a Counter-Party shall be applied equally to the portfolio of all QSEs represented by such Counter-Party.
 - (ii) A TAC-recommended and ERCOT Board-approved procedure (“Procedures for Setting Nodal Day-Ahead Market Credit Requirement Parameters”), which will be reviewed at least annually and posted on the MIS Public Area, will be used to define and modify the values of “e1,” “e2,” and “e3.”
- (7) The variables to define the pre-DAM credit validation process referenced in item (6) above (including the standard setting for the “e1,” “e2,” and “e3,” if any) shall be posted on the MIS Public Area. TAC shall review these variables at least annually and may recommend to the ERCOT Board, changes to these values. If changes to these values are approved by the ERCOT Board, such revised values shall be posted on the MIS Public Area within three Business Days of ERCOT Board approval.

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4.5 DAM Execution and Results

4.5.1 DAM Clearing Process

- (1) At 1000 in the Day-Ahead, ERCOT shall start the Day-Ahead Market (DAM) clearing process.
- (2) Prior to execution of the DAM, ERCOT shall complete a Day-Ahead Simultaneous Feasibility Test. This test uses the Day-Ahead Updated Network Model topology and evaluates all Congestion Revenue Rights (CRRs) for feasibility to determine hourly oversold quantities.
- (3) The purpose of the DAM is to economically and simultaneously clear offers and bids described in Section 4.4, Inputs into DAM and Other Trades.
- (4) The DAM uses a multi-hour mixed integer programming algorithm to maximize bid-based revenues minus the offer-based costs over the Operating Day, subject to security and other constraints, and ERCOT Ancillary Service procurement requirements.
 - (a) The bid-based revenues include revenues from DAM Energy Bids and Point-to-Point (PTP) Obligation Bids.
 - (b) The offer-based costs include costs from the Startup Offer, Minimum Energy Offer, and Energy Offer Curve of any Resource that submitted a Three-Part Supply Offer, DAM Energy-Only Offers, CRR Offers, and Ancillary Service Offers.

[NPRR322: Replace paragraph (4)(b) above with the following upon system implementation:]

- (b) The offer-based costs include costs from the Startup Offer, Minimum Energy Offer, and Energy Offer Curve of any Resource that submitted a Three-Part Supply Offer, DAM Energy-Only Offers and Ancillary Service Offers.

- (c) Security constraints specified to prevent DAM solutions that would overload the elements of the ERCOT Transmission Grid include the following:
 - (i) Transmission constraints – transfer limits on energy flows through the ERCOT Transmission Grid, e.g., thermal or stability limits. These limits must be satisfied by the intact network and for certain specified contingencies.

These constraints may represent:

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- (A) Thermal constraints – protect Transmission Facilities against thermal overload.
- (B) Generic constraints – protect the ERCOT Transmission Grid against transient instability, dynamic stability or voltage collapse.
- (C) Power flow constraints – the energy balance at required Electrical Buses in the ERCOT Transmission Grid must be maintained.
- (ii) Resource constraints – the physical and security limits on Resources that submit Three-Part Supply Offers:
 - (A) Resource output constraints – the Low Sustained Limit (LSL) and High Sustained Limit (HSL) of each Resource; and
 - (B) Resource operational constraints – includes minimum run time, minimum down time, and configuration constraints.
- (iii) Other constraints –
 - (A) Linked offers – the DAM may not select any one part of that Resource capacity to provide more than one Ancillary Service or to provide both energy and an Ancillary Service in the same Operating Hour. The DAM may, however, select part of that Resource capacity to provide one Ancillary Service and another part of that capacity to provide a different Ancillary Service or energy in the same Operating Hour, provided that a Generation Resource may not offer, and the DAM may not select, linked Energy and Off-Line Non-Spinning Reserve (Non-Spin) Ancillary Service offers in the same Operating Hour.
 - (B) The sum of the awarded Ancillary Service capacities for each Resource must be within the Resource limits specified in the Current Operating Plan (COP) and Section 3.18, Resource Limits in Providing Ancillary Service, and the Resource parameters as described in Section 3.7, Resource Parameters.
 - (C) Block Ancillary Service Offers for a Load Resource – blocks will not be cleared unless the entire quantity block can be awarded.
 - (D) Block CRR Offers and PTP Obligation Bids – blocks will not be cleared unless the entire time block can be awarded.

[NPRR322: Replace paragraph (4)(c)(iii)(D) above with the following upon system implementation:]

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(D) Block PTP Obligation Bids – blocks will not be cleared unless the entire time block can be awarded.

- (E) Combined Cycle Generation Resources – The DAM may commit a Combined Cycle Generation Resource in a time period that includes the last hour of the Operating Day only if that Combined Cycle Generation Resource can transition to a shutdown condition in the DAM Operating Day.
- (d) Ancillary Service needs for each Ancillary Service include the needs specified in the Ancillary Service Plan that are not part of the Self-Arranged Ancillary Service Quantity and that must be met from available DAM Ancillary Service Offers while co-optimizing with DAM Energy Offers. ERCOT may not buy more of one Ancillary Service in place of the quantity of a different service. See Section 4.5.2, Ancillary Service Insufficiency, for what happens if insufficient Ancillary Service Offers are received in the DAM.
- (5) ERCOT shall determine the appropriate Load distributions to allocate offers, bids, and source and sink of CRRs at a Load Zone across the Electrical Buses that are modeled with Load in that Load Zone. The default distribution is the State Estimator hourly distribution for the seven days before the Operating Day. If ERCOT decides, in its sole discretion, to change this distribution for reasons such as anticipated weather events or holidays, ERCOT shall select a State Estimator distribution from a proxy day reasonably reflecting the anticipated distribution in the Operating Day. ERCOT may also modify this distribution to account for predicted differences in network topology between the proxy day and Operating Day. ERCOT shall develop a methodology, subject to Technical Advisory Committee (TAC) approval, to describe the modification of the proxy day bus-load distribution for this purpose.
- (6) ERCOT shall allocate offers, bids, and source and sink of CRRs at a Hub using the distribution factors specified in the definition of that Hub in Section 3.5.2, Hub Definitions.
- (7) A Resource that has a Three-Part Supply Offer cleared in the DAM may be eligible for Make-Whole Payment of the Startup Offer and Minimum Energy Offer submitted by the Qualified Scheduling Entity (QSE) representing the Resource under Section 4.6, DAM Settlement.
- (8) The directional network element flows for PTP Options declared for Settlement in Real-Time must be properly accounted for in determining available transmission network capacity in the DAM. In the event the available transmission capability in the DAM cannot accommodate all PTP Options declared for Settlement in Real-Time, any PTP Option declared for Settlement in Real-Time that impacts overloaded directional network

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elements must be appropriately derated for DAM modeling purposes only, in proportion to that impact. The derated MW of PTP Options declared for Settlement in Real-Time will be settled in the DAM if their Minimum Reservation Prices are less than or equal to the DAM prices for corresponding PTP Options. Otherwise, the derated MW will be settled in Real-Time.

[NPRR322: Delete paragraph (8) above and renumber accordingly upon system implementation]

- (9) The DAM Settlement is based on hourly MW awards and on Day-Ahead hourly Settlement Point Prices. All PTP Options settled in the DAM are settled based on the Day-Ahead Settlement Point Prices. ERCOT shall assign a Locational Marginal Price (LMP) to de-energized Electrical Buses for use in the calculation of the Day-Ahead Settlement Point Prices by using heuristic rules applied in the following order:
- (a) Use average LMP for Electrical Buses within the same station having the same voltage level as the de-energized Electrical Bus, if any exist.
 - (b) Use average LMP for all Electrical Buses within the same station, if any exist.
 - (c) Use system lambda.

[NPRR339: Replace paragraph (9) above with the following upon system implementation:]

- (9) The DAM Settlement is based on hourly MW awards and on Day-Ahead hourly Settlement Point Prices. All PTP Options settled in the DAM are settled based on the Day-Ahead Settlement Point Prices. ERCOT shall assign a Locational Marginal Price (LMP) to de-energized Electrical Buses for use in the calculation of the Day-Ahead Settlement Point Prices by using heuristic rules applied in the following order:
- (a) Use an appropriate LMP predetermined by ERCOT as applicable to a specific Electrical Bus; or if not so specified
 - (b) Use the following rules in order:
 - (i) Use average LMP for Electrical Buses within the same station having the same voltage level as the de-energized Electrical Bus, if any exist.
 - (ii) Use average LMP for all Electrical Buses within the same station, if any exist.
 - (iii) Use system lambda.

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- (10) The Day-Ahead Market Clearing Price for Capacity (MCPC) for each hour for each Ancillary Service is the Shadow Price for that Ancillary Service for the hour as determined by the DAM algorithm.
- (11) If the Day-Ahead MCPC cannot be calculated by ERCOT, the Day-Ahead MCPC for the particular Ancillary Service is equal to the Day-Ahead MCPC for that Ancillary Service in the same Settlement Interval of the preceding Operating Day.
- (12) If the Day-Ahead Settlement Point Prices cannot be calculated by ERCOT, all CRRs shall be settled based on Real-Time Prices. Settlements for all CRRs shall be reflected on the Real-Time Settlement Statement.

4.5.3 Communicating DAM Results

- (1) As soon as practicable, but no later than 1330 in the Day-Ahead, ERCOT shall notify the parties to each cleared DAM transaction (e.g., the buyer and the seller) of the results of the DAM as follows:
 - (a) Awarded Ancillary Service Offers, specifying Resource, MW, Ancillary Service type, and price, for each hour of the awarded offer;
 - (b) Awarded energy offers from Three-Part Supply Offers and from DAM Energy-Only Offers, specifying Resource (except for DAM Energy-Only Offers), MWh, Settlement Point, and Settlement Point Price, for each hour of the awarded offer;
 - (c) Awarded DAM Energy Bids, specifying MWh, Settlement Point, and Settlement Point Price for each hour of the awarded bid;
 - (d) Awarded CRR Offers (PTP Options and PTP Options with Refund), specifying CRR identifier(s), number of CRRs in MW, source and sink Settlement Points, and price, for each Settlement Interval of the awarded offer; and
 - (e) Awarded PTP Obligation Bids, number of PTP Obligations in MW, source and sink Settlement Points, and price for each Settlement Interval of the awarded bid.

[NPRR322: Replace paragraph (1) above with the following upon system implementation:]

- (1) As soon as practicable, but no later than 1330 in the Day-Ahead, ERCOT shall notify the parties to each cleared DAM transaction (e.g., the buyer and the seller) of the results of the DAM as follows:
 - (a) Awarded Ancillary Service Offers, specifying Resource, MW, Ancillary Service type, and price, for each hour of the awarded offer;

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- (b) Awarded energy offers from Three-Part Supply Offers and from DAM Energy-Only Offers, specifying Resource (except for DAM Energy-Only Offers), MWh, Settlement Point, and Settlement Point Price, for each hour of the awarded offer;
- (c) Awarded DAM Energy Bids, specifying MWh, Settlement Point, and Settlement Point Price for each hour of the awarded bid;
- ~~(d) Awarded CRR Offers (PTP Options and PTP Options with Refund), specifying CRR identifier(s), number of CRRs in MW, source and sink Settlement Points, and price, for each Settlement Interval of the awarded offer; and~~
- (de) Awarded PTP Obligation Bids, number of PTP Obligations in MW, source and sink Settlement Points, and price for each Settlement Interval of the awarded bid.

- (2) As soon as practicable, but no later than 1330, ERCOT shall post on the Market Information System (MIS) Public Area the hourly:
 - (a) Day-Ahead MCPC for each type of Ancillary Service for each hour of the Operating Day;
 - (b) Day-Ahead Settlement Point Prices (DASPPs) for each Settlement Point for each hour of the Operating Day;
 - (c) Day-Ahead hourly LMPs for each Electrical Bus for each hour of the Operating Day;
 - (d) Shadow Prices for every binding constraint for each hour of the Operating Day;
 - (e) Quantity of total Ancillary Service Offers received in the DAM, in MW by Ancillary Service type for each hour of the Operating Day;
 - (f) Energy bought in the DAM consisting of the following:
 - (i) The total quantity of awarded DAM Energy Bids (in MWh) bought in the DAM at each Settlement Point for each hour of the Operating Day;
 - (ii) The total quantity of awarded PTP Obligation Bids (in MWh) cleared in the DAM that sink at each Settlement Point for each hour of the Operating Day; and
 - (iii) The total quantity of PTP Options that were declared before DAM execution by the Non-Opt-In Entity (NOIE) to be settled in Real-Time and not cleared in the DAM (in MWh) that sink at each Settlement Point for each hour of the Operating Day.

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- (g) Energy sold in the DAM consisting of the following:
 - (i) The total quantity of awarded DAM Energy Offers (in MWh), from Three-Part Supply Offers and DAM Energy Only Offers, bought in the DAM at each Settlement Point for each hour of the Operating Day;
 - (ii) The total quantity of awarded PTP Obligation Bids (in MWh) cleared in the DAM that source at each Settlement Point for each hour of the Operating Day; and
 - (iii) The total quantity of PTP Options that were declared before DAM execution by the NOIE to be settled in Real-Time and not cleared in the DAM (in MWh) that source at each Settlement Point for each hour of the Operating Day.

[NPRR 322: Replace items (f) and (g) above with the following upon system implementation:]

- (f) Energy bought in the DAM consisting of the following:
 - (i) The total quantity of awarded DAM Energy Bids (in MWh) bought in the DAM at each Settlement Point for each hour of the Operating Day; and
 - (ii) The total quantity of awarded PTP Obligation Bids (in MWh) cleared in the DAM that sink at each Settlement Point for each hour of the Operating Day; and
- (g) Energy sold in the DAM consisting of the following:
 - (i) The total quantity of awarded DAM Energy Offers (in MWh), from Three-Part Supply Offers and DAM Energy Only Offers, bought in the DAM at each Settlement Point for each hour of the Operating Day; and
 - (ii) The total quantity of awarded PTP Obligation Bids (in MWh) cleared in the DAM that source at each Settlement Point for each hour of the Operating Day; and

- (h) Aggregated Ancillary Service Offer Curve of all Ancillary Service Offers for each type of Ancillary Service for each hour of the Operating Day.

[-NPRR343: Insert items (i) and (j) below upon system implementation:]

- (i) Electrically Similar Settlement Points used during the DAM clearing process; and
- (j) Settlement Points that were de-energized in the base case.

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- (3) ERCOT shall monitor Day-Ahead MCPCs and Day-Ahead hourly LMPs for errors and if there are conditions that cause the price to be questionable, ERCOT shall notify all Market Participants that the DAM prices are under investigation as soon as practicable.
- (4) All DAM LMPs, MCPCs, and Settlement Point Prices are final at 1000 of the next Business Day after the Operating Day. After DAM LMPs, MCPCs, and Settlement Point Prices are final, if ERCOT determines that prices are in need of correction, it shall notify Market Participants and describe the need for such correction. DAM LMPs, MCPCs, and Settlement Point Prices cannot be changed unless the ERCOT Board finds that the DAM LMPs, MCPCs, or Settlement Point Prices are significantly affected by a software or data error.

4.6.3 Settlement for PTP Obligations Bought in DAM

- (1) ERCOT shall pay or charge a QSE for a cleared PTP Obligation Bid the difference in the DAM Settlement Point Prices between the sink Settlement Point and the source Settlement Point. The charge or payment to each QSE for a given Operating Hour of its cleared PTP Obligation Bids with each pair of source and sink Settlement Points is calculated as follows:

$$\text{DARTOBLAMT}_{q, (j, k)} = \text{DAOBLPR}_{(j, k)} * \text{RTOBL}_{q, (j, k)}$$

Where:

$$\text{DAOBLPR}_{(j, k)} = \text{DASPP}_k - \text{DASPP}_j$$

The above variables are defined as follows:

Variable	Unit	Definition
$\text{DARTOBLAMT}_{q, (j, k)}$	\$	Day-Ahead Real-Time Obligation Amount per QSE per pair of source and sink—The charge or payment to QSE q for a PTP Obligation Bid cleared in the DAM with the source j and the sink k, for the hour.
$\text{DAOBLPR}_{(j, k)}$	\$/MWh per hour	Day-Ahead Obligation Price per pair of source and sink—The DAM clearing price of a PTP Obligation Bid with the source j and the sink k, for the hour.
DASPP_j	\$/MWh	Day-Ahead Settlement Point Price at source—The DAM Settlement Point Price at the source Settlement Point j for the hour.
DASPP_k	\$/MWh	Day-Ahead Settlement Point Price at sink—The DAM Settlement Point Price at the sink Settlement Point k for the hour.
$\text{RTOBL}_{q, (j, k)}$	MW	Real-Time Obligation per QSE per pair of source and sink—The total MW of the QSE's PTP Obligation Bids cleared in the DAM for the source j and the sink k for the hour.
q	none	A QSE.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.

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- (2) The net total charge or payment to the QSE for the hour of all its cleared PTP Obligation Bids is calculated as follows:

$$\text{DARTOBLAMTQSETOT}_q = \sum_j \sum_k \text{DARTOBLAMT}_{q, (j, k)}$$

The above variables are defined as follows:

Variable	Unit	Definition
DARTOBLAMTQSETOT _q	\$	Day-Ahead Real-Time Obligation Amount QSE Total per QSE - The net total charge or payment to QSE q for all its PTP Obligation Bids cleared in the DAM for the hour.
DARTOBLAMT _{q, (j, k)}	\$	Day-Ahead Real-Time Obligation Amount per QSE per pair of source and sink - The charge or payment to QSE q for a PTP Obligation Bids cleared in the DAM with the source j and the sink k, for the hour.
q	none	A QSE.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.

[NPRR322: Insert paragraphs (3) and (4) below upon system implementation:]

- (3) ERCOT shall charge a QSE for a cleared PTP Obligation bid with Links to an Option the positive difference in the DAM Settlement Point Prices between the sink Settlement Point and the source Settlement Point. The charge to each QSE for a given Operating Hour of its cleared PTP Obligation bid with Links to an Option with each pair of source and sink Settlement Points is calculated as follows:

$$\text{DARTOBLLOAMT}_{q, (j, k)} = \text{Max} (0, \text{DAOBLPR}_{(j, k)}) * \text{OBLLO}_{q, (j, k)}$$

Where

$$\text{OBLLO}_{q, (j, k)} = \sum_{\text{errid}} \text{OBLLOCRR}_{q, (j, k), \text{errid}}$$

The above variables are defined as follows:

Variable	Unit	Definition
DARTOBLLOAMT _{q, (j, k)}	\$	Day-Ahead Real-Time Obligation with Links to an Option Amount per QSE per pair of source and sink—The charge to QSE q for a PTP Obligation bid with Links to an Option cleared in the DAM with the source j and the sink k, for the hour.
DAOBLPR _(j, k)	\$/MW per hour	Day-Ahead Obligation Price per pair of source and sink—The DAM clearing price of a PTP Obligation bid with the source j and the sink k, for the hour.

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<u>OBLLO_{q, (j, k)}</u>	<u>MW</u>	<u>PTP Obligation with Links to an Option per QSE per pair of source and sink</u> —The total MW of QSE <i>q</i> 's PTP Obligation bids with Links to an Option cleared in the DAM for the source <i>j</i> and the sink <i>k</i> for the hour.
<u>OBLLOCRR_{q, (j, k), crrid}</u>	<u>MW</u>	<u>PTP Obligation with Links to an Option per QSE per pair of source and sink and CRRID of the linked Option</u> —The total MW of QSE <i>q</i> 's PTP Obligation bids with Links to an Option cleared in the DAM for the source <i>j</i> and the sink <i>k</i> for the hour and CRRID of the linked PTP Option.
<u>crrid</u>	<u>none</u>	<u>A CRR Option identification code.</u>
<u>q</u>	<u>none</u>	<u>A QSE.</u>
<u>j</u>	<u>none</u>	<u>A source Settlement Point.</u>
<u>k</u>	<u>none</u>	<u>A sink Settlement Point.</u>

(4) The net total charge to the QSE for the hour of all its cleared PTP Obligation bids with Links to an Option is calculated as follows:

$$\text{DARTOBLLOAMTQSETOT}_q = \sum_j \sum_k \text{DARTOBLLOAMT}_{q, (j, k)}$$

The above variables are defined as follows:

<u>Variable</u>	<u>Unit</u>	<u>Definition</u>
<u>DARTOBLLOAMTQSETOT_q</u>	<u>\$</u>	<u>Day-Ahead Real-Time Obligation with Links to an Option Amount QSE Total per QSE</u> —The net total charge to QSE <i>q</i> for all its PTP Obligation bids with Links to an Option cleared in the DAM for the hour.
<u>DARTOBLLOAMT_{q, (j, k)}</u>	<u>\$</u>	<u>Day-Ahead Real-Time Obligation with Links to Option Amount per QSE per pair of source and sink</u> —The charge to QSE <i>q</i> for a PTP Obligation bid with Links to an Option cleared in the DAM with the source <i>j</i> and the sink <i>k</i> , for the hour.
<u>q</u>	<u>none</u>	<u>A QSE.</u>
<u>j</u>	<u>none</u>	<u>A source Settlement Point.</u>
<u>k</u>	<u>none</u>	<u>A sink Settlement Point.</u>

6.6.10 Real-Time Revenue Neutrality Allocation

- (1) ERCOT must be revenue-neutral in each Settlement Interval. Each QSE receives an allocated share, on a LRS basis, of the net amount of:
 - (a) Real-Time Energy Imbalance payments or charges under Section 6.6.3.1, Real-Time Energy Imbalance Payment or Charge at a Resource Node;
 - (b) Real-Time Energy Imbalance payments or charges under Section 6.6.3.2, Real-Time Energy Imbalance Payment or Charge at a Load Zone;

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- (c) Real-Time Energy Imbalance payments or charges under Section 6.6.3.3, Real-Time Energy Imbalance Payment or Charge at a Hub;
 - (d) Real-Time energy payments under Section 6.6.3.4, Real-Time Energy Payment for DC Tie Import;
 - (e) Real-Time energy payments under Section 6.6.3.5, Real-Time Payment for a Block Load Transfer Point;
 - (f) Real-Time energy charge under Section 6.6.3.6, Real-Time Energy Charge for DC Tie Export Represented by the QSE Under the Oklaunion Exemption;
 - (g) Real-Time congestion payments or charges under Section 6.6.4, Real-Time Congestion Payment or Charge for Self Schedules;
 - (h) Real-Time value of Day-Ahead energy sale from RMR Units under Section 6.6.6.5, RMR Service Charge; and
 - (i) Real-Time payments or charges to the Congestion Revenue Right (CRR) Owners under Section 7.9.2, Real-Time CRR Payments and Charges.
- (2) The Real-Time Revenue Neutrality Allocation for each QSE for a given 15-minute Settlement Interval is calculated as follows:

$$\text{LARTRNAMT}_q = (-1) * (\text{RTEIAMTTOT} + \text{BLTRAMTTOT} + \text{RTDCIMPAMTTOT} + \text{RTDCEXPAMTTOT} + \text{RTCCAMTTOT} + \text{RMRDAESRTVTOT} + \text{RTOBLAMTTOT} / 4 + \text{RTOPTAMTTOT} / 4 + \text{RTOPTRAMTTOT} / 4) * \text{LRS}_q$$

Where:

Total Real-Time Energy Imbalance Payment (or Charge) at Settlement Point (or Hub)

$$\text{RTEIAMTTOT} = \sum_q \text{RTEIAMTQSETOT}_q$$

Total Real-Time Payment for BLT Resources

$$\text{BLTRAMTTOT} = \sum_q \text{BLTRAMTQSETOT}_q$$

Total Real-Time Payment for DC Tie Imports

$$\text{RTDCIMPAMTTOT} = \sum_q \text{RTDCIMPAMTQSETOT}_q$$

Total Real-Time Charge for DC Tie Exports (under “Oklaunion Exemption”)

$$\text{RTDCEXPAMTTOT} = \sum_q \text{RTDCEXPAMTQSETOT}_q$$

Total Real-Time Congestion Payment or Charge for Self-Schedules

$$\text{RTCCAMTTOT} = \sum_q \text{RTCCAMTQSETOT}_q$$

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Total Real-Time Payment or Charge for Point-to-Point (PTP) Obligations

$$RTOBLAMTTOT = \sum_q RTOBLAMTQSETOT_q$$

Total Real-Time Payment for PTP Options

$$RTOPTAMTTOT = \sum_o RTOPTAMTOTOT_o$$

Total Real-Time Payment for PTP Options with Refund

$$RTOPTRAMTTOT = \sum_o RTOPTRAMTOTOT_o$$

The above variables are defined as follows:

Variable	Unit	Description
LARTRNAMT _q	\$	<i>Load-Allocated Real-Time Revenue Neutrality Amount per QSE</i> —The QSE <i>q</i> 's share of the total Real-Time revenue neutrality amount, for the 15-minute Settlement Interval.
RTEIAMTTOT _q	\$	<i>Real-Time Energy Imbalance Amount Total</i> —The total net payments and charges for Real-Time Energy Imbalance Service at all Settlement Points (Resource, Load Zone or Hub) for the 15-minute Interval.
BLTRAMTTOT	\$	<i>Block Load Transfer Resource Amount Total</i> —The total of payments for energy delivered into the ERCOT Region through BLT points for the 15-minute Settlement Interval.
RTDCIMPAMTTOT	\$	<i>Real-Time DC Import Amount Total</i> —The summation of payments for DC Tie imports for the 15-minute Settlement Interval.
RTDCEXPAMTTOT	\$	<i>Real-Time DC Export Amount Total</i> —The summation of charges to all QSEs under the “Oklaunion Exemption” for DC Tie exports for the 15-minute Settlement Interval.
RTCCAMTTOT	\$	<i>Real-Time Energy Congestion Cost Amount Total</i> —The total net congestion payments and charges for all Self-Schedules for the 15-minute Settlement Interval.
RMRDAESRTVTOT	\$	<i>RMR Day-Ahead Energy Sale Real-Time Value Total</i> —The total of the Real-Time value of the Day-Ahead energy sales from all RMR Units for the 15-minute Settlement Interval. See Section 6.6.6, Reliability Must-Run Settlement.
RTOBLAMTTOT	\$	<i>Real-Time Obligation Amount Total</i> —The sum of all payments and charges for PTP Obligations settled in Real-Time for the hour that includes the 15-minute Settlement Interval.
RTOPTAMTTOT	\$	<i>Real-Time Option Amount Total</i> —The sum of all payments for PTP Options settled in Real-Time for the hour that includes the 15-minute Settlement Interval.
RTOPTRAMTTOT	\$	<i>Real-Time Option with Refund Amount Total</i> —The sum of all payments for PTP Options with Refund settled in Real-Time for the hour that includes the 15-minute Settlement Interval.
RTEIAMTQSETOT _q	\$	<i>Real-Time Energy Imbalance Amount QSE Total per QSE</i> —The total net payments and charges to QSE <i>q</i> for Real-Time Energy Imbalance at all Resource Node Settlement Points for the 15-minute Settlement Interval.

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Variable	Unit	Description
RTCCAMTQSETOT _q	\$	<i>Real-Time Congestion Cost Amount QSE Total per QSE</i> —The total net congestion payments and charges to QSE <i>q</i> for its Self-Schedules for the 15-minute Settlement Interval.
BLTRAMTQSETOT _q	\$	<i>Block Load Transfer Resource Amount QSE Total per QSE</i> —The total of the payments to QSE <i>q</i> for energy delivered into the ERCOT Region through BLT points for the 15-minute Settlement Interval.
RTDCIMPAMTQSETOT _q	\$	<i>Real-Time DC Import Amount QSE Total per QSE</i> —The total of the payments to QSE <i>q</i> for energy imported into the ERCOT Region through DC Ties for the 15-minute Settlement Interval.
RTDCEXPAMTQSETOT _q	\$	<i>Real-Time DC Export Amount QSE Total per QSE</i> —The total of the charges to QSE <i>q</i> for energy exported from the ERCOT Region through DC Ties for the 15-minute Settlement Interval.
RTOBLAMTQSETOT _q	\$	<i>Real-Time Obligation Amount QSE Total per QSE</i> —The net total payment or charge to QSE <i>q</i> of all its PTP Obligations settled in Real-Time for the hour that includes the 15-minute Settlement Interval. See paragraph (2) of Section 7.9.2.1, Payments and Charges for PTP Obligations Settled in Real-Time.
RTOPTAMTOTOT _o	\$	<i>Real-Time Option Amount Owner Total per Owner</i> —The total payment for all the PTP Options held by the CRR owner <i>o</i> and settled in Real-Time for the hour that includes the 15-minute Settlement Interval. See paragraph (2) of Section 7.9.2.2, Payments for PTP Options Settled in Real-Time.
RTOPTRAMTOTOT _o	\$	<i>Real-Time Option with Refund Amount Owner Total per Owner</i> —The payment for the PTP Options with Refund held by the CRR owner <i>o</i> and settled in Real-Time for the hour that includes the 15-minute Settlement Interval. See paragraph (2) of Section 7.9.2.3, Payments for Non-Opt-In Entity (NOIE) PTP Options with Refund Settled in Real-Time.
LRS _q	none	The LRS calculated for QSE <i>q</i> for the 15-minute Settlement Interval. See Section 6.6.2.2, QSE Load Ratio Share for a 15-Minute Settlement Interval.
<i>q</i>	none	A QSE.
<i>o</i>	none	A CRR owner.

[NPRR322: Replace paragraph (2) above with the following upon system implementation:]

- (2) The Real-Time Revenue Neutrality Allocation for each QSE for a given 15-minute Settlement Interval is calculated as follows:

$$\text{LARTRNAMT}_q = (-1) * (\text{RTEIAMTTOT} + \text{BLTRAMTTOT} + \text{RTDCIMPAMTTOT} + \text{RTDCEXPAMTTOT} + \text{RTCCAMTTOT} + \text{RMRDAESRTVTOT} + \text{RTOBLAMTTOT} / 4 + \text{RTOBLLOAMTTOT} / 4 + \text{RTOPTAMTTOT} / 4 + \text{RTOPTRAMTTOT} / 4) * \text{LRS}_q$$

Where:

Total Real-Time Energy Imbalance Payment (or Charge) at Settlement Point (or Hub)

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$$\text{RTEIAMTTOT} = \sum_q \text{RTEIAMTQSETOT}_q$$

Total Real-Time Payment for BLT Resources

$$\text{BLTRAMTTOT} = \sum_q \text{BLTRAMTQSETOT}_q$$

Total Real-Time Payment for DC Tie Imports

$$\text{RTDCIMPAMTTOT} = \sum_q \text{RTDCIMPAMTQSETOT}_q$$

Total Real-Time Charge for DC Tie Exports (under “Oklaunion Exemption”)

$$\text{RTDCEXPAMTTOT} = \sum_q \text{RTDCEXPAMTQSETOT}_q$$

Total Real-Time Congestion Payment or Charge for Self-Schedules

$$\text{RTCCAMTTOT} = \sum_q \text{RTCCAMTQSETOT}_q$$

Total Real-Time Payment or Charge for Point-to-Point (PTP) Obligations

$$\text{RTOBLAMTTOT} = \sum_q \text{RTOBLAMTQSETOT}_q$$

Total Real-Time Payment for PTP Obligations with Links to Options

$$\text{RTOBLLOAMTTOT} = \sum_q \text{RTOBLLOAMTQSETOT}_q$$

~~Total Real Time Payment for PTP Options~~

$$\text{RTOPTAMTTOT} = \sum_o \text{RTOPTAMTOTOT}_o$$

~~Total Real Time Payment for PTP Options with Refund~~

$$\text{RTOPTRAMTTOT} = \sum_o \text{RTOPTRAMTOTOT}_o$$

The above variables are defined as follows:

Variable	Unit	Description
LARTNAMT _q	\$	<i>Load-Allocated Real-Time Revenue Neutrality Amount per QSE</i> —The QSE <i>q</i> ’s share of the total Real-Time revenue neutrality amount, for the 15-minute Settlement Interval.
RTEIAMTTOT _q	\$	<i>Real-Time Energy Imbalance Amount Total</i> —The total net payments and charges for Real-Time Energy Imbalance Service at all Settlement Points (Resource, Load Zone or Hub) for the 15-minute Interval.
BLTRAMTTOT	\$	<i>Block Load Transfer Resource Amount Total</i> —The total of payments for energy delivered into the ERCOT Region through BLT points for the 15-minute Settlement Interval.
RTDCIMPAMTTOT	\$	<i>Real-Time DC Import Amount Total</i> —The summation of payments for DC Tie imports for the 15-minute Settlement Interval.

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RTDCEXPAMTTOT	\$	<i>Real-Time DC Export Amount Total</i> —The summation of charges to all QSEs under the “Oklahoma Exemption” for DC Tie exports for the 15-minute Settlement Interval.
RTCCAMTTOT	\$	<i>Real-Time Energy Congestion Cost Amount Total</i> — The total net congestion payments and charges for all Self-Schedules for the 15-minute Settlement Interval.
RMRDAESRTVTOT	\$	<i>RMR Day-Ahead Energy Sale Real-Time Value Total</i> —The total of the Real-Time value of the Day-Ahead energy sales from all RMR Units for the 15-minute Settlement Interval. See Section 6.6.6, Reliability Must-Run Settlement.
RTOBLAMTTOT	\$	<i>Real-Time Obligation Amount Total</i> —The sum of all payments and charges for PTP Obligations settled in Real-Time for the hour that includes the 15-minute Settlement Interval.
<u>RTOBLLOAMTTOT</u>	<u>\$</u>	<u><i>Real-Time Obligation with Links to an Option Amount Total</i>—The sum of all payments for PTP Obligations with Links to an Option settled in Real-Time for the hour that includes the 15-minute Settlement Interval</u>
RTOPTAMTTOT	\$	<i>Real-Time Option Amount Total</i>—The sum of all payments for PTP Options settled in Real-Time for the hour that includes the 15-minute Settlement Interval.
RTOPTRAMTTOT	\$	<i>Real-Time Option with Refund Amount Total</i>—The sum of all payments for PTP Options with Refund settled in Real-Time for the hour that includes the 15-minute Settlement Interval.
RTEIAMTQSETOT _q	\$	<i>Real-Time Energy Imbalance Amount QSE Total per QSE</i> —The total net payments and charges to QSE <i>q</i> for Real-Time Energy Imbalance at all Resource Node Settlement Points for the 15-minute Settlement Interval.
RTCCAMTQSETOT _q	\$	<i>Real-Time Congestion Cost Amount QSE Total per QSE</i> —The total net congestion payments and charges to QSE <i>q</i> for its Self-Schedules for the 15-minute Settlement Interval.
BLTRAMTQSETOT _q	\$	<i>Block Load Transfer Resource Amount QSE Total per QSE</i> —The total of the payments to QSE <i>q</i> for energy delivered into the ERCOT Region through BLT points for the 15-minute Settlement Interval.
RTDCIMPAMTQSETOT _q	\$	<i>Real-Time DC Import Amount QSE Total per QSE</i> —The total of the payments to QSE <i>q</i> for energy imported into the ERCOT Region through DC Ties for the 15-minute Settlement Interval.
RTDCEXPAMTQSETOT _q	\$	<i>Real-Time DC Export Amount QSE Total per QSE</i> —The total of the charges to QSE <i>q</i> for energy exported from the ERCOT Region through DC Ties for the 15-minute Settlement Interval.
RTOBLAMTQSETOT _q	\$	<i>Real-Time Obligation Amount QSE Total per QSE</i> —The net total payment or charge to QSE <i>q</i> of all its PTP Obligations settled in Real-Time for the hour that includes the 15-minute Settlement Interval. See paragraph (2) of Section 7.9.2.1, Payments and Charges for PTP Obligations Settled in Real-Time.
<u>RTOBLLOAMTQSETOT_q</u>	<u>\$</u>	<u><i>Real-Time Obligation with Links to an Option Amount QSE Total per QSE</i>—The total payment to QSE <i>q</i> for all of its PTP Obligations with Links to an Option settled in Real-Time for the hour that includes the 15-minute Settlement Interval. See paragraph (2) of Section 7.9.2.1.</u>

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$RTOPTAMTTOT_o$	\$	<i>Real-Time Option Amount Owner Total per Owner—The total payment for all the PTP Options held by the CRR owner o and settled in Real-Time for the hour that includes the 15-minute Settlement Interval. See paragraph (2) of Section 7.9.2.2, Payments for PTP Options Settled in Real-Time.</i>
$RTOPTRAMTTOT_o$	\$	<i>Real-Time Option with Refund Amount Owner Total per Owner—The payment for the PTP Options with Refund held by the CRR owner o and settled in Real-Time for the hour that includes the 15-minute Settlement Interval. See paragraph (2) of Section 7.9.2.3, Payments for Non-Opt-In Entity (NOIE) PTP Options with Refund Settled in Real-Time.</i>
LRS_q	none	The LRS calculated for QSE q for the 15-minute Settlement Interval. See Section 6.6.2.2, QSE Load Ratio Share for a 15-Minute Settlement Interval.
q	none	A QSE.
o	none	A CRR owner.

- (3) In the event that ERCOT is unable to execute the DAM, the Real-Time Revenue Neutrality Allocation for each QSE for a given 15-minute Settlement Interval is calculated as follows:

$$LARTRNAMT_q = (-1) * (RTEIAMTTOT + BLTRAMTTOT + RTDCIMPAMTTOT + RTDCEXPAMTTOT + RTCCAMTTOT + RMRDAESRTVTOT + NDRTOBLAMTTOT / 4 + NDRTOPTAMTTOT / 4 + NDRTOPTRAMTTOT / 4 + NDRTFGRAMTTOT / 4 + NDRTOBLRAMTTOT / 4) * LRS_q$$

Where:

Total Real-Time Energy Imbalance Payment (or Charge) at Settlement Point (or Hub)

$$RTEIAMTTOT = \sum_q RTEIAMTQSETOT_q$$

Total Real-Time Payment for BLT Resources

$$BLTRAMTTOT = \sum_q BLTRAMTQSETOT_q$$

Total Real-Time Payment for DC Tie Imports

$$RTDCIMPAMTTOT = \sum_q RTDCIMPAMTQSETOT_q$$

Total Real-Time Charge for DC Tie Exports (under “Oklaunion Exemption”)

$$RTDCEXPAMTTOT = \sum_q RTDCEXPAMTQSETOT_q$$

Total Real-Time Congestion Payment or Charge for Self Schedules

$$RTCCAMTTOT = \sum_q RTCCAMTQSETOT_q$$

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Total Real-Time Payment or Charge for PTP Obligations when ERCOT is unable to execute the DAM

$$\text{NDRTOBLAMTTOT} = \sum_o \text{NDRTOBLAMTOTOT}_o$$

Total Real-Time Payment for PTP Options when ERCOT is unable to execute the DAM

$$\text{NDRTOPTAMTTOT} = \sum_o \text{NDRTOPTAMTOTOT}_o$$

Total Real-Time Payment for PTP Options with Refund when ERCOT is unable to execute the DAM

$$\text{NDRTOPTRAMTTOT} = \sum_o \text{NDRTOPTRAMTOTOT}_o$$

Total Real-Time Payment for Flowgate Rights (FGRs) when ERCOT is unable to execute the DAM

$$\text{NDRTFGRAMTTOT} = \sum_o \text{NDRTFGRAMTOTOT}_o$$

Total Real-Time Payment or Charge for PTP Obligations with Refund when ERCOT is unable to execute the DAM

$$\text{NDRTOBLRAMTTOT} = \sum_o \text{NDRTOBLRAMTOTOT}_o$$

The above variables are defined as follows:

Variable	Unit	Description
LARTRNAMT _q	\$	<i>Load-Allocated Real-Time Revenue Neutrality Amount per QSE</i> —The QSE <i>q</i> 's share of the total Real-Time revenue neutrality amount for the 15-minute Settlement Interval.
RTEIAMTTOT	\$	<i>Real-Time Energy Imbalance Amount Total</i> —The total net payments and charges for Real-Time Energy Imbalance at all Settlement Points (Resource, Load Zone, or Hub) for the 15-minute Interval.
BLTRAMTTOT	\$	<i>Block Load Transfer Resource Amount Total</i> —The total of the payments for energy delivered into the ERCOT Region through BLT points for the 15-minute Settlement Interval.
RTDCIMPAMTTOT	\$	<i>Real-Time DC Import Amount Total</i> —The summation of payments for DC Tie imports for the 15-minute Settlement Interval.
RTDCEXPAMTTOT	\$	<i>Real-Time DC Export Amount Total</i> —The summation of charges to all QSEs that are under the “Oklaunion Exemption” for DC Tie exports for the 15-minute Settlement Interval.
RTCCAMTTOT	\$	<i>Real-Time Energy Congestion Cost Amount Total</i> —The total net congestion payments and charges for all Self-Schedules for the 15-minute Settlement Interval.

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Variable	Unit	Description
RMRDAESRTVTOT	\$	<i>RMR Day-Ahead Energy Sale Real-Time Value Total</i> —The total of the Real-Time value of the Day-Ahead energy sales from all RMR Units for the 15-minute Settlement Interval. See Section 6.6.6, Reliability Must-Run Settlement.
NDRTOBLAMTTOT	\$	<i>No DAM Real-Time Obligation Amount Total</i> —The sum of all payments and charges for PTP Obligations settled in Real-Time, when ERCOT is unable to execute the DAM, for the hour that includes the 15-minute Settlement Interval.
NDRTOPTAMTTOT	\$	<i>No DAM Real-Time Option Amount Total</i> —The sum of all payments for PTP Options settled in Real-Time, when ERCOT is unable to execute the DAM, for the hour that includes the 15-minute Settlement Interval.
NDRTOPTRAMTTOT	\$	<i>No DAM Real-Time Option with Refund Amount Total</i> —The sum of all payments for PTP Options with Refund settled in Real-Time, when ERCOT is unable to execute the DAM, for the hour that includes the 15-minute Settlement Interval.
NDRTFGRAMTTOT	\$	<i>No DAM Real-Time FGR Amount Total</i> — The sum of all payments for FGRs settled in Real-Time, when ERCOT is unable to execute the DAM, for the hour that includes the 15-minute Settlement Interval.
NDRTOBLRAMTTOT	\$	<i>No DAM Real-Time Obligation with Refund Amount Total</i> — The sum of all payments for PTP Obligations with Refund settled in Real-Time, when ERCOT is unable to execute the DAM, for the hour that includes the 15-minute Settlement Interval.
RTEIAMTQSETOT _q	\$	<i>Real-Time Energy Imbalance Amount QSE Total per QSE</i> —The total net payments and charges to QSE <i>q</i> for Real-Time Energy Imbalance Service at all Resource Node Settlement Points for the 15-minute Settlement Interval.
RTCCAMTQSETOT _q	\$	<i>Real-Time Congestion Cost Amount QSE Total per QSE</i> —The total net congestion payments and charges to QSE <i>q</i> for its Self-Schedules for the 15-minute Settlement Interval.
BLTRAMTQSETOT _q	\$	<i>Block Load Transfer Resource Amount QSE Total per QSE</i> —The total of the payments to QSE <i>q</i> for energy delivered into the ERCOT Region through BLT points for the 15-minute Settlement Interval.
RTDCIMPAMTQSETOT _q	\$	<i>Real-Time DC Import Amount QSE Total per QSE</i> —The total of the payments to QSE <i>q</i> for energy imported into the ERCOT Region through DC Ties for the 15-minute Settlement Interval.
RTDCEXPAMTQSETOT _q	\$	<i>Real-Time DC Export Amount QSE Total per QSE</i> —The total of the charges to QSE <i>q</i> for energy exported from the ERCOT Region through DC Ties for the 15-minute Settlement Interval.
NDRTOBLAMTTOTOT _o	\$	<i>No DAM Real-Time Obligation Amount Owner Total per CRR Owner</i> —The net total payment or charge to CRR owner <i>o</i> of all its PTP Obligations settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
NDRTOPTAMTTOTOT _o	\$	<i>No DAM Real-Time Option Amount Owner Total per CRR Owner</i> —The total payment to CRR owner <i>o</i> for all its PTP Options settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.

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Variable	Unit	Description
NDRTOPTRAMTOTOT _o	\$	<i>No DAM Real-Time Option with Refund Amount Owner Total per CRR Owner</i> —The total payment to NOIE CRR owner <i>o</i> for all its PTP Options with Refund settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
NDRTFGRAMTOTOT _o	\$	<i>No DAM Real-Time FGR Amount Owner Total per CRR Owner</i> —The total payment to CRR owner <i>o</i> of all its FGRs settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
NDRTOBLRAMTOTOT _o	\$	<i>No DAM Real-Time Obligation with Refund Amount Owner Total per CRR Owner</i> —The net total payment or charge to CRR owner <i>o</i> for all its PTP Obligations with Refund settled in Real-Time, when ERCOT is unable to execute the DAM, for the hour.
LRS _q	none	The LRS calculated for QSE <i>q</i> for the 15-minute Settlement Interval. See Section 6.6.2.2, QSE Load Ratio Share for a 15-Minute Settlement Interval.
q	none	A QSE.
o	none	A CRR Owner.

7.9.1.3 Minimum and Maximum Resource Prices

- (1) For purposes of Section 7.9.1, Day-Ahead CRR Payments and Charges, Settlements data published to the MIS Secure Area shall include the association of the Resource Category for each Generation Resource. The following prices specified in paragraphs (2) and (3) below are used in the CRR hedge value calculation for CRRs settled in the DAM and PTP Options settled in Real-Time.

[NPRR322: Replace paragraph (1) above with the following upon system implementation:]

- (1) For purposes of Section 7.9.1, Day-Ahead CRR Payments and Charges, Settlements data published to the MIS Secure Area shall include the association of the Resource Category for each Generation Resource. The following prices specified in paragraphs (2) and (3) below are used in the CRR hedge value calculation for CRRs settled in the DAM ~~and PTP Options settled in Real-Time.~~

- (2) Minimum Resource Prices of source Settlement Points are:

$$\text{MINRESPR}_j = \text{Min} (\text{MINRESRPR}_{j,r})_r$$

Where:

Minimum Resource Prices for Resources located at source Settlement Points ($\text{MINRESRPR}_{j,r}$) are:

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- (a) Nuclear = -\$20.00/MWh;
- (b) Hydro = -\$20.00/MWh;
- (c) Coal and Lignite = \$0.00/MWh;
- (d) Combined Cycle greater than 90 MW = FIP * 5 MMBtu/MWh;
- (e) Combined Cycle less than or equal to 90 MW = FIP * 6 MMBtu/MWh;
- (f) Gas -Steam Supercritical Boiler = FIP * 6.5 MMBtu/MWh;
- (g) Gas Steam Reheat Boiler = FIP * 7.5 MMBtu/MWh;
- (h) Gas Steam Non-Reheat or Boiler without Air-Preheater = FIP * 10.5 MMBtu/MWh;
- (i) Simple Cycle greater than 90 MW = FIP * 10 MMBtu/MWh;
- (j) Simple Cycle less than or equal to 90 MW = FIP * 11 MMBtu/MWh;
- (k) Diesel = FIP * 12 MMBtu/MWh;
- (l) Wind = -\$35/MWh;
- (m) Reliability Must-Run (RMR) Resource = RMR contract price Energy Offer Curve at Low Sustained Limit (LSL); and
- (n) Other Renewable = -\$10.

The above variables are defined as follows:

Variable	Unit	Definition
MINRES _{PR j}	\$/MWh	<i>Minimum Resource Price for source</i> —The lowest Minimum Resource Price for the Resources located at the source Settlement Point <i>j</i> .
MINRES _{RP j}	\$/MWh	<i>Minimum Resource Price for Resource</i> —The Minimum Resource Price for the Resources located at the source Settlement Point <i>j</i> .
<i>r</i>	none	A Generation Resource located at the source Settlement Point <i>j</i> .
<i>j</i>	none	A source Settlement Point.

- (3) Maximum Resource Prices of sink Settlement Points are:

$$\text{MAXRES}_{PR\ k} = \text{Max}(\text{MAXRES}_{RP\ k, r})_r$$

Where:

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Maximum Resource Prices for Resources located at sink Settlement Points (**MAXRESRPR_{k, r}**) are:

- (a) Nuclear = \$15.00/MWh;
- (b) Hydro = \$10.00/MWh;
- (c) Coal and Lignite = \$18.00/MWh;
- (d) Combined Cycle greater than 90 MW = FIP * 9 MMBtu/MWh;
- (e) Combined Cycle less than or equal to 90 MW = FIP * 10 MMBtu/MWh;
- (f) Gas -Steam Supercritical Boiler = FIP * 10.5 MMBtu/MWh;
- (g) Gas Steam Reheat Boiler = FIP * 11.5 MMBtu/MWh;
- (h) Gas Steam Non-Reheat or Boiler without Air-Preheater = FIP * 14.5 MMBtu/MWh;
- (i) Simple Cycle greater than 90 MW = FIP * 14 MMBtu/MWh;
- (j) Simple Cycle less than or equal to 90 MW = FIP * 15 MMBtu/MWh;
- (k) Diesel = FIP * 16 MMBtu/MWh;
- (l) Wind = \$0/MWh;
- (m) RMR Resource = RMR contract price Energy Offer Curve at HSL; and
- (n) Other Renewable = \$0.

The above variables are defined as follows:

Variable	Unit	Definition
MAXRESRPR _k	\$/MWh	<i>Maximum Resource Price for source</i> —The highest Maximum Resource Price for the Resources located at the sink Settlement Point <i>k</i> .
MAXRESRPR _k	\$/MWh	<i>Maximum Resource Price for Resource</i> —The Maximum Resource Price for the Resources located at the sink Settlement Point <i>k</i> .
r	none	A Generation Resource located at the sink Settlement Point <i>k</i> .
k	none	A sink Settlement Point.

7.9.1.6 Payments for PTP Options with Refund Settled in DAM

- (1) Except as specified otherwise in paragraph (2) below, ERCOT shall pay the owner of a PTP Option with Refund the difference in the DAM Settlement Point Prices between the sink Settlement Point and the source Settlement Point, if positive, subject to a charge for

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refund, as described in item (e)(i) of Section 7.4.2, PCRR Allocation Terms and Conditions.

- (2) The payment of PTP Options with Refund may be further reduced due to Transmission Elements that are oversold in previous CRR Auctions.
- (3) The payment to each CRR Owner for a given Operating Hour of its PTP Options with Refund with each pair of source and sink Settlement Points settled in the DAM is calculated as follows:

$$\text{DAOPTRAMT}_{o, (j, k)} = (-1) * \text{Max} ((\text{DAOPTRTP}_{o, (j, k)} - \text{DAOPTRDA}_{o, (j, k)}), \text{Min} (\text{DAOPTRTP}_{o, (j, k)}, \text{DAOPTRHV}_{o, (j, k)}))$$

Where:

The target payment:

$$\text{DAOPTRTP}_{o, (j, k)} = \text{DAOPTR}_{(j, k)} * \text{Min} (\text{DAOPTR}_{o, (j, k)}, \text{OPTRACT}_{o, (j, k)} * \text{DAOPTR}_{o, (j, k)} / (\text{DAOPTR}_{o, (j, k)} + \text{RTOPTR}_{o, (j, k)}))$$

$$\text{DAOPTR}_{(j, k)} = \text{Max} (0, \text{DASPP}_k - \text{DASPP}_j)$$

$$\text{OPTRACT}_{o, (j, k)} = \sum_r (\text{OPTROF}_{o, r} * \text{RESACT}_r * \text{OPTRF}_{o, r, (j, k)})$$

If (a valid OS_{r, y} exists for all SCED intervals within the hour)

$$\text{RESACT}_r = \sum_y (\text{OS}_{r, y} * \text{TLMP}_y) / (\sum_y \text{TLMP}_y)$$

Otherwise

$$\text{RESACT}_r = \text{TGFTH}_r$$

The derated amount:

$$\text{DAOPTRDA}_{o, (j, k)} = \text{OPTDRPR}_{(j, k)} * \text{Min} (\text{DAOPTR}_{o, (j, k)}, \text{OPTRACT}_{o, (j, k)} * \text{DAOPTR}_{o, (j, k)} / (\text{DAOPTR}_{o, (j, k)} + \text{RTOPTR}_{o, (j, k)}))$$

$$\text{OPTDRPR}_{(j, k)} = \sum_c (\text{Max} (0, \text{DAWASF}_{j, c} - \text{DAWASF}_{k, c}) * \text{DASP}_c * \text{DRF}_c)$$

The hedge value:

$$\text{DAOPTRHV}_{o, (j, k)} = \text{DAOPTRVPR}_{(j, k)} * \text{Min} (\text{DAOPTR}_{o, (j, k)}, \text{OPTRACT}_{o, (j, k)} * \text{DAOPTR}_{o, (j, k)} / (\text{DAOPTR}_{o, (j, k)} + \text{RTOPTR}_{o, (j, k)}))$$

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$$DAOPTHVPR_{(j, k)} = \text{Max} (0, \text{DASPP}_k - \text{MINRESPR}_j)$$

The above variables are defined as follows:

Variable	Unit	Definition
DAOPTRAMT _{o, (j, k)}	\$	<i>Day-Ahead Option with Refund Amount per CRR Owner per pair of source and sink</i> —The payment to CRR Owner <i>o</i> for its PTP Options with Refund with the source <i>j</i> and the sink <i>k</i> , settled in the DAM, for the hour.
DAOPTRTP _{o, (j, k)}	\$	<i>Day-Ahead Option with Refund Target Payment per CRR Owner per source and sink pair</i> —The target payment for CRR Owner <i>o</i> 's PTP Options with Refund, with the source <i>j</i> and the sink <i>k</i> , settled in the DAM, for the hour.
DAOPTRHV _{o, (j, k)}	\$	<i>Day-Ahead Option with Refund Hedge Value per CRR Owner per source and sink pair</i> —The hedge value of CRR Owner <i>o</i> 's PTP Options with Refund, with the source <i>j</i> and the sink <i>k</i> , settled in the DAM, for the hour.
DAOPTRDA _{o, (j, k)}	\$	<i>Day-Ahead Option with Refund Derated Amount per CRR Owner per source and sink pair</i> —The derated amount of CRR Owner <i>o</i> 's PTP Options with Refund, with the source <i>j</i> and the sink <i>k</i> , settled in the DAM, for the hour.
DAOPTPR _(j, k)	\$/MW per hour	<i>Day-Ahead Option Price per pair of source and sink</i> —The DAM price of the PTP Option with the source <i>j</i> and the sink <i>k</i> , for the hour.
DASPP _j	\$/MWh	<i>Day-Ahead Settlement Point Price at source</i> —The DAM Settlement Point Price at the source Settlement Point <i>j</i> , for the hour.
DASPP _k	\$/MWh	<i>Day-Ahead Settlement Point Price at sink</i> —The DAM Settlement Point Price at the sink Settlement Point <i>k</i> , for the hour.
DAOPTR _{o, (j, k)}	MW	<i>Day-Ahead Option with Refund per CRR Owner per pair of source and sink</i> —The number of CRR Owner <i>o</i> 's PTP Options with Refund with the source <i>j</i> and the sink <i>k</i> , settled in DAM, for the hour.
RTOPTR _{o, (j, k)}	MW	<i>Real-Time Option with Refund per CRR Owner per pair of source and sink</i> —The number of CRR Owner <i>o</i> 's PTP Options with Refund with the source <i>j</i> and the sink <i>k</i> settled in Real-Time, for the hour.
OPTRACT _{o, (j, k)}	MW	<i>Option with Refund Actual usage per CRR Owner per pair of source and sink</i> —CRR Owner <i>o</i> 's actual usage for the PTP Options with Refund with the source <i>j</i> and the sink <i>k</i> , for the hour.
RESACT _r	MW	<i>Resource Actual per Resource per hour</i> —The time-weighted average of the Output Schedule of Resource <i>r</i> (if a valid Operating Schedule exists) or the telemetered output of Resource <i>r</i> , for the hour.
OPTROF _{o, r}	none	<i>Option with Refund Ownership Factor per CRR Owner per Resource</i> —The factor showing the percentage usage of Resource <i>r</i> for CRR Owner <i>o</i> 's PTP Options with Refund. Its value is 1, if only one CRR Owner has acquired PCRRs under the refund provision using this Resource <i>r</i> .
OS _{r, y}	MW	<i>Output Schedule per Resource per SCED interval</i> —The Output Schedule submitted to ERCOT for Resource <i>r</i> for the SCED interval <i>y</i> .
TGFTH _r	MWh	<i>Telemetered Generation for the Hour per Resource per hour</i> —The telemetered generation of Generation Resource <i>r</i> , for the hour.
OPTRF _{o, r, (j, k)}	none	<i>Option with Refund Factor per CRR Owner per Resource associated with pair of source and sink</i> —The ratio of CRR Owner <i>o</i> 's Resource <i>r</i> 's capacity allocated to the PTP Options with Refund with the source <i>j</i> and sink <i>k</i> to the same CRR Owner's total capacity for the Resource <i>r</i> nominated PCRRs under the refund provision with the same source <i>j</i> .

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Variable	Unit	Definition
TLMP _y	second	<i>Duration of SCED interval per interval</i> —The duration of the portion of the SCED interval y within the hour.
OPTDRPR _(j, k)	\$/MW per hour	<i>Option Deration Price per source and sink pair</i> —The deration price of a PTP Option with the source j and the sink k, for the hour.
DASP _c	\$/MW per hour	<i>Day-Ahead Shadow Price per constraint</i> —The DAM Shadow Price of the constraint c for the hour.
DRF _c	none	<i>Deration Factor per constraint</i> — The deration factor of the constraint c for the hour, equal to the MW amount by which the constraint is oversold divided by the total MW amount of the positive impacts on the constraint of all CRRs existing prior to DAM execution.
DAWASF _{j, c}	none	<i>Day-Ahead Weighted Average Shift Factor at source per constraint</i> —The Day-Ahead Shift Factor for the source Settlement Point and the directional network element for constraint c, in the hour.
DAWASF _{k, c}	none	<i>Day-Ahead Weighted Average Shift Factor at sink per constraint</i> —The Day-Ahead Shift Factor for the sink Settlement Point and the directional network element for constraint c, in the hour.
DAOPTHVPR _(j, k)	\$/MWh	<i>Day-Ahead Option Hedge Value Price per pair of source and sink</i> —The Day-Ahead hedge price of a PTP Option with the source j and the sink k, for the hour.
MINRESRPR _j	\$/MWh	<i>Minimum Resource Price for source</i> —The lowest Minimum Resource Price for Resources located at the source Settlement Point j.
o	none	A CRR Owner.
y	none	A SCED interval in the hour.
r	none	A Resource.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.
c	none	A constraint associated with a directional network element for the hour.

[NPRR322: Replace paragraph (3) above with the following upon system implementation:]

(3) The payment to each CRR Owner for a given Operating Hour of its PTP Options with Refund with each pair of source and sink Settlement Points settled in the DAM is calculated as follows:

$$\text{DAOPTRAMT}_{o, (j, k)} = (-1) * \text{Max} ((\text{DAOPTRTP}_{o, (j, k)} - \text{DAOPTRDA}_{o, (j, k)}), \text{Min} (\text{DAOPTRTP}_{o, (j, k)}, \text{DAOPTRHV}_{o, (j, k)}))$$

Where:

The target payment:

$$\text{DAOPTRTP}_{o, (j, k)} = \text{DAOPTPR}_{(j, k)} * \text{Min} (\text{DAOPTR}_{o, (j, k)}, \text{OPTRACT}_{o, (j, k)})$$

$$\text{DAOPTPR}_{(j, k)} = \text{Max} (0, \text{DASPP}_k - \text{DASPP}_j)$$

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$$\text{OPTRACT}_{o,(j,k)} = \sum_r (\text{OPTROF}_{o,r} * \text{RESACT}_r * \text{OPTRF}_{o,r,(j,k)})$$

If (a valid OS_{r,y} exists for all SCED intervals within the hour)

$$\text{RESACT}_r = \frac{\sum_y (\text{OS}_{r,y} * \text{TLMP}_y)}{\sum_y \text{TLMP}_y}$$

Otherwise

$$\text{RESACT}_r = \text{TGFTH}_r$$

The derated amount:

$$\text{DAOPTRDA}_{o,(j,k)} = \text{OPTDRPR}_{(j,k)} * \text{Min} (\text{DAOPTR}_{o,(j,k)}, \text{OPTRACT}_{o,(j,k)})$$

$$\text{OPTDRPR}_{(j,k)} = \sum_c (\text{Max} (0, \text{DAWASF}_{j,c} - \text{DAWASF}_{k,c}) * \text{DASP}_c * \text{DRF}_c)$$

The hedge value:

$$\text{DAOPTRHV}_{o,(j,k)} = \text{DAOPTHVPR}_{(j,k)} * \text{Min} (\text{DAOPTR}_{o,(j,k)}, \text{OPTRACT}_{o,(j,k)})$$

$$\text{DAOPTHVPR}_{(j,k)} = \text{Max} (0, \text{DASPP}_k - \text{MINRESPP}_j)$$

The above variables are defined as follows:

Variable	Unit	Definition
<u>DAOPTRAMT_{o,(j,k)}</u>	\$	<u>Day-Ahead Option with Refund Amount per CRR Owner per pair of source and sink</u> —The payment to CRR Owner <i>o</i> for its PTP Options with Refund with the source <i>j</i> and the sink <i>k</i> , settled in the DAM, for the hour.
<u>DAOPT RTP_{o,(j,k)}</u>	\$	<u>Day-Ahead Option with Refund Target Payment per CRR Owner per source and sink pair</u> —The target payment for CRR Owner <i>o</i> 's PTP Options with Refund, with the source <i>j</i> and the sink <i>k</i> , settled in the DAM, for the hour.
<u>DAOPTRHV_{o,(j,k)}</u>	\$	<u>Day-Ahead Option with Refund Hedge Value per CRR Owner per source and sink pair</u> —The hedge value of CRR Owner <i>o</i> 's PTP Options with Refund, with the source <i>j</i> and the sink <i>k</i> , settled in the DAM, for the hour.
<u>DAOPTRDA_{o,(j,k)}</u>	\$	<u>Day-Ahead Option with Refund Derated Amount per CRR Owner per source and sink pair</u> —The derated amount of CRR Owner <i>o</i> 's PTP Options with Refund, with the source <i>j</i> and the sink <i>k</i> , settled in the DAM, for the hour.
<u>DAOPTPR_(j,k)</u>	\$/MW per hour	<u>Day-Ahead Option Price per pair of source and sink</u> —The DAM price of the PTP Option with the source <i>j</i> and the sink <i>k</i> , for the hour.
<u>DASPP_j</u>	\$/MWh	<u>Day-Ahead Settlement Point Price at source</u> —The DAM Settlement Point Price at the source Settlement Point <i>j</i> , for the hour.
<u>DASPP_k</u>	\$/MWh	<u>Day-Ahead Settlement Point Price at sink</u> —The DAM Settlement Point Price at the sink Settlement Point <i>k</i> , for the hour.
<u>DAOPTR_{o,(j,k)}</u>	MW	<u>Day-Ahead Option with Refund per CRR Owner per pair of source and sink</u> —The number of CRR Owner <i>o</i> 's PTP Options with Refund with the source <i>j</i> and the sink <i>k</i> , settled in DAM, for the hour.

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<u>OPTRACT_{o,(j,k)}</u>	<u>MW</u>	<u>Option with Refund Actual usage per CRR Owner per pair of source and sink—CRR Owner o’s actual usage for the PTP Options with Refund with the source j and the sink k, for the hour.</u>
<u>RESACT_r</u>	<u>MW</u>	<u>Resource Actual per Resource per hour—The time-weighted average of the Output Schedule of Resource r (if a valid Operating Schedule exists) or the telemetered output of Resource r, for the hour.</u>
<u>OPTROF_{o,r}</u>	<u>none</u>	<u>Option with Refund Ownership Factor per CRR Owner per Resource—The factor showing the percentage usage of Resource r for CRR Owner o’s PTP Options with Refund. Its value is 1, if only one CRR Owner has acquired PCRRs under the refund provision using this Resource r.</u>
<u>OS_{r,y}</u>	<u>MW</u>	<u>Output Schedule per Resource per SCED interval—The Output Schedule submitted to ERCOT for Resource r for the SCED interval y.</u>
<u>TGFTH_r</u>	<u>MWh</u>	<u>Telemetered Generation for the Hour per Resource per hour—The telemetered generation of Generation Resource r, for the hour.</u>
<u>OPTRF_{o,r,(j,k)}</u>	<u>none</u>	<u>Option with Refund Factor per CRR Owner per Resource associated with pair of source and sink—The ratio of CRR Owner o’s Resource r’s capacity allocated to the PTP Options with Refund with the source j and sink k to the same CRR Owner’s total capacity for the Resource r nominated PCRRs under the refund provision with the same source j.</u>
<u>TLMP_y</u>	<u>second</u>	<u>Duration of SCED interval per interval—The duration of the portion of the SCED interval y within the hour.</u>
<u>OPTDRPR_(j,k)</u>	<u>\$/MW per hour</u>	<u>Option Deration Price per source and sink pair—The deration price of a PTP Option with the source j and the sink k, for the hour.</u>
<u>DASP_c</u>	<u>\$/MW per hour</u>	<u>Day-Ahead Shadow Price per constraint—The DAM Shadow Price of the constraint c for the hour.</u>
<u>DRF_c</u>	<u>none</u>	<u>Deration Factor per constraint— The deration factor of the constraint c for the hour, equal to the MW amount by which the constraint is oversold divided by the total MW amount of the positive impacts on the constraint of all CRRs existing prior to DAM execution.</u>
<u>DAWASF_{j,c}</u>	<u>none</u>	<u>Day-Ahead Weighted Average Shift Factor at source per constraint—The Day-Ahead Shift Factor for the source Settlement Point and the directional network element for constraint c, in the hour.</u>
<u>DAWASF_{k,c}</u>	<u>none</u>	<u>Day-Ahead Weighted Average Shift Factor at sink per constraint—The Day-Ahead Shift Factor for the sink Settlement Point and the directional network element for constraint c, in the hour.</u>
<u>DAOPTHVPR_(j,k)</u>	<u>\$/MWh</u>	<u>Day-Ahead Option Hedge Value Price per pair of source and sink—The Day-Ahead hedge price of a PTP Option with the source j and the sink k, for the hour.</u>
<u>MINRESPR_j</u>	<u>\$/MWh</u>	<u>Minimum Resource Price for source—The lowest Minimum Resource Price for Resources located at the source Settlement Point j.</u>
<u>o</u>	<u>none</u>	<u>A CRR Owner.</u>
<u>y</u>	<u>none</u>	<u>A SCED interval in the hour.</u>
<u>r</u>	<u>none</u>	<u>A Resource.</u>
<u>j</u>	<u>none</u>	<u>A source Settlement Point.</u>
<u>k</u>	<u>none</u>	<u>A sink Settlement Point.</u>
<u>c</u>	<u>none</u>	<u>A constraint associated with a directional network element for the hour.</u>

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- (4) The total payment to each Non-Opt-In-Entity (NOIE) CRR Owner for the Operating Hour of all its PTP Options with Refund settled in the DAM is calculated as follows:

$$\text{DAOPTRAMTOTOT}_o = \sum_j \sum_k \text{DAOPTRAMT}_{o, (j, k)}$$

The above variables are defined as follows:

Variable	Unit	Definition
DAOPTRAMTOTOT _o	\$	Day-Ahead Option with Refund Amount Owner Total per CRR Owner—The total payment to NOIE CRR Owner <i>o</i> for all its PTP Options with Refund settled in the DAM, for the hour.
DAOPTRAMT _{o, (j, k)}	\$	Day-Ahead Option with Refund Amount per CRR Owner per pair of source and sink—The payment to NOIE CRR Owner <i>o</i> for the PTP Options with Refund with the source <i>j</i> and the sink <i>k</i> settled in the DAM, for the hour.
<i>o</i>	none	A CRR Owner.
<i>j</i>	none	A source Settlement Point.
<i>k</i>	none	A sink Settlement Point.

7.9.2 Real-Time CRR Payments and Charges

7.9.2.1 Payments and Charges for PTP Obligations Settled in Real-Time

- (1) ERCOT shall pay or charge the Qualified Scheduling Entity (QSE) of each PTP Obligation acquired in the DAM the difference in Real-Time Settlement Point Prices between the sink Settlement Point and the source Settlement Point. The payment or charge to each QSE for a given Operating Hour of its cleared PTP Obligations with each pair of source and sink Settlement Points is calculated as follows:

$$\text{RTOBLAMT}_{q, (j, k)} = (-1) * \text{RTOBLPR}_{(j, k)} * \text{RTOBL}_{q, (j, k)}$$

- (2) In the event that ERCOT is unable to execute the DAM, ERCOT shall pay or charge the owner of each PTP Obligation based on the difference in Real-Time Settlement Point Prices between the sink Settlement Point and the source Settlement Point. The payment or charge to each CRR Owner for a given Operating Hour of its PTP Obligations with each pair of source and sink Settlement Points is calculated as follows:

$$\text{NDRTOBLAMT}_{o, (j, k)} = (-1) * \text{RTOBLPR}_{(j, k)} * \text{DAOBL}_{o, (j, k)}$$

Where:

$$\text{RTOBLPR}_{(j, k)} = \frac{\sum_{i=1}^4 (\text{RTSPP}_{k, i} - \text{RTSPP}_{j, i})}{4}$$

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The above variables are defined as follows:

Variable	Unit	Definition
$RTOBLAMT_{q, (j, k)}$	\$	<i>Real-Time Obligation Amount per QSE per pair of source and sink</i> —The payment or charge to QSE q for its PTP Obligations with the source j and the sink k settled in Real-Time, for the hour.
$NDRTOBLAMT_{o, (j, k)}$	\$	<i>No DAM Real-Time Obligation Amount per CRR Owner per pair of source and sink</i> —The payment or charge to CRR Owner o for its PTP Obligations with the source j and the sink k settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
$RTOBLPR_{(j, k)}$	\$/MW per hour	<i>Real-Time Obligation Price</i> —The Real-Time price of the PTP Obligation, for the hour.
$RTSPP_{j, i}$	\$/MWh	<i>Real-Time Settlement Point Price at source per interval</i> —The Real-Time Settlement Point Price at the source j for the 15-minute Settlement Interval i .
$RTSPP_{k, i}$	\$/MWh	<i>Real-Time Settlement Point Price at sink per interval</i> —The Real-Time Settlement Point Price at the sink k for the 15-minute Settlement Interval i .
$RTOBL_{q, (j, k)}$	MW	<i>Real-Time Obligation per QSE per pair of source and sink</i> —The number of QSE q 's PTP Obligations for the source j and the sink k settled in Real-Time for the hour.
$DAOBL_{o, (j, k)}$	MW	<i>Day-Ahead Obligation per CRR Owner per source and sink pair</i> —The number of CRR Owner o 's PTP Obligations with the source j and the sink k settled in the DAM for the hour. See Section 7.9.1.1, Payments and Charges for PTP Obligations Settled in DAM.
o	none	A CRR Owner.
q	none	A QSE.
i	none	A 15-minute Settlement Interval in the Operating Hour.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.

- (3) The net total payment or charge to each QSE for the Operating Hour of all its PTP Obligations settled in Real-Time is calculated as follows:

$$RTOBLAMTQSETOT_q = \sum_j \sum_k RTOBLAMT_{q, (j, k)}$$

The above variables are defined as follows:

Variable	Unit	Definition
$RTOBLAMTQSETOT_q$	\$	<i>Real-Time Obligation Amount QSE Total per QSE</i> —The net total payment or charge to QSE q of all its PTP Obligations settled in Real-Time, for the hour.
$RTOBLAMT_{q, (j, k)}$	\$	<i>Real-Time Obligation Amount per QSE per pair of source and sink</i> —The payment or charge to QSE q for the PTP Obligations with the source j and the sink k settled in Real-Time, for the hour.
q	none	A QSE.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.

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- (4) If ERCOT is unable to execute DAM, the net total payment or charge to each CRR Owner for the Operating Hour of all its PTP Obligations settled in Real-Time is calculated as follows:

$$\text{NDRTOBLAMTOTOT}_o = \sum_j \sum_k \text{NDRTOBLAMT}_{o,(j,k)}$$

The above variables are defined as follows:

Variable	Unit	Definition
NDRTOBLAMTOTOT_o	\$	No DAM Real-Time Obligation Amount Owner Total per CRR Owner—The net total payment or charge to CRR Owner o of all its PTP Obligations settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
$\text{NDRTOBLAMT}_{o,(j,k)}$	\$	No DAM Real-Time Obligation Amount per CRR Owner per pair of source and sink—The payment or charge to CRR Owner o for its PTP Obligations with the source j and the sink k settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
o	None	A CRR Owner.
j	None	A source Settlement Point.
k	None	A sink Settlement Point.

[NPRR322: Replace Section 7.9.2.1 above with the following upon system implementation:]

7.9.2.1 Payments and Charges for PTP Obligations Settled in Real-Time

- (1) ERCOT shall pay the Qualified Scheduling Entity (QSE) of each cleared PTP Obligation with links to an Option the positive difference in Real-Time Settlement Point Prices between the sink Settlement Point and the source Settlement Point. The payment to each QSE for a given Operating Hour of its cleared PTP Obligation with links to an Option with each pair of source and sink Settlement Points is calculated as follows:

$$\text{RTOBLLOAMT}_{q,(j,k)} = (-1) * \text{MAX}(0, \text{RTOBLPR}_{(j,k)}) * \text{RTOBLLO}_{q,(j,k)}$$

- (2) ERCOT shall pay or charge the Qualified Scheduling Entity (QSE) of each PTP Obligation acquired in the DAM the difference in Real-Time Settlement Point Prices between the sink Settlement Point and the source Settlement Point. The payment or charge to each QSE for a given Operating Hour of its cleared PTP Obligations with each pair of source and sink Settlement Points is calculated as follows:

$$\text{RTOBLAMT}_{q,(j,k)} = (-1) * \text{RTOBLPR}_{(j,k)} * \text{RTOBL}_{q,(j,k)}$$

- (23) In the event that ERCOT is unable to execute the DAM, ERCOT shall pay or charge the owner of each PTP Obligation based on the difference in Real-Time Settlement Point Prices between the sink Settlement Point and the source Settlement Point. The payment or charge to each CRR Owner for a given Operating Hour of its PTP Obligations with each pair of source and sink Settlement Points is calculated as follows:

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$$\text{NDRTOBLAMT}_{o, (j, k)} = (-1) * \text{RTOBLPR}_{(j, k)} * \text{DAOBL}_{o, (j, k)}$$

Where:

$$\text{RTOBLPR}_{(j, k)} = \sum_{i=1}^4 (\text{RTSPP}_{k, i} - \text{RTSPP}_{j, i}) / 4$$

The above variables are defined as follows:

Variable	Unit	Definition
$\text{RTOBLAMT}_{q, (j, k)}$	\$	<i>Real-Time Obligation Amount per QSE per pair of source and sink—The payment or charge to QSE q for its PTP Obligations with the source j and the sink k settled in Real-Time, for the hour.</i>
<u>$\text{RTOBLOAMT}_{q, (j, k)}$</u>	<u>\$</u>	<u><i>Real-Time Obligation with Links to an Option Amount per QSE per pair of source and sink—The payment to QSE q for its PTP Obligations with Links to an Option with the source j and the sink k settled in Real-Time, for the hour.</i></u>
$\text{NDRTOBLAMT}_{o, (j, k)}$	\$	<i>No DAM Real-Time Obligation Amount per CRR Owner per pair of source and sink—The payment or charge to CRR Owner o for its PTP Obligations with the source j and the sink k settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.</i>
$\text{RTOBLPR}_{(j, k)}$	\$/MW per hour	<i>Real-Time Obligation Price—The Real-Time price of the PTP Obligation, for the hour.</i>
$\text{RTSPP}_{j, i}$	\$/MWh	<i>Real-Time Settlement Point Price at source per interval—The Real-Time Settlement Point Price at the source j for the 15-minute Settlement Interval i.</i>
$\text{RTSPP}_{k, i}$	\$/MWh	<i>Real-Time Settlement Point Price at sink per interval—The Real-Time Settlement Point Price at the sink k for the 15-minute Settlement Interval i.</i>
$\text{RTOBL}_{q, (j, k)}$	MW	<i>Real-Time Obligation per QSE per pair of source and sink—The number of QSE q's PTP Obligations for the source j and the sink k settled in Real-Time for the hour.</i>
<u>$\text{RTOBLO}_{q, (j, k)}$</u>	<u>MW</u>	<u><i>Real-Time Obligation per QSE per pair of source and sink—The number of QSE q's PTP Obligations with Links to an Option for the source j and the sink k settled in Real-Time for the hour.</i></u>
$\text{DAOBL}_{o, (j, k)}$	MW	<i>Day-Ahead Obligation per CRR Owner per source and sink pair—The number of CRR Owner o's PTP Obligations with the source j and the sink k settled in the DAM for the hour. See Section 7.9.1.1, Payments and Charges for PTP Obligations Settled in DAM.</i>
o	none	A CRR Owner.
q	none	A QSE.
i	none	A 15-minute Settlement Interval in the Operating Hour.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.

- (34) The net total payment or charge to each QSE for the Operating Hour of all its PTP Obligations settled in Real-Time is calculated as follows:

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$$RTOBLAMTQSETOT_q = \sum_j \sum_k RTOBLAMT_{q,(j,k)}$$

The above variables are defined as follows:

Variable	Unit	Definition
$RTOBLAMTQSETOT_q$	\$	<i>Real-Time Obligation Amount QSE Total per QSE</i> —The net total payment or charge to QSE q of all its PTP Obligations settled in Real-Time, for the hour.
$RTOBLAMT_{q,(j,k)}$	\$	<i>Real-Time Obligation Amount per QSE per pair of source and sink</i> —The payment or charge to QSE q for the PTP Obligations with the source j and the sink k settled in Real-Time, for the hour.
q	none	A QSE.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.

(5) The net total payment to each QSE for the Operating Hour of all its PTP Obligations with Links to Options settled in Real-Time is calculated as follows:

$$RTOBLLOAMTQSETOT_q = \sum_j \sum_k RTOBLLOAMT_{q,(j,k)}$$

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Field Code Changed

The above variables are defined as follows:

Variable	Unit	Definition
$RTOBLLOAMTQSETOT_q$	\$	<i>Real-Time Obligation with Links to an Option Amount QSE Total per QSE</i> —The net total payment to QSE q of all its PTP Obligations with Links to an Option settled in Real-Time, for the hour.
$RTOBLLOAMT_{q,(j,k)}$	\$	<i>Real-Time Obligation with Links to an Option Amount per QSE per pair of source and sink</i> —The payment to QSE q for the PTP Obligations with Links to an Option with the source j and the sink k settled in Real-Time, for the hour.
q	none	A QSE.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.

(46) If ERCOT is unable to execute DAM, the net total payment or charge to each CRR Owner for the Operating Hour of all its PTP Obligations settled in Real-Time is calculated as follows:

$$NDRTOBLAMTOTOT_o = \sum_j \sum_k NDRTOBLAMT_{o,(j,k)}$$

The above variables are defined as follows:

Variable	Unit	Definition
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NDRTOTBLAMT _o	\$	No DAM Real-Time Obligation Amount Owner Total per CRR Owner—The net total payment or charge to CRR Owner <i>o</i> of all its PTP Obligations settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
NDRTOTBLAMT _{o, (j, k)}	\$	No DAM Real-Time Obligation Amount per CRR Owner per pair of source and sink—The payment or charge to CRR Owner <i>o</i> for its PTP Obligations with the source <i>j</i> and the sink <i>k</i> settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
<i>o</i>	None	A CRR Owner.
<i>j</i>	None	A source Settlement Point.
<i>k</i>	None	A sink Settlement Point.

7.9.2.2 Payments for PTP Options Settled in Real-Time

- (1) Except as specified in paragraphs (2) and (3) below, ERCOT shall pay the NOIE that owns a PTP Option that was declared before DAM execution by the NOIE to be settled in Real-Time and not cleared in the DAM, the positive difference in Real-Time Settlement Point Prices between the sink and the source.
- (2) For PTP Options that source or sink at a Resource Node, the PTP Option payment may be reduced due to Transmission Elements that are oversold in previous CRR Auctions.
- (3) When the DAM is not executed, ERCOT shall pay the owner of each PTP Option based on the positive difference in Real-Time Settlement Point Prices between the sink Settlement Point and the source Settlement Point. ERCOT shall not reduce the PTP Option payment as specified in paragraph (2) above due to Transmission Elements that are oversold in previous CRR Auctions. The payment to each CRR Owner for a given Operating Hour of its PTP Options with each pair of source and sink Settlement Points is calculated as follows:

$$\text{NDRTOPTAMT}_{o, (j, k)} = (-1) * \text{NDRTOPTTP}_{o, (j, k)}$$

Where:

The target payment if ERCOT is unable to execute the DAM:

$$\text{NDRTOPTTP}_{o, (j, k)} = \text{RTOPTPR}_{(j, k)} * \text{DAOPT}_{o, (j, k)}$$

- (4) When the DAM is executed, the payment to each NOIE CRR Owner for a given Operating Hour of the PTP Options with each pair of source and sink Settlement Points settled in Real-Time is calculated as follows:

If the source, *j*, is a Load Zone or Hub and the sink, *k*, is also a Load Zone or Hub, then

$$\text{RTOPTAMT}_{o, (j, k)} = (-1) * \text{RTOPTTP}_{o, (j, k)}$$

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If either the source, j , or the sink, k , is a Resource Node, then

$$\text{RTOPTAMT}_{o, (j, k)} = (-1) * \text{Max} ((\text{RTOPTTP}_{o, (j, k)} - \text{RTOPTDA}_{o, (j, k)}), \text{Min} (\text{RTOPTTP}_{o, (j, k)}, \text{RTOPTHV}_{o, (j, k)}))$$

Where:

The target payment:

$$\begin{aligned} \text{RTOPTTP}_{o, (j, k)} &= \text{RTOPTPR}_{(j, k)} * \text{RTOPT}_{o, (j, k)} \\ \text{RTOPTPR}_{(j, k)} &= \sum_{i=1}^4 \text{Max} (0, \text{RTSPP}_{k, i} - \text{RTSPP}_{j, i}) / 4 \end{aligned}$$

The derated amount:

$$\begin{aligned} \text{RTOPTDA}_{o, (j, k)} &= \text{OPTDRPR}_{(j, k)} * \text{RTOPT}_{o, (j, k)} \\ \text{OPTDRPR}_{(j, k)} &= \sum_c (\text{Max} (0, \text{DAWASF}_{j, c} - \text{DAWASF}_{k, c}) * \text{DASP}_c * \text{DRF}_c) \end{aligned}$$

The hedge value:

$$\text{RTOPTHV}_{o, (j, k)} = \text{RTOPTHVPR}_{(j, k)} * \text{RTOPT}_{o, (j, k)}$$

If the source, j , is a Load Zone or Hub and the sink, k , is a Resource Node,

$$\text{RTOPTHVPR}_{(j, k)} = \sum_{i=1}^4 \text{Max} (0, \text{MAXRESPR}_k - \text{RTSPP}_{j, i}) / 4$$

If the source, j , is a Resource Node and the sink, k , is a Load Zone or Hub,

$$\text{RTOPTHVPR}_{(j, k)} = \sum_{i=1}^4 \text{Max} (0, \text{RTSPP}_{k, i} - \text{MINRESPR}_j) / 4$$

If the source, j , is a Resource Node and the sink, k , is also a Resource Node,

$$\text{RTOPTHVPR}_{(j, k)} = \text{Max} (0, \text{MAXRESPR}_k - \text{MINRESPR}_j)$$

The above variables are defined as follows:

Variable	Unit	Definition
$\text{RTOPTAMT}_{o, (j, k)}$	\$	<i>Real-Time Option Amount per CRR Owner per source and sink pair</i> —The payment to NOIE CRR Owner o of PTP Options with the source j and the sink k settled in Real-Time, for the hour.
$\text{NDRTOPTAMT}_{o, (j, k)}$	\$	<i>No DAM Real-Time Option Amount per CRR Owner per source and sink pair</i> —The payment to CRR Owner o of PTP Options with the source j and the sink k settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.

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Variable	Unit	Definition
RTOPTTP _{o, (j, k)}	\$	<i>Real-Time Option Target Payment per CRR Owner per source and sink pair</i> —The target payment for CRR Owner <i>o</i> 's PTP Options with the source <i>j</i> and the sink <i>k</i> settled in Real-Time, for the hour.
NDRTOPTTP _{o, (j, k)}	\$	<i>No DAM Real-Time Option Target Payment per CRR Owner per source and sink pair</i> —The target payment for CRR Owner <i>o</i> 's PTP Options with the source <i>j</i> and the sink <i>k</i> settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
RTOPTHV _{o, (j, k)}	\$	<i>Real-Time Option Hedge Value per CRR Owner per source and sink pair</i> —The hedge value of CRR Owner <i>o</i> 's PTP Options with the source <i>j</i> and the sink <i>k</i> settled in Real-Time, for the hour.
RTOPTDA _{o, (j, k)}	\$	<i>Real-Time Option Derated Amount per CRR Owner per source and sink pair</i> —The derated amount of CRR Owner <i>o</i> 's PTP Options with the source <i>j</i> and the sink <i>k</i> settled in Real-Time, for the hour.
RTOPTPR _(j, k)	\$/MW per hour	<i>Real-Time Option Price per source and sink pair</i> —The Real-Time price of a PTP Option with the source <i>j</i> and the sink <i>k</i> for the hour.
RTSPP _{j, i}	\$/MWh	<i>Real-Time Settlement Point Price at source per interval</i> —The Real-Time Settlement Point Price at the source Settlement Point <i>j</i> , for the 15-minute Settlement Interval <i>i</i> .
RTSPP _{k, i}	\$/MWh	<i>Real-Time Settlement Point Price at sink per interval</i> —The Real-Time Settlement Point Price at the sink Settlement Point <i>k</i> , for the 15-minute Settlement Interval <i>i</i> .
OPTDRPR _(j, k)	\$/MW per hour	<i>Option Deration Price per source and sink pair</i> —The deration price of a PTP Option with the source <i>j</i> and the sink <i>k</i> , for the hour.
DASP _c	\$/MW per hour	<i>Day-Ahead Shadow Price per constraint</i> —The DAM Shadow Price of the constraint <i>c</i> for the hour.
DRF _c	none	<i>Deration Factor per constraint</i> —The deration factor of the constraint <i>c</i> for the hour, equal to the MW amount by which the constraint is oversold divided by the total MW amount of the positive impacts on the constraint of all CRRs existing prior to DAM execution.
DAWASF _{j, c}	none	<i>Day-Ahead Weighted Average Shift Factor at source per constraint</i> —The Day-Ahead Shift Factor for the source Settlement Point and the constrained directional network element for constraint <i>c</i> , in the hour.
DAWASF _{k, c}	none	<i>Day-Ahead Weighted Average Shift Factor at sink per constraint</i> —The Day-Ahead Shift Factor for the sink Settlement Point and the constrained directional network element for constraint <i>c</i> , in the hour.
RTOPTHVPR _(j, k)	\$/MWh	<i>Real-Time Option Hedge Value Price per source and sink pair</i> —The Day-Ahead hedge price of a PTP Option with the source <i>j</i> and the sink <i>k</i> , for the hour.
MINRESPR _j	\$/MWh	<i>Minimum Resource Price for source</i> —The lowest Minimum Resource Price for Resources located at the source Settlement Point <i>j</i> .
MAXRESPR _k	\$/MWh	<i>Max Resource Price for sink</i> —The highest Maximum Resource Price for Resources located at the sink Settlement Point <i>k</i> .
RTOPT _{o, (j, k)}	MW	<i>Real-Time Option per CRR Owner per pair of source and sink</i> —The number of NOIE CRR Owner <i>o</i> 's PTP Options with the source <i>j</i> and the sink <i>k</i> settled in Real-Time for the hour.
DAOPT _{o, (j, k)}	MW	<i>Day-Ahead Option per CRR Owner per source and sink pair</i> —The number of CRR Owner <i>o</i> 's PTP Options with the source <i>j</i> and the sink <i>k</i> settled in the DAM for the hour. See Section 7.9.1.2, Payments for PTP Options Settled in DAM.

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Variable	Unit	Definition
o	none	A CRR Owner.
i	none	A 15-minute Settlement Interval in the Operating Hour.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.
c	none	A DAM constraint associated with a directional network element for the hour.

- (5) The total payment to each NOIE CRR Owner for the Operating Hour of all its PTP Options settled in Real-Time is calculated as follows:

$$RTOPTAMTOTOT_o = \sum_j \sum_k RTOPTAMT_{o, (j, k)}$$

The above variables are defined as follows:

Variable	Unit	Definition
$RTOPTAMTOTOT_o$	\$	<i>Real-Time Option Amount Owner Total per CRR Owner</i> —The total payment to NOIE CRR Owner <i>o</i> for all its PTP Options settled in Real-Time, for the hour.
$RTOPTAMT_{o, (j, k)}$	\$	<i>Real-Time Option Amount per CRR Owner per pair of source and sink</i> —The payment to NOIE CRR Owner <i>o</i> for its PTP Options with the source <i>j</i> and the sink <i>k</i> settled in Real-Time, for the hour.
o	none	A CRR Owner.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.

- (6) If ERCOT is unable to execute the DAM, the total payment to each CRR Owner for the Operating Hour of all its PTP Options settled in Real-Time is calculated as follows:

$$NDRTOPTAMTOTOT_o = \sum_j \sum_k NDRTOPTAMT_{o, (j, k)}$$

The above variables are defined as follows:

Variable	Unit	Definition
$NDRTOPTAMTOTOT_o$	\$	<i>No DAM Real-Time Option Amount Owner Total per CRR Owner</i> —The total payment to CRR Owner <i>o</i> for all its PTP Options settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
$NDRTOPTAMT_{o, (j, k)}$	\$	<i>No DAM Real-Time Option Amount per CRR Owner per pair of source and sink</i> —The payment to CRR Owner <i>o</i> for its PTP Options with the source <i>j</i> and the sink <i>k</i> settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
o	none	A CRR Owner.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.

- (7) For informational purposes, the following calculation of PTP Option value shall be posted on the MIS Public Area:

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$$\text{RTOPTPRINFO}_{(j, k)} = \sum_c \left[\sum_y (\text{RTSP}_{c, y} * \text{Max}(0, \text{RTWASF}_{j, c, y} - \text{RTWASF}_{k, c, y}) * \text{TLMP}_y) / (\sum_y \text{TLMP}_y) \right]$$

The above variables are defined as follows:

Variable	Unit	Definition
$\text{RTOPTPRINFO}_{(j, k)}$	\$/MW per hour	<i>Real-Time Option Price per pair of source and sink</i> —The Real-Time price of the PTP Options with the source Settlement Point <i>j</i> and the sink Settlement Point <i>k</i> , for the hour.
$\text{RTWASF}_{j, c, y}$	none	<i>Real-Time Weighted Average Shift Factor at source per constraint per SCED interval</i> —The Real-Time Shift Factor for the source Settlement Point and for the constrained directional network element for constraint <i>c</i> , in the SCED interval <i>y</i> .
$\text{RTWASF}_{k, c, y}$	none	<i>Real-Time Weighted Average Shift Factor at sink per constraint per SCED interval</i> —The Real-Time Shift Factor for the sink Settlement Point and for the constrained directional network element for constraint <i>c</i> , in the SCED interval <i>y</i> .
$\text{RTSP}_{c, y}$	\$/MW per hour	<i>Real-Time Shadow Price per constraint per SCED interval</i> —The Real-Time Shadow Price for the constraint <i>c</i> in the SCED interval <i>y</i> .
TLMP_y	second	<i>Duration of SCED interval per interval</i> —The duration of the portion of the SCED interval <i>y</i> within the hour.
<i>c</i>	none	A constraint associated with a directional network element for the hour
<i>y</i>	none	A SCED interval in the hour.

[NPRR322: Replace Section 7.9.2.2 above with the following upon system implementation:]

7.9.2.2 Payments for PTP Options Settled in Real-Time

- (1) ~~Except as specified in paragraphs (2) and (3) below, ERCOT shall pay the NOIE that owns a PTP Option that was declared before DAM execution by the NOIE to be settled in Real Time and not cleared in the DAM, the positive difference in Real Time Settlement Point Prices between the sink and the source.~~
- (2) ~~For PTP Options that source or sink at a Resource Node, the PTP Option payment may be reduced due to Transmission Elements that are oversold in previous CRR Auctions.~~
- (3) When the DAM is not executed, ERCOT shall pay the owner of each PTP Option based on the positive difference in Real-Time Settlement Point Prices between the sink Settlement Point and the source Settlement Point. ~~ERCOT shall not reduce the PTP Option payment as specified in paragraph (2) above due to Transmission Elements that are oversold in previous CRR Auctions.~~ The payment to each CRR Owner for a given Operating Hour of its PTP Options with each pair of source and sink Settlement Points is calculated as follows:

$$\text{NDRTOPTAMT}_{o, (j, k)} = (-1) * \text{NDRTOPTTP}_{o, (j, k)}$$

Where:

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The target payment if ERCOT is unable to execute the DAM:

$$\text{NDRTOPTTP}_{o,(j,k)} = \text{RTOPTPR}_{(j,k)} * \text{DAOPT}_{o,(j,k)}$$

$$\text{RTOPTPR}_{(j,k)} = \frac{\sum_{i=1}^4 \text{Max}(0, \text{RTSPP}_{k,i} - \text{RTSPP}_{j,i})}{4}$$

The above variables are defined as follows:

Variable	Unit	Definition
$\text{NDRTOPTAMT}_{o,(j,k)}$	\$	<u>No DAM Real-Time Option Amount per CRR Owner per source and sink pair—The payment to CRR Owner o of PTP Options with the source j and the sink k settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.</u>
$\text{NDRTOPTTP}_{o,(j,k)}$	\$	<u>No DAM Real-Time Option Target Payment per CRR Owner per source and sink pair—The target payment for CRR Owner o's PTP Options with the source j and the sink k settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.</u>
$\text{RTOPTPR}_{(j,k)}$	\$/MW per hour	<u>Real-Time Option Price per source and sink pair—The Real-Time price of a PTP Option or PTP Option with Refund with the source j and the sink k for the hour.</u>
$\text{DAOPT}_{o,(j,k)}$	MW	<u>Day-Ahead Option per CRR Owner per source and sink pair—The number of CRR Owner o's PTP Options with the source j and the sink k settled in the DAM for the hour. See Section 7.9.1.2, Payments for PTP Options Settled in DAM.</u>
$\text{RTSPP}_{j,i}$	\$/MWh	<u>Real-Time Settlement Point Price at source per interval—The Real-Time Settlement Point Price at the source Settlement Point j, for the 15-minute Settlement Interval i.</u>
$\text{RTSPP}_{k,i}$	\$/MWh	<u>Real-Time Settlement Point Price at sink per interval—The Real-Time Settlement Point Price at the sink Settlement Point k, for the 15-minute Settlement Interval i.</u>
o	none	<u>A CRR Owner.</u>
j	none	<u>A source Settlement Point.</u>
k	none	<u>A sink Settlement Point.</u>

(4) When the DAM is executed, the payment to each NOIE CRR Owner for a given Operating Hour of the PTP Options with each pair of source and sink Settlement Points settled in Real Time is calculated as follows:

If the source, j , is a Load Zone or Hub and the sink, k , is also a Load Zone or Hub, then

$$\text{RTOPTAMT}_{o,(j,k)} = (-1) * \text{RTOPTTP}_{o,(j,k)}$$

If either the source, j , or the sink, k , is a Resource Node, then

$$\text{RTOPTAMT}_{o,(j,k)} = (-1) * \text{Max}((\text{RTOPTTP}_{o,(j,k)} - \text{RTOPTDA}_{o,(j,k)}), \text{Min}(\text{RTOPTTP}_{o,(j,k)}, \text{RTOPTHV}_{o,(j,k)}))$$

Where:

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The target payment:

$$RTOPTTP_{o,(j,k)} = \frac{RTOPTPR_{(j,k)} * RTOPT_{o,(j,k)}}{RTOPTPR_{(j,k)} - \frac{\sum_{i=1}^4 \text{Max}(0, RTSPP_{k,i} - RTSPP_{j,i})}{4}}$$

The derated amount:

$$RTOPTDA_{o,(j,k)} = \frac{OPTDRPR_{(j,k)} * RTOPT_{o,(j,k)}}{OPTDRPR_{(j,k)} - \sum_c (\text{Max}(0, DAWASF_{j,c} - DAWASF_{k,c}) * DASP_c * DRF_c)}$$

The hedge value:

$$RTOPTHV_{o,(j,k)} = \frac{RTOPTHVPR_{(j,k)} * RTOPT_{o,(j,k)}}{\text{If the source, } j, \text{ is a Load Zone or Hub and the sink, } k, \text{ is a Resource Node,}} \\ RTOPTHVPR_{(j,k)} = \frac{\sum_{i=1}^4 \text{Max}(0, \text{MAXRESPR}_k - RTSPP_{j,i})}{4} \\ \text{If the source, } j, \text{ is a Resource Node and the sink, } k, \text{ is a Load Zone or Hub,}} \\ RTOPTHVPR_{(j,k)} = \frac{\sum_{i=1}^4 \text{Max}(0, RTSPP_{k,i} - \text{MINRESPR}_j)}{4} \\ \text{If the source, } j, \text{ is a Resource Node and the sink, } k, \text{ is also a Resource Node,}} \\ RTOPTHVPR_{(j,k)} = \text{Max}(0, \text{MAXRESPR}_k - \text{MINRESPR}_j)$$

The above variables are defined as follows:

Variable	Unit	Definition
$RTOPTAMT_{o,(j,k)}$	\$	Real-Time Option Amount per CRR Owner per source and sink pair—The payment to NOIE CRR Owner <i>o</i> of PTP Options with the source <i>j</i> and the sink <i>k</i> settled in Real-Time, for the hour.
$NDRTOPTAMT_{o,(j,k)}$	\$	No DAM Real-Time Option Amount per CRR Owner per source and sink pair—The payment to CRR Owner <i>o</i> of PTP Options with the source <i>j</i> and the sink <i>k</i> settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
$RTOPTTP_{o,(j,k)}$	\$	Real-Time Option Target Payment per CRR Owner per source and sink pair—The target payment for CRR Owner <i>o</i> 's PTP Options with the source <i>j</i> and the sink <i>k</i> settled in Real-Time, for the hour.
$NDRTOPTTP_{o,(j,k)}$	\$	No DAM Real-Time Option Target Payment per CRR Owner per source and sink pair—The target payment for CRR Owner <i>o</i> 's PTP Options with the source <i>j</i> and the sink <i>k</i> settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.

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$RTOPTHV_{o,(j,k)}$	\$	Real-Time Option Hedge Value per CRR Owner per source and sink pair—The hedge value of CRR Owner o's PTP Options with the source j and the sink k settled in Real-Time, for the hour.
$RTOPTDA_{o,(j,k)}$	\$	Real-Time Option Derated Amount per CRR Owner per source and sink pair—The derated amount of CRR Owner o's PTP Options with the source j and the sink k settled in Real-Time, for the hour.
$RTOPTPR_{(j,k)}$	\$/MW per hour	Real-Time Option Price per source and sink pair—The Real-Time price of a PTP Option with the source j and the sink k for the hour.
$RTSPP_{j,i}$	\$/MWh	Real-Time Settlement Point Price at source per interval—The Real-Time Settlement Point Price at the source Settlement Point j, for the 15-minute Settlement Interval i.
$RTSPP_{k,i}$	\$/MWh	Real-Time Settlement Point Price at sink per interval—The Real-Time Settlement Point Price at the sink Settlement Point k, for the 15-minute Settlement Interval i.
$OPTDRPR_{(j,k)}$	\$/MW per hour	Option Deration Price per source and sink pair—The deration price of a PTP Option with the source j and the sink k, for the hour.
$DASP_e$	\$/MW per hour	Day-Ahead Shadow Price per constraint—The DAM Shadow Price of the constraint e for the hour.
DRF_e	none	Deration Factor per constraint—The deration factor of the constraint e for the hour, equal to the MW amount by which the constraint is oversold divided by the total MW amount of the positive impacts on the constraint of all CRRs existing prior to DAM execution.
$DAWASF_{j,e}$	none	Day-Ahead Weighted Average Shift Factor at source per constraint—The Day-Ahead Shift Factor for the source Settlement Point and the constrained directional network element for constraint e, in the hour.
$DAWASF_{k,e}$	none	Day-Ahead Weighted Average Shift Factor at sink per constraint—The Day-Ahead Shift Factor for the sink Settlement Point and the constrained directional network element for constraint e, in the hour.
$RTOPTHVPR_{(j,k)}$	\$/MWh	Real-Time Option Hedge Value Price per source and sink pair—The Day-Ahead hedge price of a PTP Option with the source j and the sink k, for the hour.
$MINRESPR_j$	\$/MWh	Minimum Resource Price for source—The lowest Minimum Resource Price for Resources located at the source Settlement Point j.
$MAXRESPR_k$	\$/MWh	Max Resource Price for sink—The highest Maximum Resource Price for Resources located at the sink Settlement Point k.
$RTOPT_{o,(j,k)}$	MW	Real-Time Option per CRR Owner per pair of source and sink—The number of NOIE CRR Owner o's PTP Options with the source j and the sink k settled in Real-Time for the hour.
$DAOPT_{o,(j,k)}$	MW	Day-Ahead Option per CRR Owner per source and sink pair—The number of CRR Owner o's PTP Options with the source j and the sink k settled in the DAM for the hour. See Section 7.9.1.2, Payments for PTP Options Settled in DAM.
o	none	A CRR Owner.
i	none	A 15-minute Settlement Interval in the Operating Hour.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.
e	none	A DAM constraint associated with a directional network element for the hour.

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~~(5) The total payment to each NOIE CRR Owner for the Operating Hour of all its PTP Options settled in Real Time is calculated as follows:~~

$$\text{RTOPTAMTOTOT}_o = \sum_j \sum_k \text{RTOPTAMT}_{o,(j,k)}$$

The above variables are defined as follows:

Variable	Unit	Definition
RTOPTAMTOTOT_o	\$	Real Time Option Amount Owner Total per CRR Owner—The total payment to NOIE CRR Owner o for all its PTP Options settled in Real Time, for the hour.
RTOPTAMT_{o,(j,k)}	\$	Real Time Option Amount per CRR Owner per pair of source and sink—The payment to NOIE CRR Owner o for its PTP Options with the source j and the sink k settled in Real Time, for the hour.
o	none	A CRR Owner.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.

~~(26) If ERCOT is unable to execute the DAM, the total payment to each CRR Owner for the Operating Hour of all its PTP Options settled in Real-Time is calculated as follows:~~

$$\text{NDRTOPTAMTOTOT}_o = \sum_j \sum_k \text{NDRTOPTAMT}_{o,(j,k)}$$

The above variables are defined as follows:

Variable	Unit	Definition
NDRTOPTAMTOTOT_o	\$	No DAM Real-Time Option Amount Owner Total per CRR Owner—The total payment to CRR Owner o for all its PTP Options settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
NDRTOPTAMT_{o,(j,k)}	\$	No DAM Real-Time Option Amount per CRR Owner per pair of source and sink—The payment to CRR Owner o for its PTP Options with the source j and the sink k settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
o	none	A CRR Owner.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.

~~(7) For informational purposes, the following calculation of PTP Option value shall be posted on the MIS Public Area:~~

$$\text{RTOPTPRINFO}_{(j,k)} = \frac{\sum_c \{ \sum_y (\text{RTSP}_{c,y} * \text{Max}(0, \text{RTWASF}_{j,c,y} - \text{RTWASF}_{k,c,y}) * \text{TLMP}_y) \}}{(\sum_y \text{TLMP}_y)}$$

The above variables are defined as follows:

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Variable	Unit	Definition
$RTOPTPRINFO_{(j,k)}$	$\$/MW$ per hour	Real-Time Option Price per pair of source and sink—The Real-Time price of the PTP Options with the source Settlement Point j and the sink Settlement Point k, for the hour.
$RTWASF_{j,e,y}$	none	Real-Time Weighted Average Shift Factor at source per constraint per SCED interval—The Real-Time Shift Factor for the source Settlement Point and for the constrained directional network element for constraint e, in the SCED interval y.
$RTWASF_{k,e,y}$	none	Real-Time Weighted Average Shift Factor at sink per constraint per SCED interval—The Real-Time Shift Factor for the sink Settlement Point and for the constrained directional network element for constraint e, in the SCED interval y.
$RTSP_{e,y}$	$\$/MW$ per hour	Real-Time Shadow Price per constraint per SCED interval—The Real-Time Shadow Price for the constraint e in the SCED interval y.
$TLMP_y$	second	Duration of SCED interval per interval—The duration of the portion of the SCED interval y within the hour.
e	none	A constraint associated with a directional network element for the hour
y	none	A SCED interval in the hour.

7.9.2.3 Payments for NOIE PTP Options with Refund Settled in Real-Time

- (1) Except as specified in paragraphs (2) and (3) below, ERCOT shall pay the NOIE that owns a PTP Option with Refund that was allocated to that NOIE as a PCRR and that was, declared before DAM execution by the NOIE to be settled in Real-Time but not cleared in the DAM, for the MW quantity up to the pro rata actual usage based on the positive difference in Real-Time Settlement Point Price between the sink and the source.
- (2) The payment of PTP Options with Refund may be further reduced due to Transmission Elements that are oversold in previous CRR Auctions.
- (3) When the DAM is not executed, ERCOT shall pay the NOIE owner of each PTP Option with Refund that was allocated to that NOIE as a PCRR, for the quantity up to the actual usage based on the positive difference in Real-Time Settlement Point Prices between the sink Settlement Point and the source Settlement Point. ERCOT shall not reduce the PTP Options with Refund payment as specified in paragraph (2) above due to Transmission Elements that are oversold in previous CRR Auctions. The payment to each NOIE CRR Owner for a given Operating Hour of its PTP Options with Refund each pair of source and sink Settlement Points is calculated as follows:

$$NDRTOPTRAMT_{o,(j,k)} = (-1) * NDRTOPTRTP_{o,(j,k)}$$

Where:

The target payment if ERCOT is unable to execute the DAM:

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$$\text{NDRTOPTRTP}_{o, (j, k)} = \text{RTOPTPR}_{(j, k)} * \text{Min} (\text{DAOPTR}_{o, (j, k)}, \text{OPTRACT}_{o, (j, k)})$$

- (4) When the DAM is executed, the payment to each NOIE CRR Owner for a given Operating Hour of the PTP Options with Refund with each pair of source and sink Settlement Points settled in Real-Time is calculated as follows:

$$\text{RTOPTRAMT}_{o, (j, k)} = (-1) * \text{Max} ((\text{RTOPTRTP}_{o, (j, k)} - \text{RTOPTRDA}_{o, (j, k)}), \text{Min} (\text{RTOPTRTP}_{o, (j, k)}, \text{RTOPTRHV}_{o, (j, k)}))$$

Where:

The target payment:

$$\text{RTOPTRTP}_{o, (j, k)} = \text{RTOPTPR}_{(j, k)} * \text{Min} (\text{RTOPTR}_{o, (j, k)}, (\text{OPTRACT}_{o, (j, k)} * \text{RTOPTR}_{o, (j, k)} / (\text{RTOPTR}_{o, (j, k)} + \text{DAOPTR}_{o, (j, k)})))$$

$$\text{RTOPTPR}_{(j, k)} = \sum_{i=1}^4 \text{Max} (0, \text{RTSPP}_{k, i} - \text{RTSPP}_{j, i}) / 4$$

$$\text{OPTRACT}_{o, (j, k)} = \sum_r (\text{OPTROF}_{o, r} * \text{RESACT}_r * \text{OPTRF}_{o, r, (j, k)})$$

If (a valid OS_{r, y} exists for all SCED intervals within the hour)

$$\text{RESACT}_r = \sum_y \text{OS}_{r, y} * \text{TLMP}_y / (\sum_y \text{TLMP}_y)$$

Otherwise

$$\text{RESACT}_r = \text{TGFTH}_r$$

The derated amount:

$$\text{RTOPTRDA}_{o, (j, k)} = \text{OPTDRPR}_{(j, k)} * \text{Min} (\text{RTOPTR}_{o, (j, k)}, (\text{OPTRACT}_{o, (j, k)} * \text{RTOPTR}_{o, (j, k)} / (\text{RTOPTR}_{o, (j, k)} + \text{DAOPTR}_{o, (j, k)})))$$

$$\text{OPTDRPR}_{(j, k)} = \sum_c (\text{Max} (0, \text{DAWASF}_{j, c} - \text{DAWASF}_{k, c}) * \text{DASP}_c * \text{DRF}_c)$$

The hedge value:

$$\text{RTOPTRHV}_{o, (j, k)} = \text{RTOPTHVPR}_{(j, k)} * \text{Min} (\text{RTOPTR}_{o, (j, k)}, (\text{OPTRACT}_{o, (j, k)} * \text{RTOPTR}_{o, (j, k)} / (\text{RTOPTR}_{o, (j, k)} + \text{DAOPTR}_{o, (j, k)})))$$

$$\text{RTOPTHVPR}_{(j, k)} = \text{Max} (0, \text{RTSPP}_k - \text{MINRESPR}_j)$$

The above variables are defined as follows:

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Variable	Unit	Definition
$RTOPTRAMT_{o,(j,k)}$	\$	<i>Real-Time Option with Refund Amount per CRR Owner per pair of source and sink</i> —The payment to CRR Owner o of the PTP Options with Refund with the source j and the sink k , settled in Real-Time, for the hour.
$NDRTOPTRAMT_{o,(j,k)}$	\$	<i>No DAM Real-Time Option with Refund Amount per CRR Owner per pair of source and sink</i> —The payment to CRR Owner o of the PTP Options with Refund with the source j and the sink k , settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
$RTOPTRTP_{o,(j,k)}$	\$	<i>Real-Time Option with Refund Target Payment per CRR Owner per source and sink pair</i> —The target payment for CRR Owner o 's PTP Options with Refund, with the source j and the sink k , settled in Real-Time, for the hour.
$NDRTOPTRTP_{o,(j,k)}$	\$	<i>No DAM Real-Time Option with Refund Target Payment per CRR Owner per source and sink pair</i> —The target payment for CRR Owner o 's PTP Options with Refund, with the source j and the sink k , settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
$RTOPTRHV_{o,(j,k)}$	\$	<i>Real-Time Option with Refund Hedge Value per CRR Owner per source and sink pair</i> —The hedge value of CRR Owner o 's PTP Options with Refund, with the source j and the sink k , settled in Real-Time, for the hour.
$RTOPTRDA_{o,(j,k)}$	\$	<i>Real-Time Option with Refund Derated Amount per CRR Owner per source and sink pair</i> —The derated amount of CRR Owner o 's PTP Options with Refund, with the source j and the sink k , settled in Real-Time, for the hour.
$RTOPTPR_{(j,k)}$	\$/MW per hour	<i>Real-Time Option Price per pair of source and sink</i> —The Real-Time price of the PTP Options with the source j and the sink k , for the hour.
$RTSPP_{j,i}$	\$/MWh	<i>Real-Time Settlement Point Price at source per interval</i> —The Real-Time Settlement Point Price at the source j for the 15-minute Settlement Interval i .
$RTSPP_{k,i}$	\$/MWh	<i>Real-Time Settlement Point Price at sink per interval</i> —The Real-Time Settlement Point Price at the sink k for the 15-minute Settlement Interval i .
$OPTRACT_{o,(j,k)}$	MW	<i>Option with Refund Actual usage per CRR Owner per pair of source and sink</i> —CRR Owner o 's actual usage for the PTP Options with Refund with the source j and the sink k , for the hour.
$RESACT_r$	MW	<i>Resource Actual per Resource per hour</i> —The time-weighted average of the Output Schedule of Resource r (if a valid Output Schedule exists) or the telemetered output of Resource r , for the hour.
$OPTROF_{o,r}$	none	<i>Option with Refund Ownership Factor per CRR Owner per Resource</i> —The factor showing the percentage usage of Resource r for CRR Owner o 's PTP Options with Refund. Its value is 1, if only one CRR Owner uses this Resource for PCRRs under the refund provision.
$OS_{r,y}$	MW	<i>Output Schedule per Resource per SCED interval</i> —The Output Schedule submitted to ERCOT for Resource r for the SCED interval y .
$TGFTH_r$	MWh	<i>Telemetered Generation for the Hour per Resource per hour</i> —The telemetered generation of Generation Resource r , for the hour.

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Variable	Unit	Definition
OPTRF _{o, r, (j, k)}	none	<i>Option with Refund Factor per CRR Owner per Resource associated with pair of source and sink</i> —The ratio of CRR Owner <i>o</i> 's Resource <i>r</i> 's capacity allocated to the PTP Options with Refund with the source <i>j</i> and sink <i>k</i> to the same CRR Owner's total capacity for the Resource <i>r</i> nominated for all the PCRRs under the refund provision with the same source <i>j</i> .
TLMP _y	second	<i>Duration of SCED interval per interval</i> —The duration of the portion of the SCED interval <i>y</i> within the hour.
RTOPTR _(j, k)	MW	<i>Real-Time Option with Refund per pair of source and sink</i> —The number of the CRR Owner's PTP Options with Refund with the source <i>j</i> and the sink <i>k</i> , settled in Real-Time, for the hour.
DAOPTR _{o, (j, k)}	MW	<i>Day-Ahead Option with Refund per CRR Owner per pair of source and sink</i> —The number of CRR Owner <i>o</i> 's PTP Options with Refund settled in the DAM for the hour.
OPTDRPR _(j, k)	\$/MW per hour	<i>Option Deration Price per source and sink pair</i> —The deration price of a PTP Option with the source <i>j</i> and the sink <i>k</i> , for the hour.
DASP _c	\$/MW per hour	<i>Day-Ahead Shadow Price per constraint</i> —The DAM Shadow Price of the constraint <i>c</i> for the hour.
DRF _c	none	<i>Deration Factor per constraint</i> — The deration factor of the constraint <i>c</i> for the hour, equal to the MW amount by which the constraint is oversold divided by the total MW amount of the positive impacts on the constraint of all CRRs existing prior to DAM execution.
DAWASF _{j, c}	none	<i>Day-Ahead Weighted Average Shift Factor at source per constraint</i> —The Day-Ahead Shift Factor for the source Settlement Point and the directional network element for constraint <i>c</i> , in the hour.
DAWASF _{k, c}	none	<i>Day-Ahead Weighted Average Shift Factor at sink per constraint</i> —The Day-Ahead Shift Factor for the sink Settlement Point and the directional network element for constraint <i>c</i> , in the hour.
RTOPTHVPR _(j, k)	\$/MWh	<i>Real-Time Option Hedge Value Price per source and sink pair</i> —The Real-Time hedge price of a PTP Option with the source <i>j</i> and the sink <i>k</i> , for the hour.
MINRESPR _j	\$/MWh	<i>Minimum Resource Price for source</i> —The lowest Minimum Resource Price for Resources located at the source Settlement Point <i>j</i> .
<i>o</i>	none	A CRR Owner.
<i>r</i>	none	A Resource.
<i>y</i>	none	A SCED interval in the hour.
<i>j</i>	none	A source Settlement Point.
<i>k</i>	none	A sink Settlement Point.
<i>c</i>	none	A constraint associated with a directional network element for the hour.

- (5) The total payment to each NOIE CRR Owner for the Operating Hour of all its PTP Options with Refund settled in Real-Time is calculated as follows:

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$$\text{RTOPTRAMTOTOT}_o = \sum_j \sum_k \text{RTOPTRAMT}_{o, (j, k)}$$

The above variables are defined as follows:

Variable	Unit	Definition
RTOPTRAMTOTOT_o	\$	<i>Real-Time Option with Refund Amount Owner Total per CRR Owner</i> —The total payment to NOIE CRR Owner <i>o</i> for all its PTP Options with Refund settled in Real-Time, for the hour.
$\text{RTOPTRAMT}_{o, (j, k)}$	\$	<i>Real-Time Option with Refund Amount per CRR Owner per pair of source and sink</i> —The payment to NOIE CRR Owner <i>o</i> for the PTP Options with Refund with the source <i>j</i> and the sink <i>k</i> settled in Real-Time, for the hour.
<i>o</i>	none	A CRR Owner.
<i>j</i>	none	A source Settlement Point.
<i>k</i>	none	A sink Settlement Point.

- (6) If ERCOT is unable to execute the DAM, the total payment to each NOIE CRR Owner for the Operating Hour of all its PTP Options with Refund settled in Real-Time is calculated as follows:

$$\text{NDRTOPTRAMTOTOT}_o = \sum_j \sum_k \text{NDRTOPTRAMT}_{o, (j, k)}$$

The above variables are defined as follows:

Variable	Unit	Definition
NDRTOPTRAMTOTOT_o	\$	<i>No DAM Real-Time Option with Refund Amount Owner Total per CRR Owner</i> —The total payment to NOIE CRR Owner <i>o</i> for all its PTP Options with Refund settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
$\text{NDRTOPTRAMT}_{o, (j, k)}$	\$	<i>No DAM Real-Time Option with Refund Amount per CRR Owner per pair of source and sink</i> —The payment to NOIE CRR Owner <i>o</i> for the PTP Options with Refund with the source <i>j</i> and the sink <i>k</i> settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
<i>o</i>	None	A CRR Owner.
<i>j</i>	None	A source Settlement Point.
<i>k</i>	None	A sink Settlement Point.

[NPRR322: Replace Section 7.9.2.3 above with the following upon system implementation:]

7.9.2.3 Payments for NOIE PTP Options with Refund Settled in Real-Time

- (1) ~~Except as specified in paragraphs (2) and (3) below, ERCOT shall pay the NOIE that owns a PTP Option with Refund that was allocated to that NOIE as a PCRR and that was, declared before DAM execution by the NOIE to be settled in Real-Time but not cleared in the DAM, for the MW quantity up to the pro-rata actual usage based on the~~

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positive difference in Real-Time Settlement Point Price between the sink and the source.

~~(2) The payment of PTP Options with Refund may be further reduced due to Transmission Elements that are oversold in previous CRR Auctions.~~

~~(3)~~ When the DAM is not executed, ERCOT shall pay the NOIE owner of each PTP Option with Refund that was allocated to that NOIE as a PCRR, for the quantity up to the actual usage based on the positive difference in Real-Time Settlement Point Prices between the sink Settlement Point and the source Settlement Point. ~~ERCOT shall not reduce the PTP Options with Refund payment as specified in paragraph (2) above due to Transmission Elements that are oversold in previous CRR Auctions.~~ The payment to each NOIE CRR Owner for a given Operating Hour of its PTP Options with Refund each pair of source and sink Settlement Points is calculated as follows:

$$\text{NDRTOPTRAMT}_{o, (j, k)} = (-1) * \text{NDRTOPTRTP}_{o, (j, k)}$$

Where:

The target payment if ERCOT is unable to execute the DAM:

$$\text{NDRTOPTRTP}_{o, (j, k)} = \text{RTOPT} * \text{RPR}_{(j, k)} * \text{Min}(\text{DAOPTR}_{o, (j, k)}, \text{OPTRACT}_{o, (j, k)})$$

$$\text{OPTRACT}_{o, (j, k)} = \sum_r (\text{OPTROF}_{o, r} * \text{RESACT}_r * \text{OPTRF}_{o, r, (j, k)})$$

$$\text{RESACT}_r = \frac{\text{If (a valid OS}_{r, y} \text{ exists for all SCED intervals within the hour)}}{\sum_y \text{OS}_{r, y} * \text{TLMP}_y} / (\sum_y \text{TLMP}_y)$$

$$\text{Otherwise} \quad \text{RESACT}_r = \text{TGFTH}_r$$

The above variables are defined as follows:

Variable	Unit	Definition
<u>NDRTOPTRAMT_{o, (j, k)}</u>	\$	<u>No DAM Real-Time Option with Refund Amount per CRR Owner per pair of source and sink—The payment to CRR Owner o of the PTP Options with Refund with the source j and the sink k, settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.</u>
<u>NDRTOPTRAMT_{o, (j, k)}</u>	\$	<u>No DAM Real-Time Option with Refund Amount per CRR Owner per pair of source and sink—The payment to CRR Owner o of the PTP Options with Refund with the source j and the sink k, settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.</u>
<u>NDRTOPTRTP_{o, (j, k)}</u>	\$	<u>No DAM Real-Time Option with Refund Target Payment per CRR Owner per source and sink pair—The target payment for CRR Owner o's PTP Options with Refund, with the source j and the sink k, settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.</u>

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<u>RTSPP_{j,i}</u>	<u>\$/MWh</u>	<u>Real-Time Settlement Point Price at source per interval—The Real-Time Settlement Point Price at the source <i>j</i> for the 15-minute Settlement Interval <i>i</i>.</u>
<u>RTSPP_{k,i}</u>	<u>\$/MWh</u>	<u>Real-Time Settlement Point Price at sink per interval—The Real-Time Settlement Point Price at the sink <i>k</i> for the 15-minute Settlement Interval <i>i</i>.</u>
<u>RTOPTPR_(j,k)</u>	<u>\$/MW per hour</u>	<u>Real-Time Option Price per source and sink pair—The Real-Time price of a PTP Option with Refund with the source <i>j</i> and the sink <i>k</i> for the hour.</u>
<u>OPTRACT_{o,(j,k)}</u>	<u>MW</u>	<u>Option with Refund Actual usage per CRR Owner per pair of source and sink—CRR Owner <i>o</i>'s actual usage for the PTP Options with Refund with the source <i>j</i> and the sink <i>k</i>, for the hour.</u>
<u>RESACT_r</u>	<u>MW</u>	<u>Resource Actual per Resource per hour—The time-weighted average of the Output Schedule of Resource <i>r</i> (if a valid Output Schedule exists) or the telemetered output of Resource <i>r</i>, for the hour.</u>
<u>OPTROF_{o,r}</u>	<u>none</u>	<u>Option with Refund Ownership Factor per CRR Owner per Resource—The factor showing the percentage usage of Resource <i>r</i> for CRR Owner <i>o</i>'s PTP Options with Refund. Its value is 1, if only one CRR Owner uses this Resource for PCRRs under the refund provision.</u>
<u>OS_{r,y}</u>	<u>MW</u>	<u>Output Schedule per Resource per SCED interval—The Output Schedule submitted to ERCOT for Resource <i>r</i> for the SCED interval <i>y</i>.</u>
<u>TGETH_r</u>	<u>MWh</u>	<u>Telemetered Generation for the Hour per Resource per hour—The telemetered generation of Generation Resource <i>r</i>, for the hour.</u>
<u>OPTRF_{o,r,(j,k)}</u>	<u>none</u>	<u>Option with Refund Factor per CRR Owner per Resource associated with pair of source and sink—The ratio of CRR Owner <i>o</i>'s Resource <i>r</i>'s capacity allocated to the PTP Options with Refund with the source <i>j</i> and sink <i>k</i> to the same CRR Owner's total capacity for the Resource <i>r</i> nominated for all the PCRRs under the refund provision with the same source <i>j</i>.</u>
<u>TLMP_y</u>	<u>second</u>	<u>Duration of SCED interval per interval—The duration of the portion of the SCED interval <i>y</i> within the hour.</u>
<u>DAOPTR_{o,(j,k)}</u>	<u>MW</u>	<u>Day-Ahead Option with Refund per CRR Owner per pair of source and sink—The number of CRR Owner <i>o</i>'s PTP Options with Refund settled in the DAM for the hour.</u>
<u>o</u>	<u>none</u>	<u>A CRR Owner.</u>
<u>r</u>	<u>none</u>	<u>A Resource.</u>
<u>y</u>	<u>none</u>	<u>A SCED interval in the hour.</u>
<u>j</u>	<u>none</u>	<u>A source Settlement Point.</u>
<u>k</u>	<u>none</u>	<u>A sink Settlement Point.</u>

(4) When the DAM is executed, the payment to each NOIE CRR Owner for a given Operating Hour of the PTP Options with Refund with each pair of source and sink Settlement Points settled in Real Time is calculated as follows:

$$RTOPTRAMT_{o,(j,k)} = (1) * \text{Max}((RTOPT RTP_{o,(j,k)} - RTOPTRDA_{o,(j,k)}), \text{Min}(RTOPT RTP_{o,(j,k)} - RTOPTRHV_{o,(j,k)}))$$

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Where:

The target payment:

$$RTOPT RTP_{o,(j,k)} = \frac{RTOPT PR_{(j,k)} * \text{Min} (RTOPT PR_{o,(j,k)}, (OPTRACT_{o,(j,k)} * RTOPT PR_{o,(j,k)} / (RTOPT PR_{o,(j,k)} + DAOPT PR_{o,(j,k)})))}{}$$

$$RTOPT PR_{(j,k)} = \sum_{i=1}^4 \text{Max} (0, RTSP_{k,i} - RTSP_{j,i}) / 4$$

$$OPTRACT_{o,(j,k)} = \sum_r (OPTROF_{o,r} * RESACT_r * OPTRE_{o,r,(j,k)})$$

$$\text{If (a valid } OS_{r,y} \text{ exists for all SCED intervals within the hour)} \\ RESACT_r = \frac{\sum_y OS_{r,y} * TLMP_y}{(\sum_y TLMP_y)}$$

$$\text{Otherwise} \\ RESACT_r = TGFTH_r$$

The derated amount:

$$RTOPT RDA_{o,(j,k)} = OPTDR PR_{(j,k)} * \text{Min} (RTOPT PR_{o,(j,k)}, (OPTRACT_{o,(j,k)} * RTOPT PR_{o,(j,k)} / (RTOPT PR_{o,(j,k)} + DAOPT PR_{o,(j,k)})))$$

$$OPTDR PR_{(j,k)} = \sum_c (\text{Max} (0, DAWASF_{j,c} - DAWASF_{k,c}) * DASP_c * DRF_c)$$

The hedge value:

$$RTOPT RHV_{o,(j,k)} = \frac{RTOPT HV PR_{(j,k)} * \text{Min} (RTOPT PR_{o,(j,k)}, (OPTRACT_{o,(j,k)} * RTOPT PR_{o,(j,k)} / (RTOPT PR_{o,(j,k)} + DAOPT PR_{o,(j,k)})))}{}$$

$$RTOPT HV PR_{(j,k)} = \text{Max} (0, RTSP_{k,j} - \text{MINRES PR}_{j,j})$$

The above variables are defined as follows:

Variable	Unit	Definition
$RTOPT RAMT_{o,(j,k)}$	\$	Real Time Option with Refund Amount per CRR Owner per pair of source and sink – The payment to CRR Owner <i>o</i> of the PTP Options with Refund with the source <i>j</i> and the sink <i>k</i> , settled in Real Time, for the hour.
$NDRTOPTRAMT_{o,(j,k)}$	\$	No-DAM Real Time Option with Refund Amount per CRR Owner per pair of source and sink – The payment to CRR Owner <i>o</i> of the PTP Options with Refund with the source <i>j</i> and the sink <i>k</i> , settled in Real Time when ERCOT is unable to execute the DAM, for the hour.

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$RTOPTRTP_{o,(j,k)}$	\$	Real-Time Option with Refund Target Payment per CRR Owner per source and sink pair —The target payment for CRR Owner o 's PTP Options with Refund, with the source j and the sink k , settled in Real-Time, for the hour.
$NDRTOPTRTP_{o,(j,k)}$	\$	No-DAM Real-Time Option with Refund Target Payment per CRR Owner per source and sink pair —The target payment for CRR Owner o 's PTP Options with Refund, with the source j and the sink k , settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
$RTOPTRHV_{o,(j,k)}$	\$	Real-Time Option with Refund Hedge Value per CRR Owner per source and sink pair —The hedge value of CRR Owner o 's PTP Options with Refund, with the source j and the sink k , settled in Real-Time, for the hour.
$RTOPTRDA_{o,(j,k)}$	\$	Real-Time Option with Refund Derated Amount per CRR Owner per source and sink pair —The derated amount of CRR Owner o 's PTP Options with Refund, with the source j and the sink k , settled in Real-Time, for the hour.
$RTOPTPR_{(j,k)}$	\$/MW per hour	Real-Time Option Price per pair of source and sink —The Real-Time price of the PTP Options with the source j and the sink k , for the hour.
$RTSPP_{j,i}$	\$/MWh	Real-Time Settlement Point Price at source per interval —The Real-Time Settlement Point Price at the source j for the 15-minute Settlement Interval i .
$RTSPP_{k,i}$	\$/MWh	Real-Time Settlement Point Price at sink per interval —The Real-Time Settlement Point Price at the sink k for the 15-minute Settlement Interval i .
$OPTRACT_{o,(j,k)}$	MW	Option with Refund Actual usage per CRR Owner per pair of source and sink —CRR Owner o 's actual usage for the PTP Options with Refund with the source j and the sink k , for the hour.
$RESACT_r$	MW	Resource Actual per Resource per hour —The time-weighted average of the Output Schedule of Resource r (if a valid Output Schedule exists) or the telemetered output of Resource r , for the hour.
$OPTROF_{o,r}$	none	Option with Refund Ownership Factor per CRR Owner per Resource —The factor showing the percentage usage of Resource r for CRR Owner o 's PTP Options with Refund. Its value is 1, if only one CRR Owner uses this Resource for PCRRs under the refund provision.
$OS_{r,y}$	MW	Output Schedule per Resource per SCED interval —The Output Schedule submitted to ERCOT for Resource r for the SCED interval y .
$TGFTH_r$	MWh	Telemetered Generation for the Hour per Resource per hour —The telemetered generation of Generation Resource r , for the hour.
$OPTRF_{o,r,(j,k)}$	none	Option with Refund Factor per CRR Owner per Resource associated with pair of source and sink —The ratio of CRR Owner o 's Resource r 's capacity allocated to the PTP Options with Refund with the source j and sink k to the same CRR Owner's total capacity for the Resource r nominated for all the PCRRs under the refund provision with the same source j .
$TLMP_y$	second	Duration of SCED interval per interval —The duration of the portion of the SCED interval y within the hour.

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$RTOPTR_{(j,k)}$	MW	<i>Real-Time Option with Refund per pair of source and sink—The number of the CRR Owner's PTP Options with Refund with the source j and the sink k, settled in Real Time, for the hour.</i>
$DAOPTR_{o,(j,k)}$	MW	<i>Day Ahead Option with Refund per CRR Owner per pair of source and sink—The number of CRR Owner o's PTP Options with Refund settled in the DAM for the hour.</i>
$OPTDRPR_{(j,k)}$	\$/MW per hour	<i>Option Deration Price per source and sink pair—The deration price of a PTP Option with the source j and the sink k, for the hour.</i>
$DASP_e$	\$/MW per hour	<i>Day Ahead Shadow Price per constraint — The DAM Shadow Price of the constraint e for the hour.</i>
DRF_e	none	<i>Deration Factor per constraint — The deration factor of the constraint e for the hour, equal to the MW amount by which the constraint is oversold divided by the total MW amount of the positive impacts on the constraint of all CRRs existing prior to DAM execution.</i>
$DAWASF_{j,e}$	none	<i>Day Ahead Weighted Average Shift Factor at source per constraint — The Day Ahead Shift Factor for the source Settlement Point and the directional network element for constraint e, in the hour.</i>
$DAWASF_{k,e}$	none	<i>Day Ahead Weighted Average Shift Factor at sink per constraint — The Day Ahead Shift Factor for the sink Settlement Point and the directional network element for constraint e, in the hour.</i>
$RTOPTHVPR_{(j,k)}$	\$/MWh	<i>Real-Time Option Hedge Value Price per source and sink pair—The Real-Time hedge price of a PTP Option with the source j and the sink k, for the hour.</i>
$MINRESPR_j$	\$/MWh	<i>Minimum Resource Price for source—The lowest Minimum Resource Price for Resources located at the source Settlement Point j.</i>
o	none	A CRR Owner.
r	none	A Resource.
y	none	A SCED interval in the hour.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.
e	none	A constraint associated with a directional network element for the hour.

(5) — The total payment to each NOIE CRR Owner for the Operating Hour of all its PTP Options with Refund settled in Real Time is calculated as follows:

$$RTOPTRAMTOTOT_o = \sum_j \sum_k RTOPTRAMT_{o,(j,k)}$$

The above variables are defined as follows:

Variable	Unit	Definition
$RTOPTRAMTOTOT_o$	\$	<i>Real-Time Option with Refund Amount Owner Total per CRR Owner—The total payment to NOIE CRR Owner o for all its PTP Options with Refund settled in Real Time, for the hour.</i>
$RTOPTRAMT_{o,(j,k)}$	\$	<i>Real-Time Option with Refund Amount per CRR Owner per pair of source and sink—The payment to NOIE CRR Owner o for the PTP Options with Refund</i>

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		with the source j and the sink k settled in Real-Time, for the hour.
o	none	A CRR Owner.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.

(26) If ERCOT is unable to execute the DAM, the total payment to each NOIE CRR Owner for the Operating Hour of all its PTP Options with Refund settled in Real-Time is calculated as follows:

$$\text{NDRTOPTRAMTOTOT}_o = \sum_j \sum_k \text{NDRTOPTRAMT}_{o, (j, k)}$$

The above variables are defined as follows:

Variable	Unit	Definition
NDRTOPTRAMTOTOT_o	\$	No DAM Real-Time Option with Refund Amount Owner Total per CRR Owner—The total payment to NOIE CRR Owner o for all its PTP Options with Refund settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
$\text{NDRTOPTRAMT}_{o, (j, k)}$	\$	No DAM Real-Time Option with Refund Amount per CRR Owner per pair of source and sink—The payment to NOIE CRR Owner o for the PTP Options with Refund with the source j and the sink k settled in Real-Time when ERCOT is unable to execute the DAM, for the hour.
o	None	A CRR Owner.
j	None	A source Settlement Point.
k	None	A sink Settlement Point.

7.9.3.1 DAM Congestion Rent

- (1) The DAM congestion rent is calculated as the sum of the following payments and charges:
 - (a) The total of payments to all QSEs for cleared DAM energy offers (this does not include any revenue calculated for an RMR Unit, even though its Three-Part Supply Offer was cleared in the DAM), whether through Three-Part Supply Offers or through DAM Energy-Only Offer Curves, calculated under Section 4.6.2.1, Day-Ahead Energy Payment;
 - (b) The total of revenue for all RMR Units as calculated below;
 - (c) The total of charges to all QSEs for cleared DAM Energy Bids, calculated under Section 4.6.2.2, Day-Ahead Energy Charge; and

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- (d) The total of charges or payments to all QSEs for PTP Obligation bids cleared in the DAM, calculated under Section 4.6.3, Settlement for PTP Obligations Bought in DAM.

- (2) The DAM congestion rent for a given Operating Hour is calculated as follows:

$$\text{DACONGRENT} = \text{DAESAMTTOT} + \text{RMRDAEREVTOT} + \text{DAEPAMTTOT} + \text{DARTOBLAMTTOT}$$

Where:

$$\text{DAESAMTTOT} = \sum_q \text{DAESAMTQSETOT}_q$$

$$\text{DAEPAMTTOT} = \sum_q \text{DAEPAMTQSETOT}_q$$

$$\text{DARTOBLAMTTOT} = \sum_q \text{DARTOBLAMTQSETOT}_q$$

$$\text{RMRDAEREVTOT} = \sum_q \sum_p \sum_r \text{DAEREV}_{q,p,r}$$

$$\text{DAEREV}_{q,p,r} = (-1) * \text{DASPP}_p * \text{DAESR}_{q,p,r}$$

The above variables are defined as follows:

Variable	Unit	Definition
DACONGRENT	\$	<i>Day-Ahead Congestion Rent</i> —The congestion rent collected in the DAM for the hour.
DAESAMTTOT	\$	<i>Day-Ahead Energy Sale Amount Total</i> —The total payment to all QSEs for cleared DAM energy offers, whether through Three-Part Supply Offers or through DAM Energy-Only Offer Curves for the hour.
RMRDAEREVTOT	\$	<i>RMR Day-Ahead Energy Revenue Total</i> —The total of the RMR Day-Ahead Energy Revenue for all RMR Units for the hour. See Section 6.6.6, Reliability Must-Run Settlement.
DAEPAMTTOT	\$	<i>Day-Ahead Energy Purchase Amount Total</i> —The total charge to all QSEs for cleared DAM Energy Bids for the hour.
DARTOBLAMTTOT	\$	<i>Day-Ahead Real-Time Obligation Amount Total</i> —The net total charge or payment to all QSEs for cleared PTP Obligation bids in the DAM for the hour.
DAESAMTQSETOT _q	\$	<i>Day-Ahead Energy Sale Amount QSE Total per QSE</i> —The total payment to QSE <i>q</i> for cleared DAM energy offers, whether through Three-Part Supply Offers or through DAM Energy-Only Offer Curves, for the hour. See item (2) of Section 4.6.2.1.

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Variable	Unit	Definition
DAEREV _{q, p, r}	\$	<i>Day-Ahead Energy Revenue per QSE by Settlement Point per unit</i> —The revenue received in the DAM for RMR Unit <i>r</i> at Resource Node <i>p</i> represented by QSE <i>q</i> , based on the DAM Settlement Point Price, for the hour. Where for a Combined Cycle Train, the Resource <i>r</i> is a Combined Cycle Generation Resource within the Combined Cycle Train.
DASPP _p	\$/MWh	<i>Day-Ahead Settlement Point Price by Settlement Point</i> —The DAM Settlement Point Price at Resource Node <i>p</i> for the hour.
DAESR _{q, p, r}	MW	<i>Day-Ahead Energy Sale from Resource per QSE by Settlement Point per unit</i> —The amount of energy cleared through Three-Part Supply Offers in the DAM and/or DAM Energy-Only Offer Curves for RMR Unit <i>r</i> at Resource Node <i>p</i> represented by QSE <i>q</i> for the hour. Where for a Combined Cycle Train, the Resource <i>r</i> is a Combined Cycle Generation Resource within the Combined Cycle Train.
DAEPAMTQSETOT _q	\$	<i>Day-Ahead Energy Purchase Amount QSE Total per QSE</i> —The total charge to QSE <i>q</i> for cleared DAM Energy Bids for the hour. See item (2) of Section 4.6.2.2.
DARTOBLAMTQSETOT _q	\$	<i>Day-Ahead Real-Time Obligation Amount QSE Total per QSE</i> —The total charge or payment to QSE <i>q</i> for PTP Obligation Bids cleared in the DAM for the hour. See item (2) of Section 4.6.3.
<i>q</i>	none	A QSE.
<i>p</i>	none	A Resource Node Settlement Point.
<i>r</i>	none	An RMR Unit.

[NPRR322: Replace Section 7.9.3.1 above with the following upon system implementation:]

7.9.3.1 DAM Congestion Rent

(1) The DAM congestion rent is calculated as the sum of the following payments and charges:

- (a) The total of payments to all QSEs for cleared DAM energy offers (this does not include any revenue calculated for an RMR Unit, even though its Three-Part Supply Offer was cleared in the DAM), whether through Three-Part Supply Offers or through DAM Energy-Only Offer Curves, calculated under Section 4.6.2.1, Day-Ahead Energy Payment;
- (b) The total of revenue for all RMR Units as calculated below;
- (c) The total of charges to all QSEs for cleared DAM Energy Bids, calculated under Section 4.6.2.2, Day-Ahead Energy Charge; and
- (d) The total of charges or payments to all QSEs for PTP Obligation bids cleared in the DAM, calculated under Section 4.6.3, Settlement for PTP Obligations Bought in DAM.

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(e) The total of charges to all QSEs for PTP Obligation with Links to an Option bids cleared in the DAM, calculated under Section 4.6.3, Settlement for PTP Obligations Bought in DAM.

(2) The DAM congestion rent for a given Operating Hour is calculated as follows:

$$\text{DACONGRENT} = \frac{\text{DAESAMTTOT} + \text{RMRDAEREVTOT} + \text{DAEPAMTTOT} + \text{DARTOBLAMTTOT} + \text{DARTOBLLOAMTTOT}}{1}$$

Where:

$$\text{DAESAMTTOT} = \sum_q \text{DAESAMTQSETOT}_q$$

$$\text{DAEPAMTTOT} = \sum_q \text{DAEPAMTQSETOT}_q$$

$$\text{DARTOBLAMTTOT} = \sum_q \text{DARTOBLAMTQSETOT}_q$$

$$\text{DARTOBLLOAMTTOT} = \sum_q \text{DARTOBLLOAMTQSETOT}_q$$

$$\text{RMRDAEREVTOT} = \sum_q \sum_p \sum_r \text{DAEREV}_{q,p,r}$$

$$\text{DAEREV}_{q,p,r} = (-1) * \text{DASPP}_p * \text{DAESR}_{q,p,r}$$

The above variables are defined as follows:

<u>Variable</u>	<u>Unit</u>	<u>Definition</u>
<u>DACONGRENT</u>	\$	<u>Day-Ahead Congestion Rent</u> —The congestion rent collected in the DAM for the hour.
<u>DAESAMTTOT</u>	\$	<u>Day-Ahead Energy Sale Amount Total</u> —The total payment to all QSEs for cleared DAM energy offers, whether through Three-Part Supply Offers or through DAM Energy-Only Offer Curves for the hour.
<u>RMRDAEREVTOT</u>	\$	<u>RMR Day-Ahead Energy Revenue Total</u> —The total of the RMR Day-Ahead Energy Revenue for all RMR Units for the hour. See Section 6.6.6, Reliability Must-Run Settlement.
<u>DAEPAMTTOT</u>	\$	<u>Day-Ahead Energy Purchase Amount Total</u> —The total charge to all QSEs for cleared DAM Energy Bids for the hour.
<u>DARTOBLAMTTOT</u>	\$	<u>Day-Ahead Real-Time Obligation Amount Total</u> —The net total charge or payment to all QSEs for cleared PTP Obligation bids in the DAM for the hour.

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<u>DARTOBLLOAMTTOT</u>	<u>\$</u>	<u>Day-Ahead Real-Time Obligation with Links to an Option Amount Total—The net total charge to all QSEs for charge to QSE q for a PTP Obligation with Links to an Option Bid cleared in the DAM with the source j and the sink k, for the hour.</u>
<u>DAESAMTQSETOT_q</u>	<u>\$</u>	<u>Day-Ahead Energy Sale Amount QSE Total per QSE—The total payment to QSE q for cleared DAM energy offers, whether through Three-Part Supply Offers or through DAM Energy-Only Offer Curves, for the hour. See item (2) of Section 4.6.2.1.</u>
<u>DAEREV_{q,p,r}</u>	<u>\$</u>	<u>Day-Ahead Energy Revenue per QSE by Settlement Point per unit—The revenue received in the DAM for RMR Unit r at Resource Node p represented by QSE q, based on the DAM Settlement Point Price, for the hour. Where for a Combined Cycle Train, the Resource r is a Combined Cycle Generation Resource within the Combined Cycle Train.</u>
<u>DASPP_p</u>	<u>\$/MWh</u>	<u>Day-Ahead Settlement Point Price by Settlement Point—The DAM Settlement Point Price at Resource Node p for the hour.</u>
<u>DAESR_{q,p,r}</u>	<u>MW</u>	<u>Day-Ahead Energy Sale from Resource per QSE by Settlement Point per unit—The amount of energy cleared through Three-Part Supply Offers in the DAM and/or DAM Energy-Only Offer Curves for RMR Unit r at Resource Node p represented by QSE q for the hour. Where for a Combined Cycle Train, the Resource r is a Combined Cycle Generation Resource within the Combined Cycle Train.</u>
<u>DAEPAMTQSETOT_q</u>	<u>\$</u>	<u>Day-Ahead Energy Purchase Amount QSE Total per QSE—The total charge to QSE q for cleared DAM Energy Bids for the hour. See item (2) of Section 4.6.2.2.</u>
<u>DARTOBLAMTQSETOT_q</u>	<u>\$</u>	<u>Day-Ahead Real-Time Obligation Amount QSE Total per QSE —The total charge or payment to QSE q for PTP Obligation Bids cleared in the DAM for the hour. See item (2) of Section 4.6.3.</u>
<u>DARTOBLLOAMTQSETOT_q</u>	<u>\$</u>	<u>Day-Ahead Real-Time Obligation with Links to an Option Amount QSE Total per QSE - The net total charge to QSE q for all its PTP Obligation with Links to an Option Bids cleared in the DAM for the hour.</u>
<u>q</u>	<u>none</u>	<u>A QSE.</u>
<u>p</u>	<u>none</u>	<u>A Resource Node Settlement Point.</u>
<u>r</u>	<u>none</u>	<u>An RMR Unit.</u>

7.9.3.3 Shortfall Charges to CRR Owners

- (1) For each Operating Hour, if the Day-Ahead Congestion Rent is less than the total payment to all CRR Owners for the CRRs settled in the DAM, a charge will be made to each CRR Owner for any of its CRRs settled in the DAM or Real-Time that have positive Settlement prices, except for CRRs bought in the DAM.
- (2) The charge to each CRR Owner for its CRRs settled in the DAM for a given Operating Hour is calculated as follows:

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$$\text{DACRRSAMT}_o = \text{DACRRSAMTTOT} * \text{CRRCRSDA}_o$$

Where:

$$\text{DACRRSAMTTOT} = (-1) * \text{Min} (0, \text{DACONGRENT} + \text{DACRRCRTOT} + \text{DACRRCHTOT})$$

$$\text{CRRCRSDA}_o = (\text{DAOBLCROTOT}_o + \text{DAOBLRCROTOT}_o + \text{DAOPTAMTOTOT}_o + \text{DAOPTRAMTOTOT}_o + \text{DAFGRAMTOTOT}_o) / (\text{DACRRCRTOT} + \text{RTOPTAMTTOT} + \text{RTOPTRAMTTOT})$$

$$\text{RTOPTAMTTOT} = \sum_o \text{RTOPTAMTOTOT}_o$$

$$\text{RTOPTRAMTTOT} = \sum_o \text{RTOPTRAMTOTOT}_o$$

The above variables are defined as follows:

Variable	Unit	Definition
DACRRSAMT_o	\$	<i>Day-Ahead CRR Shortfall Amount per owner</i> —The shortfall charge to CRR Owner <i>o</i> for its CRRs settled in the DAM, for the hour.
DACRRSAMTTOT	\$	<i>Day-Ahead CRR Shortfall Amount Total</i> —The shortfall charge to all CRR Owners for their CRRs settled in the DAM and the Real-Time Market (RTM), for the hour.
DACONGRENT	\$	<i>Day-Ahead Congestion Rent</i> —The Congestion Rent collected in the DAM for the hour. See Section 7.9.3.1, DAM Congestion Rent.
DACRRCRTOT	\$	<i>Day-Ahead CRR Credit Total</i> —The total payment to all CRR Owners of all the CRRs settled in the DAM, for the hour. See Section 7.9.3.2, Credit to CRR Balancing Account.
DACRRCHTOT	\$	<i>Day-Ahead CRR Charge Total</i> —The total charge to all CRR Owners of all the CRRs settled in the DAM, for the hour. See Section 7.9.3.2.
CRRCRSDA_o	none	<i>CRR Credit Ratio Share Day-Ahead per owner</i> —The ratio of the total payments to CRR Owner <i>o</i> of its CRRs settled in the DAM to the total payments to all CRR Owners of all CRRs, for the hour.
DAOBLCROTOT_o	\$	<i>Day-Ahead Obligation Credit Owner Total per owner</i> —The total payment to CRR Owner <i>o</i> of PTP Obligations settled in the DAM, for the hour. See Section 7.9.1.1, Payments and Charges for PTP Obligations Settled in DAM.
DAOBLRCROTOT_o	\$	<i>Day-Ahead Obligation with Refund Credit Owner Total per owner</i> —The total payment to CRR Owner <i>o</i> of PTP Obligations with Refund settled in the DAM, for the hour. See Section 7.9.1.5, Payments and Charges for PTP Obligations with Refund Settled in DAM.
DAOPTAMTOTOT_o	\$	<i>Day-Ahead Option Amount Owner Total per owner</i> —The total payment to CRR Owner <i>o</i> of PTP Options settled in the DAM, for the hour. See Section 7.9.1.2, Payments PTP Options Settled in DAM.
DAOPTRAMTOTOT_o	\$	<i>Day-Ahead Option with Refund Amount Owner Total per owner</i> —The total

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Variable	Unit	Definition
		payment to CRR Owner <i>o</i> of PTP Options with Refund settled in the DAM, for the hour. See Section 7.9.1.6, Payments for PTP Options with Refund Settled in DAM
DAFGRAMTTOT _o	\$	<i>Day-Ahead FGR Amount Owner Total per owner</i> —The total payment to CRR Owner <i>o</i> of FGRs settled in the DAM, for the hour. See Section 7.9.1.4, Payments for FGRs Settled in DAM.
RTOPTAMTTOT	\$	<i>Real-Time Option Amount Total</i> —The total of payments to all CRR Owners of all PTP Options settled in Real-Time for the hour.
RTOPTRAMTTOT	\$	<i>Real-Time Option with Refund Amount Total</i> —The total of payments to all CRR Owners of all PTP Options with Refund settled in Real-Time for the hour.
RTOPTAMTTOT _o	\$	<i>Real-Time Option Amount Owner Total per owner</i> —The total payment to CRR Owner <i>o</i> of all its PTP Options settled in Real-Time for the hour. See Section 7.9.2.2, Payments for PTP Options Settled in Real-Time.
RTOPTRAMTTOT _o	\$	<i>Real-Time Option with Refund Amount Owner Total per owner</i> —The total payment to CRR Owner <i>o</i> of all its PTP Options with Refund settled in Real-Time for the hour. See Section 7.9.2.3, Payments for NOIE PTP Options with Refund Settled in Real-Time.
o	none	A CRR Owner.

- (3) The charge to each CRR Owner for its CRRs settled in Real-Time for a given Operating Hour is calculated as follows:

$$\text{RTCRRSMT}_o = \text{DACRRSAMTTOT} * \text{CRRCRRSRT}_o$$

Where:

$$\text{CRRCRRSRT}_o = (\text{RTOPTAMTTOT}_o + \text{RTOPTRAMTTOT}_o) / (\text{DACRRCRTOT} + \text{RTOPTAMTTOT} + \text{RTOPTRAMTTOT})$$

$$\text{RTOPTAMTTOT} = \sum_o \text{RTOPTAMTTOT}_o$$

$$\text{RTOPTRAMTTOT} = \sum_o \text{RTOPTRAMTTOT}_o$$

The above variables are defined as follows:

Variable	Unit	Definition
RTCRRSMT _o	\$	<i>Real-Time CRR Shortfall Amount per owner</i> —The shortfall charge to CRR Owner <i>o</i> for its CRRs settled in Real-Time, due to deration, for the hour.
DACRRSAMTTOT	\$	<i>Day-Ahead CRR Shortfall Amount Total</i> —The shortfall charge to all CRR Owners for their CRRs settled in the DAM and the RTM, due to deration, for the hour.
CRRCRRSRT _o	none	<i>CRR Credit Ratio Share Real-Time per owner</i> —The ratio of the total payments to CRR Owner <i>o</i> of its CRRs settled in Real-Time to the total payments to all CRR Owners of all CRRS, for the hour.

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Variable	Unit	Definition
RTOPTAMTTOT	\$	<i>Real-Time Option Amount Total</i> —The total of payments to all CRR Owners of all PTP Options settled in Real-Time for the hour.
RTOPTRAMTTOT	\$	<i>Real-Time Option with Refund Amount Total</i> —The total of payments to all CRR Owners of all PTP Options with Refund settled in Real-Time for the hour.
RTOPTAMTOTOT _o	\$	<i>Real-Time Option Amount Owner Total per owner</i> —The total payment to CRR Owner <i>o</i> of all its PTP Options settled in Real-Time for the hour. See Section 7.9.2.2.
RTOPTRAMTOTOT _o	\$	<i>Real-Time Option with Refund Amount Owner Total per owner</i> —The total payment to CRR Owner <i>o</i> of all its PTP Options with Refund settled in Real-Time for the hour. See Section 7.9.2.3.
O	none	A CRR Owner.

- (4) An additional charge to each CRR Owner for its CRRs settled in Day-Ahead for a given Operating Hour is calculated as follows:

$$\text{DACRRSRTAMT}_o = \text{RTCRRSAMTTOT} * \text{DACRRSR}_o$$

Where:

$$\text{RTCRRSAMTTOT} = \sum_o \text{RTCRRSAMT}_o$$

$$\text{DACRRSR}_o = (\text{DAOBLCROTOT}_o + \text{DAOBLRCROTOT}_o + \text{DAOPTAMTOTOT}_o + \text{DAOPTRAMTOTOT}_o + \text{DAFGRAMTOTOT}_o) / \text{DACRRCRTOT}$$

The above variables are defined as follows:

Variable	Unit	Definition
DACRRSRTAMT _o	\$	<i>Day-Ahead CRR Short Ratio Real-Time Amount per owner</i> —The shortfall charge to CRR Owner <i>o</i> for its CRRs settled in the DAM due to Real-Time CRR Shortfall Amount for the hour.
RTCRRSAMTTOT	\$	<i>Real-Time CRR Shortfall Amount Total</i> —The total Real-Time shortfall charge for CRRs settled in Real-Time for the hour.
RTCRRSAMT _o	\$	<i>Real-Time CRR Shortfall Amount per owner</i> —The shortfall charge to CRR Owner <i>o</i> for its CRRs settled in Real-Time for the hour.
DACRRSR _o	none	<i>Day-Ahead CRR Short Ratio per owner</i> —The ratio of the total payments to CRR Owner <i>o</i> of its CRRs settled in Day-Ahead to the total payments to all CRR Owners of all CRRs settled in Day-Ahead, for the hour.
O	none	A CRR Owner.

[NPRR322: Replace Section 7.9.3.3 above with the following upon system implementation:]

7.9.3.3 Shortfall Charges to CRR Owners

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(1) For each Operating Hour, if the Day-Ahead Congestion Rent is less than the total payment to all CRR Owners for the CRRs settled in the DAM, a charge will be made to each CRR Owner for any of its CRRs settled in the DAM ~~or Real-Time~~ that have positive Settlement prices; ~~except for CRRs bought in the DAM.~~

(2) The charge to each CRR Owner for its CRRs settled in the DAM for a given Operating Hour is calculated as follows:

$$\text{DACRRSAMT}_o = \text{DACRRSAMTTOT} * \text{CRRCRSSDA}_o$$

Where:

$$\text{DACRRSAMTTOT} = (-1) * \text{Min} (0, \text{DACONGRENT} + \text{DACRRCRTOT} + \text{DACRRCHTOT})$$

$$\text{CRRCRSSDA}_o = (\text{DAOBLRCROTOT}_o + \text{DAOBLRCROTOT}_o + \text{DAOPTAMTOTOT}_o + \text{DAOPTRAMTOTOT}_o + \text{DAFGRAMTOTOT}_o) / (\text{DACRRCRTOT} + \text{RTOPTAMTTOT} + \text{RTOPTRAMTTOT})$$

~~$$\text{RTOPTAMTTOT} = \sum_o \text{RTOPTAMTOTOT}_o$$~~

~~$$\text{RTOPTRAMTTOT} = \sum_o \text{RTOPTRAMTOTOT}_o$$~~

The above variables are defined as follows:

Variable	Unit	Definition
DACRRSAMT _o	\$	<i>Day-Ahead CRR Shortfall Amount per owner</i> —The shortfall charge to CRR Owner <i>o</i> for its CRRs settled in the DAM, for the hour.
DACRRSAMTTOT	\$	<i>Day-Ahead CRR Shortfall Amount Total</i> —The shortfall charge to all CRR Owners for their CRRs settled in the DAM and the Real-Time Market (RTM), for the hour.
DACONGRENT	\$	<i>Day-Ahead Congestion Rent</i> —The Congestion Rent collected in the DAM for the hour. See Section 7.9.3.1, DAM Congestion Rent.
DACRRCRTOT	\$	<i>Day-Ahead CRR Credit Total</i> —The total payment to all CRR Owners of all the CRRs settled in the DAM, for the hour. See Section 7.9.3.2, Credit to CRR Balancing Account.
DACRRCHTOT	\$	<i>Day-Ahead CRR Charge Total</i> —The total charge to all CRR Owners of all the CRRs settled in the DAM, for the hour. See Section 7.9.3.2.
CRRCRSSDA _o	none	<i>CRR Credit Ratio Share Day-Ahead per owner</i> —The ratio of the total payments to CRR Owner <i>o</i> of its CRRs settled in the DAM to the total payments to all CRR Owners of all CRRS, for the hour.

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DAOBLCROTOT _o	\$	<i>Day-Ahead Obligation Credit Owner Total per owner</i> —The total payment to CRR Owner <i>o</i> of PTP Obligations settled in the DAM, for the hour. See Section 7.9.1.1, Payments and Charges for PTP Obligations Settled in DAM.
DAOBLRCROTOT _o	\$	<i>Day-Ahead Obligation with Refund Credit Owner Total per owner</i> —The total payment to CRR Owner <i>o</i> of PTP Obligations with Refund settled in the DAM, for the hour. See Section 7.9.1.5, Payments and Charges for PTP Obligations with Refund Settled in DAM.
DAOPTAMTOTOT _o	\$	<i>Day-Ahead Option Amount Owner Total per owner</i> —The total payment to CRR Owner <i>o</i> of PTP Options settled in the DAM, for the hour. See Section 7.9.1.2, Payments PTP Options Settled in DAM.
DAOPTRAMTOTOT _o	\$	<i>Day-Ahead Option with Refund Amount Owner Total per owner</i> —The total payment to CRR Owner <i>o</i> of PTP Options with Refund settled in the DAM, for the hour. See Section 7.9.1.6, Payments for PTP Options with Refund Settled in DAM
DAFGRAMTOTOT _o	\$	<i>Day-Ahead FGR Amount Owner Total per owner</i> —The total payment to CRR Owner <i>o</i> of FGRs settled in the DAM, for the hour. See Section 7.9.1.4, Payments for FGRs Settled in DAM.
RTOPTAMTTOT	\$	<i>Real Time Option Amount Total</i>—The total of payments to all CRR Owners of all PTP Options settled in Real Time for the hour.
RTOPTRAMTTOT	\$	<i>Real Time Option with Refund Amount Total</i>—The total of payments to all CRR Owners of all PTP Options with Refund settled in Real Time for the hour.
RTOPTAMTOTOT_o	\$	<i>Real Time Option Amount Owner Total per owner</i>—The total payment to CRR Owner <i>o</i> of all its PTP Options settled in Real Time for the hour. See Section 7.9.2.2, Payments for PTP Options Settled in Real Time.
RTOPTRAMTOTOT_o	\$	<i>Real Time Option with Refund Amount Owner Total per owner</i>—The total payment to CRR Owner <i>o</i> of all its PTP Options with Refund settled in Real Time for the hour. See Section 7.9.2.3, Payments for NOIE PTP Options with Refund Settled in Real Time.
o	none	A CRR Owner.

~~(3) — The charge to each CRR Owner for its CRRs settled in Real Time for a given Operating Hour is calculated as follows:~~

$$\text{RTCRRSMT}_{\text{o}} = \text{DACRRSAMTTOT} * \text{CRRCRRSRT}_{\text{o}}$$

~~Where:~~

$$\text{CRRCRRSRT}_{\text{o}} = \frac{(\text{RTOPTAMTOTOT}_{\text{o}} + \text{RTOPTRAMTOTOT}_{\text{o}})}{(\text{DACRRCRTOT} + \text{RTOPTAMTTOT} + \text{RTOPTRAMTTOT})}$$

$$\text{RTOPTAMTTOT} = \sum_{\text{o}} \text{RTOPTAMTOTOT}_{\text{o}}$$

$$\text{RTOPTRAMTTOT} = \sum_{\text{o}} \text{RTOPTRAMTOTOT}_{\text{o}}$$

~~The above variables are defined as follows:~~

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Variable	Unit	Definition
RTCRRSAMT _o	\$	<i>Real-Time CRR Shortfall Amount per owner</i> —The shortfall charge to CRR Owner <i>o</i> for its CRRs settled in Real-Time, due to deration, for the hour.
DACRRSAMTTOT	\$	<i>Day-Ahead CRR Shortfall Amount Total</i> —The shortfall charge to all CRR Owners for their CRRs settled in the DAM and the RTM, due to deration, for the hour.
CRRCRRSRT _o	none	<i>CRR Credit Ratio Share Real Time per owner</i> —The ratio of the total payments to CRR Owner <i>o</i> of its CRRs settled in Real-Time to the total payments to all CRR Owners of all CRRS, for the hour.
RTOPTAMTTOT	\$	<i>Real Time Option Amount Total</i> —The total of payments to all CRR Owners of all PTP Options settled in Real-Time for the hour.
RTOPTRAMTTOT	\$	<i>Real-Time Option with Refund Amount Total</i> —The total of payments to all CRR Owners of all PTP Options with Refund settled in Real-Time for the hour.
RTOPTAMTOTOT _o	\$	<i>Real Time Option Amount Owner Total per owner</i> —The total payment to CRR Owner <i>o</i> of all its PTP Options settled in Real-Time for the hour. See Section 7.9.2.2.
RTOPTRAMTOTOT _o	\$	<i>Real Time Option with Refund Amount Owner Total per owner</i> —The total payment to CRR Owner <i>o</i> of all its PTP Options with Refund settled in Real-Time for the hour. See Section 7.9.2.3.
Θ	none	A CRR Owner.

(4) An additional charge to each CRR Owner for its CRRs settled in Day-Ahead for a given Operating Hour is calculated as follows:

$$DACRRSRTAMT_o = \frac{RTCRRSAMTTOT * DACRRSR_o}{\sum_o DACRRSR_o}$$

Where:

$$RTCRRSAMTTOT = \sum_o RTCRRSAMT_o$$

$$DACRRSR_o = \frac{(DAOBLCROTOT_o + DAOBLRCROTOT_o + DAOPTAMTOTOT_o + DAOPTRAMTOTOT_o + DAFGRAMTOTOT_o)}{DACRRCRTOT}$$

The above variables are defined as follows:

Variable	Unit	Definition
DACRRSRTAMT _o	\$	<i>Day-Ahead CRR Short Ratio Real-Time Amount per owner</i> —The shortfall charge to CRR Owner <i>o</i> for its CRRs settled in the DAM due to Real-Time CRR Shortfall Amount for the hour.
RTCRRSAMTTOT	\$	<i>Real-Time CRR Shortfall Amount Total</i> —The total Real-Time shortfall charge for CRRs settled in Real-Time for the hour.
RTCRRSAMT _o	\$	<i>Real-Time CRR Shortfall Amount per owner</i> —The shortfall charge to CRR Owner <i>o</i> for its CRRs settled in Real-Time for the hour.
DACRRSR _o	none	<i>Day-Ahead CRR Short Ratio per owner</i> —The ratio of the total payments to CRR Owner <i>o</i> of its CRRs settled in Day-Ahead to the total payments to all CRR Owners of all CRRs settled in Day-Ahead, for the hour.
Θ	none	A CRR Owner.

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7.9.3.4 Monthly Refunds to Short-Paid CRR Owners

- (1) On a monthly basis, a refund may be paid to the CRR Owners that have a shortfall charge for any Operating Hour in a month. The refund to each CRR Owner for a given month is calculated as follows:

$$\text{CRRRAMT}_o = (-1) * \text{Min}(\text{CRRBACRTOT}, \text{CRRSAMTTOT}) * \text{CRRSAMTRS}_o$$

Where:

$$\text{CRRBACRTOT} = \sum_h \text{CRRBACR}_h$$

$$\text{If } (\text{CRRSAMTTOT} = 0) \quad \text{CRRSAMTRS}_o = 0$$

$$\text{Otherwise} \quad \text{CRRSAMTRS}_o = \text{CRRSAMTOTOT}_o / \text{CRRSAMTTOT}$$

$$\text{CRRSAMTTOT} = \sum_o \text{CRRSAMTOTOT}_o$$

$$\text{CRRSAMTOTOT}_o = \sum_h (\text{DACRRSAMT}_{o,h} + \text{RTCRRSAMT}_{o,h})$$

The above variables are defined as follows:

Variable	Unit	Definition
CRRRAMT _o	\$	CRR Refund Amount per owner—The refund to the short-paid CRR Owner <i>o</i> for the month.
CRRBACRTOT	\$	CRR Balancing Account Credit Total—The total of credits accumulated in the CRR Balancing Account for all Operating Hours in the month.
CRRSAMTTOT	\$	CRR Shortfall Amount Total—The total of shortfall charges to all CRR Owners for all Operating Hours in the month.
CRRSAMTRS _o	none	CRR Shortfall Amount Ratio Share per owner—The ratio of the CRR Owner <i>o</i> 's total shortfall-charge to the total of all the CRR Owners' shortfall charges, for the month.
CRRSAMTOTOT _o	\$	CRR Shortfall Amount Owner Total per owner—The total of shortfall charges to CRR Owner <i>o</i> for all Operating Hours in the month.
DACRRSAMT _{o,h}	\$	Day-Ahead CRR Shortfall Amount per owner per hour—The shortfall charge to CRR Owner <i>o</i> for its CRRs settled in the DAM for the hour <i>h</i> .
RTCRRSAMT _{o,h}	\$	Real-Time CRR Shortfall Amount per owner per hour—The shortfall charge to CRR Owner <i>o</i> for its CRRs settled in Real-Time for the hour <i>h</i> .
CRRBACR _h	\$	CRR Balancing Account Credit per hour—The credit to the CRR Balancing Account for the hour <i>h</i> .
h	none	An Operating Hour in the month.

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proposed language but is not a substitute for the official TAC Report)

Variable	Unit	Definition
o	none	A CRR Owner.

(2) Additional Monthly Refunds to Short-Paid Day-Ahead CRR Owners

On a monthly basis, additional refunds may be paid to the CRR Owners due to the charges that are caused by Real-Time CRR shortfall, as described in paragraph (4) of Section 7.9.3.3, Shortfall Charges to CRR Owners. The refund to each Day-Ahead CRR Owner for a given month is calculated as follows:

$$\text{DACRRRAMT}_o = (-1) * \text{RTCRRSAMTMTOT} * \text{DACRRSAMTRS}_o$$

Where:

$$\text{RTCRRSAMTMTOT} = \sum_h \text{RTCRRSAMTTOT}_h$$

If (RTCRRSAMTMTOT = 0)

$$\text{DACRRSAMTRS}_o = 0$$

Otherwise

$$\text{DACRRSAMTRS}_o = \text{DACRRSRTAMTOTOT}_o / \text{DACRRSRTAMTTOT}$$

$$\text{DACRRSRTAMTTOT} = \sum_o \text{DACRRSRTAMTOTOT}_o$$

$$\text{DACRRSRTAMTOTOT}_o = \sum_h (\text{DACRRSRTAMT}_{o,h})$$

The above variables are defined as follows:

Variable	Unit	Definition
DACRRRAMT_o	\$	<i>Day-Ahead CRR Refund Amount per owner</i> —The additional refund to the Day-Ahead CRR Owner <i>o</i> due to Real-Time shortfall charges for the month.
RTCRRSAMTMTOT	\$	<i>Real-Time CRR Shortfall Amount Monthly Total</i> —The total Real-Time shortfall charge for CRRs settled in Real-Time for the month.
RTCRRSAMTTOT_h	\$	<i>Real-Time CRR Shortfall Amount Total</i> —The total Real-Time shortfall charge for CRRs settled in Real-Time for the hour.
DACRRSAMTRS_o	none	<i>Day-Ahead CRR Short Amount Ratio Share per owner</i> —The ratio of the Day-Ahead CRR Owner <i>o</i> 's additional total shortfall-charge to the total of all the Day-Ahead CRR Owners' additional shortfall charges, for the month.
DACRRSRTAMTOTOT_o	\$	<i>Day-Ahead CRR Short Ratio Real-Time Amount Total per owner</i> —The total of shortfall charges to CRR Owners for all Operating Hours in the month.
$\text{DACRRSRTAMT}_{o,h}$	\$	<i>Day-Ahead CRR Short Ratio Real-Time Amount per owner</i> —The shortfall charge to CRR Owner <i>o</i> for its CRRs settled in the DAM due to Real-Time CRR Shortfall Amount for the hour.
<i>h</i>	none	An Operating Hour in the month.

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Variable	Unit	Definition
o	none	A CRR Owner.

[NPRR320 and NPRR322: Replace applicable portions of Section 7.9.3.4 above with the following upon system implementation:]

7.9.3.4 Monthly Refunds to Short-Paid CRR Owners

(1) — On a monthly basis, a refund may be paid to the CRR Owners that have a shortfall charge for any Operating Hour in a month. The refund to each CRR Owner for a given month is calculated as follows:

$$CRRRAMT_o = (-1) * \text{Min} (CRRBACRTOT + CRRFEETOT, CRRSAMTTOT) * CRRSAMTRS_o$$

Where:

$$CRRBACRTOT = \sum_h CRRBACR_h$$

$$CRRFEETOT = \sum_{crrh} \sum_a (OPTAFAMT_{crrh, a})$$

$$\text{If } (CRRSAMTTOT = 0) \\ CRRSAMTRS_o = 0$$

$$\text{Otherwise} \\ CRRSAMTRS_o = CRRSAMTOTOT_o / CRRSAMTTOT$$

$$CRRSAMTTOT = \sum_o CRRSAMTOTOT_o$$

$$CRRSAMTOTOT_o = \sum_h (DACRRSAMT_{o, h} + RT CRRSAMT_{o, h})$$

The above variables are defined as follows:

Variable	Unit	Definition
CRRRAMT _o	\$	CRR Refund Amount per owner—The refund to the short-paid CRR Owner <i>o</i> for the month.
CRRBACRTOT	\$	CRR Balancing Account Credit Total—The total of credits accumulated in the CRR Balancing Account for all Operating Hours in the month.
CRRSAMTTOT	\$	CRR Shortfall Amount Total—The total of shortfall charges to all CRR Owners for all Operating Hours in the month.
CRRSAMTRS _o	none	CRR Shortfall Amount Ratio Share per owner—The ratio of the CRR Owner <i>o</i> 's total shortfall-charge to the total of all the CRR Owners' shortfall charges, for the month.

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CRRSAMTOTOT _o	\$	CRR Shortfall Amount Owner Total per owner—The total of shortfall charges to CRR Owner <i>o</i> for all Operating Hours in the month.
DACRRSAMT _{o, h}	\$	Day-Ahead CRR Shortfall Amount per owner per hour—The shortfall charge to CRR Owner <i>o</i> for its CRRs settled in the DAM for the hour <i>h</i> .
RTCRRSAMT_{o, h}	\$	Real Time CRR Shortfall Amount per owner per hour—The shortfall charge to CRR Owner <i>o</i> for its CRRs settled in Real Time for the hour <i>h</i>.
CRRBACR _h	\$	CRR Balancing Account Credit per hour—The credit to the CRR Balancing Account for the hour <i>h</i> .
CRRFEETOT	\$	CRR Auction Fee Total—The sum of the PTP Option Award Fees charged to all CRR Account Holders in single-month or multi-month CRR Auctions for the month.
OPTAFAMT _{crrh, a}	\$	PTP Option Award Fee Amount per CRR Account Holder per CRR Auction—The fee assessed to CRR Account Holder <i>crrh</i> for PTP Option awards awarded in CRR Auction <i>a</i> , for the hour for which the clearing price is less than the defined Minimum PTP Option Bid Price for the month. For a multi-month CRR Auction, the fee shall be calculated for each month.
h	none	An Operating Hour in the month.
o	none	A CRR Owner.
crrh	none	A CRR Account Holder.
a	none	A CRR Auction

~~(2) — Additional Monthly Refunds to Short Paid Day Ahead CRR Owners~~

~~On a monthly basis, additional refunds may be paid to the CRR Owners due to the charges that are caused by Real Time CRR shortfall, as described in paragraph (4) of Section 7.9.3.3, Shortfall Charges to CRR Owners. The refund to each Day Ahead CRR Owner for a given month is calculated as follows:~~

~~$$DACRRRAMT_o = (1) * RTCRRSAMTMTOT * DACRRSAMTRS_o$$~~

~~Where:~~

~~$$RTCRRSAMTMTOT = \sum_h RTCRRSAMTTOT_h$$~~

~~$$\text{If } (RTCRRSAMTMTOT = 0) \\ DACRRSAMTRS_o = 0$$~~

~~$$\text{Otherwise} \\ DACRRSAMTRS_o = DACRRSRTAMTOTOT_o / DACRRSRTAMTTOT$$~~

~~$$DACRRSRTAMTTOT = \sum_o DACRRSRTAMTOTOT_o$$~~

~~$$DACRRSRTAMTOTOT_o = \sum_h (DACRRSRTAMT_{o, h})$$~~

~~The above variables are defined as follows:~~

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Variable	Unit	Definition
$DACRRRAMT_o$	\$	<i>Day-Ahead CRR Refund Amount per owner</i> —The additional refund to the Day-Ahead CRR Owner o due to Real-Time shortfall charges for the month.
$RTCRRSAMTMTOT$	\$	<i>Real-Time CRR Shortfall Amount Monthly Total</i> —The total Real-Time shortfall charge for CRRs settled in Real-Time for the month.
$RTCRRSAMTTOT_h$	\$	<i>Real-Time CRR Shortfall Amount Total</i> —The total Real-Time shortfall charge for CRRs settled in Real-Time for the hour.
$DACRRSAMTRS_o$	none	<i>Day-Ahead CRR Short Amount Ratio Share per owner</i> —The ratio of the Day-Ahead CRR Owner o 's additional total shortfall charge to the total of all the Day-Ahead CRR Owners' additional shortfall charges, for the month.
$DACRRSRTAMTOTOT_o$	\$	<i>Day-Ahead CRR Short Ratio Real-Time Amount Total per owner</i> —The total of shortfall charges to CRR Owner o for all Operating Hours in the month.
$DACRRSRTAMTTOT$	\$	<i>Day-Ahead CRR Short Ratio Real-Time Amount Total</i> —The total of shortfall charges for all CRR Owners for all Operating Hours in the month.
$DACRRSRTAMT_{o,h}$	\$	<i>Day-Ahead CRR Short Ratio Real-Time Amount per owner</i> —The shortfall charge to CRR Owner o for its CRRs settled in the DAM due to Real-Time CRR Shortfall Amount for the hour.
h	none	<i>An Operating Hour in the month.</i>
o	none	<i>A CRR Owner.</i>

9.5.3 Real-Time Market Settlement Charge Types

- (1) When the Day-Ahead Market (DAM) is executed, ERCOT shall provide, on each RTM Settlement Statement, the dollar amount for each RTM Settlement charge and payment. The RTM Settlement “Charge Types” are:
 - (a) Section 5.7.1, RUC Make-Whole Payment;
 - (b) Section 5.7.2, RUC Clawback Charge;
 - (c) Section 5.7.3, Payment When ERCOT Decommits a QSE -Committed Resource;
 - (d) Section 5.7.4.1, RUC Capacity-Short Charge;
 - (e) Section 5.7.4.2, RUC Make-Whole Uplift Charge;
 - (f) Section 5.7.5, RUC Clawback Payment;
 - (g) Section 5.7.6, RUC Decommitment Charge;
 - (h) Section 6.6.3.1, Real-Time Energy Imbalance Payment or Charge at a Resource Node;

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- (i) Section 6.6.3.2, Real-Time Energy Imbalance Payment or Charge at a Load Zone;
- (j) Section 6.6.3.3, Real-Time Energy Imbalance Payment or Charge at a Hub;
- (k) Section 6.6.3.4, Real-Time Energy Payment for DC Tie Import;
- (l) Section 6.6.3.5, Real-Time Payment for a Block Load Transfer Point;
- (m) Section 6.6.3.6, Real-Time Energy Charge for DC Tie Export represented by the QSE under Oklahoma Exemption;
- (n) Section 6.6.4, Real-Time Congestion Payment or Charge for Self-Schedules;
- (o) Section 6.6.5.1.1, Base Point Deviation Charge for Over Generation,
- (p) Section 6.6.5.1.2, Base Point Deviation Charge for Under Generation,
- (q) Section 6.6.5.2, IRR Generation Resource Base-Point Deviation Charge;
- (r) Section 6.6.5.4, Base Point Deviation Payment;
- (s) Section 6.6.6.1, RMR Standby Payment;
- (t) Section 6.6.6.2, RMR Payment for Energy;
- (u) Section 6.6.6.3, RMR Adjustment Charge;
- (v) Section 6.6.6.4, RMR Charge for Unexcused Misconduct;
- (w) Section 6.6.6.5, RMR Service Charge;
- (x) Paragraph (2) of Section 6.6.7.1, Voltage Support Service Payments;
- (y) Paragraph (4) of Section 6.6.7.1;
- (z) Section 6.6.7.2, Voltage Support Charge;
- (aa) Section 6.6.8.1, Black Start Capacity Payment;
- (bb) Section 6.6.8.2, Black Start Capacity Charge;
- (cc) Section 6.6.9.1, Payment for Emergency Power Increase Directed by ERCOT;
- (dd) Section 6.6.9.2, Charge for Emergency Power Increases;
- (ee) Section 6.6.10, Real-Time Revenue Neutrality Allocation;

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- (ff) Paragraph (1) of Section 6.7.1, Payments for Ancillary Service Capacity Sold in a Supplemental Ancillary Service Market;
- (gg) Paragraph (2) of Section 6.7.1;
- (hh) Paragraph (3) of Section 6.7.1;
- (ii) Paragraph (4) of Section 6.7.1;
- (jj) Paragraph (1) of Section 6.7.2, Charges for Ancillary Service Capacity Replaced Due to Failure to Provide;
- (kk) Paragraph (2) of Section 6.7.2;
- (ll) Paragraph (3) of Section 6.7.2;
- (mm) Paragraph (4) of Section 6.7.2;
- (nn) Paragraph (1) of Section 6.7.3, Adjustments to Cost Allocations for Ancillary Services Procurement;
- (oo) Paragraph (2) of Section 6.7.3;
- (pp) Paragraph (3) of Section 6.7.3;
- (qq) Paragraph (4) of Section 6.7.3;
- (rr) Section 7.9.2.1, Payments and Charges for PTP Obligations Settled in Real-Time;
- (ss) Section 7.9.2.2, Payments for PTP Options Settled in Real-Time;
- (tt) Section 7.9.2.3, Payments for NOIE PTP Options with Refund Settled in Real-Time;
- (uu) Paragraph (3) of Section 7.9.3.3, Shortfall Charges to CRR Owners;
- (vv) Section 9.16.1, ERCOT System Administration Charge;
- (ww) Section 9.16.4, ERCOT Nodal Implementation Surcharge.

[NPRR322: Replace paragraph (1) above with the following upon system implementation:]

- (1) When the Day-Ahead Market (DAM) is executed, ERCOT shall provide, on each RTM Settlement Statement, the dollar amount for each RTM Settlement charge and payment. The RTM Settlement “Charge Types” are:
 - (a) Section 5.7.1, RUC Make-Whole Payment;

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- (b) Section 5.7.2, RUC Clawback Charge;
- (c) Section 5.7.3, Payment When ERCOT Decommits a QSE -Committed Resource;
- (d) Section 5.7.4.1, RUC Capacity-Short Charge;
- (e) Section 5.7.4.2, RUC Make-Whole Uplift Charge;
- (f) Section 5.7.5, RUC Clawback Payment;
- (g) Section 5.7.6, RUC Decommitment Charge;
- (h) Section 6.6.3.1, Real-Time Energy Imbalance Payment or Charge at a Resource Node;
- (i) Section 6.6.3.2, Real-Time Energy Imbalance Payment or Charge at a Load Zone;
- (j) Section 6.6.3.3, Real-Time Energy Imbalance Payment or Charge at a Hub;
- (k) Section 6.6.3.4, Real-Time Energy Payment for DC Tie Import;
- (l) Section 6.6.3.5, Real-Time Payment for a Block Load Transfer Point;
- (m) Section 6.6.3.6, Real-Time Energy Charge for DC Tie Export represented by the QSE under Oklahoma Exemption;
- (n) Section 6.6.4, Real-Time Congestion Payment or Charge for Self-Schedules;
- (o) Section 6.6.5.1.1, Base Point Deviation Charge for Over Generation,
- (p) Section 6.6.5.1.2, Base Point Deviation Charge for Under Generation,
- (q) Section 6.6.5.2, IRR Generation Resource Base-Point Deviation Charge;
- (r) Section 6.6.5.4, Base Point Deviation Payment;
- (s) Section 6.6.6.1, RMR Standby Payment;
- (t) Section 6.6.6.2, RMR Payment for Energy;
- (u) Section 6.6.6.3, RMR Adjustment Charge;
- (v) Section 6.6.6.4, RMR Charge for Unexcused Misconduct;
- (w) Section 6.6.6.5, RMR Service Charge;
- (x) Paragraph (2) of Section 6.6.7.1, Voltage Support Service Payments;

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- (y) Paragraph (4) of Section 6.6.7.1;
- (z) Section 6.6.7.2, Voltage Support Charge;
- (aa) Section 6.6.8.1, Black Start Capacity Payment;
- (bb) Section 6.6.8.2, Black Start Capacity Charge;
- (cc) Section 6.6.9.1, Payment for Emergency Power Increase Directed by ERCOT;
- (dd) Section 6.6.9.2, Charge for Emergency Power Increases;
- (ee) Section 6.6.10, Real-Time Revenue Neutrality Allocation;
- (ff) Paragraph (1) of Section 6.7.1, Payments for Ancillary Service Capacity Sold in a Supplemental Ancillary Service Market;
- (gg) Paragraph (2) of Section 6.7.1;
- (hh) Paragraph (3) of Section 6.7.1;
- (ii) Paragraph (4) of Section 6.7.1;
- (jj) Paragraph (1) of Section 6.7.2, Charges for Ancillary Service Capacity Replaced Due to Failure to Provide;
- (kk) Paragraph (2) of Section 6.7.2;
- (ll) Paragraph (3) of Section 6.7.2;
- (mm) Paragraph (4) of Section 6.7.2;
- (nn) Paragraph (1) of Section 6.7.3, Adjustments to Cost Allocations for Ancillary Services Procurement;
- (oo) Paragraph (2) of Section 6.7.3;
- (pp) Paragraph (3) of Section 6.7.3;
- (qq) Paragraph (4) of Section 6.7.3;
- (rr) Section 7.9.2.1, Payments and Charges for PTP Obligations Settled in Real-Time;
- ~~(ss) Section 7.9.2.2, Payments for PTP Options Settled in Real Time;~~
- ~~(tt) Section 7.9.2.3, Payments for NOIE PTP Options with Refund Settled in Real Time;~~

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- (~~sssttt~~) Paragraph (3) of Section 7.9.3.3, Shortfall Charges to CRR Owners;
- (~~ttttv~~) Section 9.16.1, ERCOT System Administration Charge;
- (~~uuwww~~) Section 9.16.4, ERCOT Nodal Implementation Surcharge.

- (2) In the event that ERCOT is unable to execute the DAM, ERCOT shall provide, on each RTM Settlement Statement, the dollar amount for the following RTM Congestion Revenue Right (CRR) Settlement charges and payments:
- (a) Section 7.9.2.4, Payments for FGRs in Real-Time;
- (b) Section 7.9.2.5, Payments and Charges for PTP Obligations with Refund in Real-Time.

9.19.1 Default Uplift Invoices

- (1) ERCOT shall collect the total short-pay amount for all DAM and RTM Invoices for a month, less the total payments expected from a payment plan, from Qualified Scheduling Entities (QSEs) and CRR Account Holders. The amount charged to each Counter-Party's QSE(s) and/or CRR Account Holder(s) is determined according to paragraphs (2) and (3) below. ERCOT must pay the funds it collects from payments on Default Uplift Invoices to the Entities previously short-paid. ERCOT shall notify those Entities of the details of the payment.
- (2) Each Counter-Party's share of the uplift is calculated using True-Up Settlement data for each Operating Day in the month prior to the month in which the DAM or RTM default occurred, and is calculated as follows:

$$\frac{\text{Max}_{cp} (\sum_{cp} (\text{URTMG}_{mp} + \text{URTDCIMP}_{mp}), \sum_{cp} \text{URTAML}_{mp}, \sum_{cp} \text{URTQQES}_{mp}, \sum_{cp} \text{URTQQEP}_{mp}, \sum_{cp} \text{UDAES}_{mp}, \sum_{cp} \text{UDAEP}_{mp}, \sum_{cp} \text{URTOBL}_{mp}, \sum_{cp} (\sum_{mp} (\text{UDAOPT}_{mp} + \text{UDAOBL}_{mp} + \text{UOPTS}_{mp} + \text{UOBLs}_{mp}))), \sum_{cp} (\sum_{mp} (\text{UOPTP}_{mp} + \text{UOBLP}_{mp})))}{\sum_{cp} (\sum_{mp} (\text{UOPTP}_{mp} + \text{UOBLP}_{mp}))}$$

$$\sum_{cp} [\text{Max}_{cp} (\sum_{cp} (\text{URTMG}_{mp} + \text{URTDCIMP}_{mp}), \sum_{cp} \text{URTAML}_{mp}, \sum_{cp} \text{URTQQES}_{mp}, \sum_{cp} \text{URTQQEP}_{mp}, \sum_{cp} \text{UDAES}_{mp}, \sum_{cp} \text{UDAEP}_{mp}, \sum_{cp} \text{URTOBL}_{mp}, \sum_{cp} (\sum_{mp} (\text{UDAOPT}_{mp} + \text{UDAOBL}_{mp} + \text{UOPTS}_{mp} + \text{UOBLs}_{mp}))), \sum_{cp} (\sum_{mp} (\text{UOPTP}_{mp} + \text{UOBLP}_{mp}))]$$

Where:

$\text{URTMG}_{mp} = \sum_{p, r, i} (\text{RTMG}_{mp, p, r, i})$, excluding RTMG for RMR Resources and RTMG in Reliability Unit Commitment (RUC)-Committed Intervals for RUC-committed Resources

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$$\text{URTDCIMP}_{mp} = \sum_{p, r, i} (\text{RTDCIMP}_{mp, p, i}) / 4$$

$$\text{URTAML}_{mp} = \sum_{p, i} (\text{RTAML}_{mp, p, i})$$

$$\text{URTQQES}_{mp} = \sum_{p, i} (\text{RTQQES}_{mp, p, i})$$

$$\text{URTQQEP}_{mp} = \sum_{p, i} (\text{RTQQEP}_{mp, p, i})$$

$$\text{UDAES}_{mp} = \sum_{p, h} (\text{DAES}_{mp, p, h})$$

$$\text{UDAEP}_{mp} = \sum_{p, h} (\text{DAEP}_{mp, p, h})$$

$$\text{URTOBL}_{mp} = \sum_{(j, k), h} (\text{RTOBL}_{mp, (j, k), h})$$

$$\text{UDAOPT}_{mp} = \sum_{(j, k), h} (\text{DAOPT}_{mp, (j, k), h})$$

$$\text{UDAOBL}_{mp} = \sum_{(j, k), h} (\text{DAOBL}_{mp, (j, k), h})$$

$$\text{UOPTS}_{mp} = \sum_{(j, k), h} (\text{OPTS}_{mp, (j, k), h})$$

$$\text{UOBLS}_{mp} = \sum_{(j, k), h} (\text{OBLS}_{mp, (j, k), h})$$

$$\text{UOPTP}_{mp} = \sum_{(j, k), h} (\text{OPTP}_{mp, (j, k), h})$$

$$\text{UOBLP}_{mp} = \sum_{(j, k), h} (\text{OBLP}_{mp, (j, k), h})$$

The above variables are defined as follows:

Variable	Unit	Definition
$\text{RTMG}_{mp, p, r, i}$	MWh	<i>Real-Time Metered Generation per Market Participant per Settlement Point per Resource</i> —The Real-Time energy produced by the Generation Resource <i>r</i> represented by Market Participant <i>mp</i> , at Resource Node <i>p</i> , for the 15-minute Settlement Interval <i>i</i> , where the Market Participant is a QSE.
URTMG_{mp}	MWh	<i>Uplift Real-Time Metered Generation per Market Participant</i> —The monthly sum of Real-Time energy produced by Generation Resources represented by Market Participant <i>mp</i> , excluding generation for RMR Resources and generation in RUC-Committed Intervals, where the Market Participant is a QSE assigned to the registered Counter-Party.
$\text{RTDCIMP}_{mp, p, i}$	MW	<i>Real-Time DC Import per QSE per Settlement Point</i> —The aggregated Direct Current Tie (DC Tie) Schedule submitted by Market Participant <i>mp</i> , as an importer into the ERCOT System through DC Tie <i>p</i> , for the 15-minute Settlement Interval <i>i</i> , where the Market Participant is a QSE.
URTDCIMP_{mp}	MW	<i>Uplift Real-Time DC Import per Market Participant</i> —The monthly sum of the aggregated DC Tie Schedule submitted by Market Participant <i>mp</i> , as an importer into the ERCOT System where the Market Participant is a QSE assigned to a registered Counter-Party.

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Variable	Unit	Definition
RTAML _{mp, p, i}	MWh	<i>Real-Time Adjusted Metered Load per Market Participant per Settlement Point</i> —The sum of the Adjusted Metered Load (AML) at the Electrical Buses that are included in Settlement Point <i>p</i> represented by Market Participant <i>mp</i> for the 15-minute Settlement Interval <i>i</i> , where the Market Participant is a QSE.
URTAML _{mp}	MWh	<i>Uplift Real-Time Adjusted Metered Load per Market Participant</i> —The monthly sum of the AML represented by Market Participant <i>mp</i> , where the Market Participant is a QSE assigned to the registered Counter-Party.
RTQQES _{mp, p, i}	MW	<i>QSE-to-QSE Energy Sale per Market Participant per Settlement Point</i> —The amount of MW sold by Market Participant <i>mp</i> through Energy Trades at Settlement Point <i>p</i> for the 15-minute Settlement Interval <i>i</i> , where the Market Participant is a QSE.
URTQQES _{mp}	MWh	<i>Uplift QSE-to-QSE Energy Sale per Market Participant</i> —The monthly sum of MW sold by Market Participant <i>mp</i> through Energy Trades, where the Market Participant is a QSE assigned to the registered Counter-Party.
RTQQEP _{mp, p, i}	MW	<i>QSE-to-QSE Energy Purchase per Market Participant per Settlement Point</i> —The amount of MW bought by Market Participant <i>mp</i> through Energy Trades at Settlement Point <i>p</i> for the 15-minute Settlement Interval <i>i</i> , where the Market Participant is a QSE.
URTQQEP _{mp}	MWh	<i>Uplift QSE-to-QSE Energy Purchase per Market Participant</i> —The monthly sum of MW bought by Market Participant <i>mp</i> through Energy Trades, where the Market Participant is a QSE assigned to the registered Counter-Party.
DAES _{mp, p, h}	MW	<i>Day-Ahead Energy Sale per Market Participant per Settlement Point per hour</i> —The total amount of energy represented by Market Participant <i>mp</i> 's cleared Three-Part Supply Offers in the DAM and cleared DAM Energy-Only Offers at Settlement Point <i>p</i> , excluding the offers submitted for RMR Units at the same Settlement Point, for the hour <i>h</i> , where the Market Participant is a QSE.
UDAES _{mp}	MWh	<i>Uplift Day-Ahead Energy Sale per Market Participant</i> —The monthly total of energy represented by Market Participant <i>mp</i> 's cleared Three-Part Supply Offers in the DAM and cleared DAM Energy-Only Offer Curves, where the Market Participant is a QSE assigned to the registered Counter-Party.
DAEP _{mp, p, h}	MW	<i>Day-Ahead Energy Purchase per Market Participant per Settlement Point per hour</i> —The total amount of energy represented by Market Participant <i>mp</i> 's cleared DAM Energy Bids at Settlement Point <i>p</i> for the hour <i>h</i> , where the Market Participant is a QSE.
UDAEP _{mp}	MWh	<i>Uplift Day-Ahead Energy Purchase per Market Participant</i> —The monthly total of energy represented by Market Participant <i>mp</i> 's cleared DAM Energy Bids, where the Market Participant is a QSE assigned to the registered Counter-Party.
RTOBL _{mp, (j, k), h}	MW	<i>Real-Time Obligation per Market Participant per source and sink pair per hour</i> —The number of Market Participant <i>mp</i> 's Point-to-Point (PTP) Obligations with the source <i>j</i> and the sink <i>k</i> settled in Real-Time for the hour <i>h</i> , and where the Market Participant is a QSE.
URTOBL _{mp}	MWh	<i>Uplift Real-Time Obligation per Market Participant</i> —The monthly total of Market Participant <i>mp</i> 's PTP Obligations settled in Real-Time, counting the quantity only once per source and sink pair, and where the Market Participant is a QSE assigned to the registered Counter-Party.

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Variable	Unit	Definition
DAOPT _{mp, (j, k), h}	MW	<i>Day-Ahead Option per Market Participant per source and sink pair per hour</i> —The number of Market Participant <i>mp</i> 's PTP Options with the source <i>j</i> and the sink <i>k</i> owned in the DAM for the hour <i>h</i> , and where the Market Participant is a CRR Account Holder.
UDAOPT _{mp}	MWh	<i>Uplift Day-Ahead Option per Market Participant</i> —The monthly total of Market Participant <i>mp</i> 's PTP Options owned in the DAM, counting the ownership quantity only once per source and sink pair, and where the Market Participant is a CRR Account Holder assigned to the registered Counter-Party.
DAOBL _{mp, (j, k), h}	MW	<i>Day-Ahead Obligation per Market Participant per source and sink pair per hour</i> —The number of Market Participant <i>mp</i> 's PTP Obligations with the source <i>j</i> and the sink <i>k</i> owned in the DAM for the hour <i>h</i> , and where the Market Participant is a CRR Account Holder.
UDAOBL _{mp}	MWh	<i>Uplift Day-Ahead Obligation per Market Participant</i> —The monthly total of Market Participant <i>mp</i> 's PTP Obligations owned in the DAM, counting the ownership quantity only once per source and sink pair, where the Market Participant is a CRR Account Holder assigned to the registered Counter-Party.
OPTS _{mp, (j, k), a, h}	MW	<i>PTP Option Sale per Market Participant per source and sink pair per CRR Auction per hour</i> —The MW quantity that represents the total of Market Participant <i>mp</i> 's PTP Option offers with the source <i>j</i> and the sink <i>k</i> awarded in CRR Auction <i>a</i> , for the hour <i>h</i> , where the Market Participant is a CRR Account Holder.
UOPTS _{mp}	MWh	<i>Uplift PTP Option Sale per Market Participant</i> —The MW quantity that represents the monthly total of Market Participant <i>mp</i> 's PTP Option offers awarded in CRR Auctions, counting the awarded quantity only once per source and sink pair, where the Market Participant is a CRR Account Holder assigned to the registered Counter-Party.
OBLs _{mp, (j, k), a, h}	MW	<i>PTP Obligation Sale per Market Participant per source and sink pair per CRR Auction per hour</i> —The MW quantity that represents the total of Market Participant <i>mp</i> 's PTP Obligation offers with the source <i>j</i> and the sink <i>k</i> awarded in CRR Auction <i>a</i> , for the hour <i>h</i> , where the Market Participant is a CRR Account Holder.
UOBLs _{mp}	MWh	<i>Uplift PTP Obligation Sale per Market Participant</i> —The MW quantity that represents the monthly total of Market Participant <i>mp</i> 's PTP Obligation offers awarded in CRR Auctions, counting the quantity only once per source and sink pair, where the Market Participant is a CRR Account Holder assigned to the registered Counter-Party.
OPTP _{mp, (j, k), a, h}	MW	<i>PTP Option Purchase per Market Participant per source and sink pair per CRR Auction per hour</i> —The MW quantity that represents the total of Market Participant <i>mp</i> 's PTP Option bids with the source <i>j</i> and the sink <i>k</i> awarded in CRR Auction <i>a</i> , for the hour <i>h</i> , where the Market Participant is a CRR Account Holder.
UOPTP _{mp}	MWh	<i>PTP Option Purchase per Market Participant</i> —The MW quantity that represents the monthly total of Market Participant <i>mp</i> 's PTP Option bids awarded in CRR Auctions, counting the quantity only once per source and sink pair, where the Market Participant is a CRR Account Holder assigned to the registered Counter-Party.

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Variable	Unit	Definition
OBLP _{mp, (j, k), a, h}	MW	PTP Obligation Purchase per Market Participant per source and sink pair per CRR Auction per hour—The MW quantity that represents the total of Market Participant <i>mp</i> 's PTP Obligation bids with the source <i>j</i> and the sink <i>k</i> awarded in CRR Auction <i>a</i> , for the hour <i>h</i> , where the Market Participant is a CRR Account Holder.
UOBLP _{mp}	MWh	PTP Obligation Purchase per Market Participant—The MW quantity that represents the monthly total of Market Participant <i>mp</i> 's PTP Obligation bids awarded in CRR Auctions, counting the quantity only once per source and sink pair, where the Market Participant is a CRR Account Holder assigned to the registered Counter-Party.
cp	none	A registered Counter-Party.
mp	none	A Market Participant that is a non-defaulting QSE or CRR Account Holder.
j	none	A source Settlement Point.
k	none	A sink Settlement Point.
a	none	A CRR Auction.
p	none	A Settlement Point.
i	none	A 15-minute Settlement Interval.
h	none	The hour that includes the Settlement Interval <i>i</i> .

[NPRR322: Replace paragraph (2) above with the following upon system implementation:]

- (2) Each Counter-Party's share of the uplift is calculated using True-Up Settlement data for each Operating Day in the month prior to the month in which the DAM or RTM default occurred, and is calculated as follows:

$$\frac{\text{Max}_{cp}(\sum_{cp}(\text{URTMG}_{mp} + \text{URTDCIMP}_{mp}), \sum_{cp} \text{URTAML}_{mp}, \sum_{cp} \text{URTOQES}_{mp}, \sum_{cp} \text{URTOQEP}_{mp}, \sum_{cp} \text{UDAES}_{mp}, \sum_{cp} \text{UDAEP}_{mp}, (\sum_{cp} \text{URTOBL}_{mp} + \sum_{cp} \text{UOBLLO}_{mp}), \sum_{cp}(\sum_{mp}(\text{UDAOPT}_{mp} + \text{UDAOBL}_{mp} \pm \text{UOPTS}_{mp} + \text{UOBSL}_{mp})), \sum_{cp}(\sum_{mp}(\text{UOPTP}_{mp} + \text{UOBLP}_{mp})))}{4}$$

$$\frac{\sum_{cp}[\text{Max}_{cp}(\sum_{cp}(\text{URTMG}_{mp} + \text{URTDCIMP}_{mp}), \sum_{cp} \text{URTAML}_{mp}, \sum_{cp} \text{URTOQES}_{mp}, \sum_{cp} \text{URTOQEP}_{mp}, \sum_{cp} \text{UDAES}_{mp}, \sum_{cp} \text{UDAEP}_{mp}, (\sum_{cp} \text{URTOBL}_{mp} + \sum_{cp} \text{UOBLLO}_{mp}), \sum_{cp}(\sum_{mp}(\text{UDAOPT}_{mp} + \text{UDAOBL}_{mp} \pm \text{UOPTS}_{mp} + \text{UOBSL}_{mp})), \sum_{cp}(\sum_{mp}(\text{UOPTP}_{mp} + \text{UOBLP}_{mp})))]}{4}$$

Where:

$\text{URTMG}_{mp} = \sum_{p, r, i}(\text{RTMG}_{mp, p, r, i})$, excluding RTMG for RMR Resources and RTMG in Reliability Unit Commitment (RUC)-Committed Intervals for RUC-committed Resources

$$\text{URTDCIMP}_{mp} = \sum_{p, r, i}(\text{RTDCIMP}_{mp, p, i}) / 4$$

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$$\text{URTAML}_{mp} = \sum_{p,i} (\text{RTAML}_{mp,p,i})$$

$$\text{URTQES}_{mp} = \sum_{p,i} (\text{RTQES}_{mp,p,i})$$

$$\text{URTQEP}_{mp} = \sum_{p,i} (\text{RTQEP}_{mp,p,i})$$

$$\text{UDAES}_{mp} = \sum_{p,h} (\text{DAES}_{mp,p,h})$$

$$\text{UDAEP}_{mp} = \sum_{p,h} (\text{DAEP}_{mp,p,h})$$

$$\text{URTOBL}_{mp} = \sum_{(j,k),h} (\text{RTOBL}_{mp,(j,k),h})$$

$$\text{UOBLLO}_{mp} = \sum_{(j,k),h} (\text{OBLLO}_{mp,(j,k),h}) \text{UDAOPT}_{mp} = \sum_{(j,k),h} (\text{DAOPT}_{mp,(j,k),h})$$

$$\text{UDAOBL}_{mp} = \sum_{(j,k),h} (\text{DAOBL}_{mp,(j,k),h})$$

$$\text{UOPTS}_{mp} = \sum_{(j,k),h} (\text{OPTS}_{mp,(j,k),h})$$

$$\text{UOBS}_{mp} = \sum_{(j,k),h} (\text{OBS}_{mp,(j,k),h})$$

$$\text{UOPTP}_{mp} = \sum_{(j,k),h} (\text{OPTP}_{mp,j,h})$$

$$\text{UOBLP}_{mp} = \sum_{(j,k),h} (\text{OBLP}_{mp,(j,k),h})$$

The above variables are defined as follows:

Variable	Unit	Definition
$\text{RTMG}_{mp,p,i}$	MWh	<i>Real-Time Metered Generation per Market Participant per Settlement Point per Resource</i> —The Real-Time energy produced by the Generation Resource <i>r</i> represented by Market Participant <i>mp</i> , at Resource Node <i>p</i> , for the 15-minute Settlement Interval <i>i</i> , where the Market Participant is a QSE.
URTMG_{mp}	MWh	<i>Uplift Real-Time Metered Generation per Market Participant</i> —The monthly sum of Real-Time energy produced by Generation Resources represented by Market Participant <i>mp</i> , excluding generation for RMR Resources and generation in RUC-Committed Intervals, where the Market Participant is a QSE assigned to the registered Counter-Party.
$\text{RTDCIMP}_{mp,p,i}$	MW	<i>Real-Time DC Import per QSE per Settlement Point</i> —The aggregated Direct Current Tie (DC Tie) Schedule submitted by Market Participant <i>mp</i> , as an importer into the ERCOT System through DC Tie <i>p</i> , for the 15-minute Settlement Interval <i>i</i> , where the Market Participant is a QSE.
URTDCIMP_{mp}	MW	<i>Uplift Real-Time DC Import per Market Participant</i> —The monthly sum of the aggregated DC Tie Schedule submitted by Market Participant <i>mp</i> , as an importer into the ERCOT System where the Market Participant is a QSE assigned to a registered Counter-Party.
$\text{RTAML}_{mp,p,i}$	MWh	<i>Real-Time Adjusted Metered Load per Market Participant per Settlement Point</i> —The sum of the Adjusted Metered Load (AML) at the Electrical Buses that are included in Settlement Point <i>p</i> represented by Market Participant <i>mp</i> for the 15-minute Settlement Interval <i>i</i> , where the Market Participant is a QSE.

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<u>URTAML_{mp}</u>	<u>MWh</u>	<u>Uplift Real-Time Adjusted Metered Load per Market Participant—The monthly sum of the AML represented by Market Participant <i>mp</i>, where the Market Participant is a QSE assigned to the registered Counter-Party.</u>
<u>RTQQUES_{mp, p, i}</u>	<u>MW</u>	<u>QSE-to-QSE Energy Sale per Market Participant per Settlement Point—The amount of MW sold by Market Participant <i>mp</i> through Energy Trades at Settlement Point <i>p</i> for the 15-minute Settlement Interval <i>i</i>, where the Market Participant is a QSE.</u>
<u>URTQQUES_{mp}</u>	<u>MWh</u>	<u>Uplift QSE-to-QSE Energy Sale per Market Participant—The monthly sum of MW sold by Market Participant <i>mp</i> through Energy Trades, where the Market Participant is a QSE assigned to the registered Counter-Party.</u>
<u>RTQQEP_{mp, p, i}</u>	<u>MW</u>	<u>QSE-to-QSE Energy Purchase per Market Participant per Settlement Point—The amount of MW bought by Market Participant <i>mp</i> through Energy Trades at Settlement Point <i>p</i> for the 15-minute Settlement Interval <i>i</i>, where the Market Participant is a QSE.</u>
<u>URTQQEP_{mp}</u>	<u>MWh</u>	<u>Uplift QSE-to-QSE Energy Purchase per Market Participant—The monthly sum of MW bought by Market Participant <i>mp</i> through Energy Trades, where the Market Participant is a QSE assigned to the registered Counter-Party.</u>
<u>DAES_{mp, p, h}</u>	<u>MW</u>	<u>Day-Ahead Energy Sale per Market Participant per Settlement Point per hour—The total amount of energy represented by Market Participant <i>mp</i>'s cleared Three-Part Supply Offers in the DAM and cleared DAM Energy-Only Offers at Settlement Point <i>p</i>, excluding the offers submitted for RMR Units at the same Settlement Point, for the hour <i>h</i>, where the Market Participant is a QSE.</u>
<u>UDAES_{mp}</u>	<u>MWh</u>	<u>Uplift Day-Ahead Energy Sale per Market Participant—The monthly total of energy represented by Market Participant <i>mp</i>'s cleared Three-Part Supply Offers in the DAM and cleared DAM Energy-Only Offer Curves, where the Market Participant is a QSE assigned to the registered Counter-Party.</u>
<u>DAEP_{mp, p, h}</u>	<u>MW</u>	<u>Day-Ahead Energy Purchase per Market Participant per Settlement Point per hour—The total amount of energy represented by Market Participant <i>mp</i>'s cleared DAM Energy Bids at Settlement Point <i>p</i> for the hour <i>h</i>, where the Market Participant is a QSE.</u>
<u>UDAEP_{mp}</u>	<u>MWh</u>	<u>Uplift Day-Ahead Energy Purchase per Market Participant—The monthly total of energy represented by Market Participant <i>mp</i>'s cleared DAM Energy Bids, where the Market Participant is a QSE assigned to the registered Counter-Party.</u>
<u>RTOBL_{mp, (j, k), h}</u>	<u>MW</u>	<u>Real-Time Obligation per Market Participant per source and sink pair per hour—The number of Market Participant <i>mp</i>'s Point-to-Point (PTP) Obligations with the source <i>j</i> and the sink <i>k</i> settled in Real-Time for the hour <i>h</i>, and where the Market Participant is a QSE.</u>
<u>URTOBL_{mp}</u>	<u>MWh</u>	<u>Uplift Real-Time Obligation per Market Participant—The monthly total of Market Participant <i>mp</i>'s PTP Obligations settled in Real-Time, counting the quantity only once per source and sink pair, and where the Market Participant is a QSE assigned to the registered Counter-Party.</u>
<u>OBLLO_{q, (j, k)}</u>	<u>MW</u>	<u>Obligation with Links to an Option per QSE per pair of source and sink—The total MW of the QSE's PTP Obligation with Links to an Option Bids cleared in the DAM for the source <i>j</i> and the sink <i>k</i> for the hour.</u>
<u>UOBLLO_{q, (j, k)}</u>	<u>MW</u>	<u>Uplift Obligation with Links to an Option per QSE per pair of source and sink—The monthly total of Market Participant <i>mp</i>'s MW of PTP Obligation with Links to Options Bids cleared in the DAM for the source <i>j</i> and the sink <i>k</i> for the hour, where the Market Participant is a QSE assigned to the registered Counter-Party.</u>

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<u>DAOPT_{mp, (j, k), h}</u>	<u>MW</u>	<u>Day-Ahead Option per Market Participant per source and sink pair per hour</u> —The number of Market Participant <i>mp</i> 's PTP Options with the source <i>j</i> and the sink <i>k</i> owned in the DAM for the hour <i>h</i> , and where the Market Participant is a CRR Account Holder.
<u>UDAOPT_{mp}</u>	<u>MWh</u>	<u>Uplift Day-Ahead Option per Market Participant</u> —The monthly total of Market Participant <i>mp</i> 's PTP Options owned in the DAM, counting the ownership quantity only once per source and sink pair, and where the Market Participant is a CRR Account Holder assigned to the registered Counter-Party.
<u>DAOBL_{mp, (j, k), h}</u>	<u>MW</u>	<u>Day-Ahead Obligation per Market Participant per source and sink pair per hour</u> —The number of Market Participant <i>mp</i> 's PTP Obligations with the source <i>j</i> and the sink <i>k</i> owned in the DAM for the hour <i>h</i> , and where the Market Participant is a CRR Account Holder.
<u>UDAOBL_{mp}</u>	<u>MWh</u>	<u>Uplift Day-Ahead Obligation per Market Participant</u> —The monthly total of Market Participant <i>mp</i> 's PTP Obligations owned in the DAM, counting the ownership quantity only once per source and sink pair, where the Market Participant is a CRR Account Holder assigned to the registered Counter-Party.
<u>OPTS_{mp, (j, k), a, h}</u>	<u>MW</u>	<u>PTP Option Sale per Market Participant per source and sink pair per CRR Auction per hour</u> —The MW quantity that represents the total of Market Participant <i>mp</i> 's PTP Option offers with the source <i>j</i> and the sink <i>k</i> awarded in CRR Auction <i>a</i> , for the hour <i>h</i> , where the Market Participant is a CRR Account Holder.
<u>UOPTS_{mp}</u>	<u>MWh</u>	<u>Uplift PTP Option Sale per Market Participant</u> —The MW quantity that represents the monthly total of Market Participant <i>mp</i> 's PTP Option offers awarded in CRR Auctions, counting the awarded quantity only once per source and sink pair, where the Market Participant is a CRR Account Holder assigned to the registered Counter-Party.
<u>OBLs_{mp, (j, k), a, h}</u>	<u>MW</u>	<u>PTP Obligation Sale per Market Participant per source and sink pair per CRR Auction per hour</u> —The MW quantity that represents the total of Market Participant <i>mp</i> 's PTP Obligation offers with the source <i>j</i> and the sink <i>k</i> awarded in CRR Auction <i>a</i> , for the hour <i>h</i> , where the Market Participant is a CRR Account Holder.
<u>UOBLs_{mp}</u>	<u>MWh</u>	<u>Uplift PTP Obligation Sale per Market Participant</u> —The MW quantity that represents the monthly total of Market Participant <i>mp</i> 's PTP Obligation offers awarded in CRR Auctions, counting the quantity only once per source and sink pair, where the Market Participant is a CRR Account Holder assigned to the registered Counter-Party.
<u>OPTP_{mp, (j, k), a, h}</u>	<u>MW</u>	<u>PTP Option Purchase per Market Participant per source and sink pair per CRR Auction per hour</u> —The MW quantity that represents the total of Market Participant <i>mp</i> 's PTP Option bids with the source <i>j</i> and the sink <i>k</i> awarded in CRR Auction <i>a</i> , for the hour <i>h</i> , where the Market Participant is a CRR Account Holder.
<u>UOPTP_{mp}</u>	<u>MWh</u>	<u>PTP Option Purchase per Market Participant</u> —The MW quantity that represents the monthly total of Market Participant <i>mp</i> 's PTP Option bids awarded in CRR Auctions, counting the quantity only once per source and sink pair, where the Market Participant is a CRR Account Holder assigned to the registered Counter-Party.

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<u>OBLP_{mp, (j, k), a, h}</u>	<u>MW</u>	<u>PTP Obligation Purchase per Market Participant per source and sink pair per CRR Auction per hour</u> —The MW quantity that represents the total of Market Participant <i>mp</i> 's PTP Obligation bids with the source <i>j</i> and the sink <i>k</i> awarded in CRR Auction <i>a</i> , for the hour <i>h</i> , where the Market Participant is a CRR Account Holder.
<u>UOBLP_{mp}</u>	<u>MWh</u>	<u>PTP Obligation Purchase per Market Participant</u> —The MW quantity that represents the monthly total of Market Participant <i>mp</i> 's PTP Obligation bids awarded in CRR Auctions, counting the quantity only once per source and sink pair, where the Market Participant is a CRR Account Holder assigned to the registered Counter-Party.
<u>cp</u>	<u>none</u>	<u>A registered Counter-Party.</u>
<u>mp</u>	<u>none</u>	<u>A Market Participant that is a non-defaulting QSE or CRR Account Holder.</u>
<u>j</u>	<u>none</u>	<u>A source Settlement Point.</u>
<u>k</u>	<u>none</u>	<u>A sink Settlement Point.</u>
<u>a</u>	<u>none</u>	<u>A CRR Auction.</u>
<u>p</u>	<u>none</u>	<u>A Settlement Point.</u>
<u>i</u>	<u>none</u>	<u>A 15-minute Settlement Interval.</u>
<u>h</u>	<u>none</u>	<u>The hour that includes the Settlement Interval <i>i</i>.</u>

- (3) The uplifted short-paid amount will be allocated to the Market Participants (QSEs or CRR Account Holders) assigned to a registered Counter-Party based on the pro-rata share of MWhs that the QSE or CRR Account Holder contributed to its Counter-Party's maximum MWh activity ratio share.
- (4) Any uplifted short-paid amount greater than \$2,500,000 must be scheduled so that no amount greater than \$2,500,000 is charged on each set of Default Uplift Invoices until ERCOT uplifts the total short-paid amount. ERCOT must issue Default Uplift Invoices at least 30 days apart from each other.
- (5) ERCOT shall issue Default Uplift Invoices no earlier than 180 days following a short-pay of a DAM/RTM Invoice on the date specified in the Settlement Calendar. The Invoice Recipient is responsible for accessing the Invoice on the MIS Certified Area once posted by ERCOT.
- (6) Each Default Uplift Invoice must contain:
 - (a) The Invoice Recipient's name;
 - (b) The ERCOT identifier (Settlement identification number issued by ERCOT);
 - (c) Net Amount Due or Payable – the aggregate summary of all charges owed by a Default Uplift Invoice Recipient;
 - (d) Run Date – the date on which ERCOT created and published the Default Uplift Invoice;

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- (e) Invoice Reference Number – a unique number generated by the ERCOT applications for payment tracking purposes;
 - (f) Default Uplift Invoice Reference – an identification code used to reference the amount uplifted;
 - (g) Payment Date and Time – the date and time that Default Uplift Invoice amounts must be paid;
 - (h) Remittance Information Details – details including the account number, bank name, and electronic transfer instructions of the ERCOT account to which any amounts owed by the Invoice Recipient are to be paid or of the Invoice Recipient’s account from which ERCOT may draw payments due; and
 - (i) Overdue Terms – the terms that would apply if the Market Participant makes a late payment.
- (7) Each Invoice Recipient shall pay any net debit shown on the Default Uplift Invoice on the payment due date whether or not there is any Settlement and billing dispute regarding the amount of the debit.