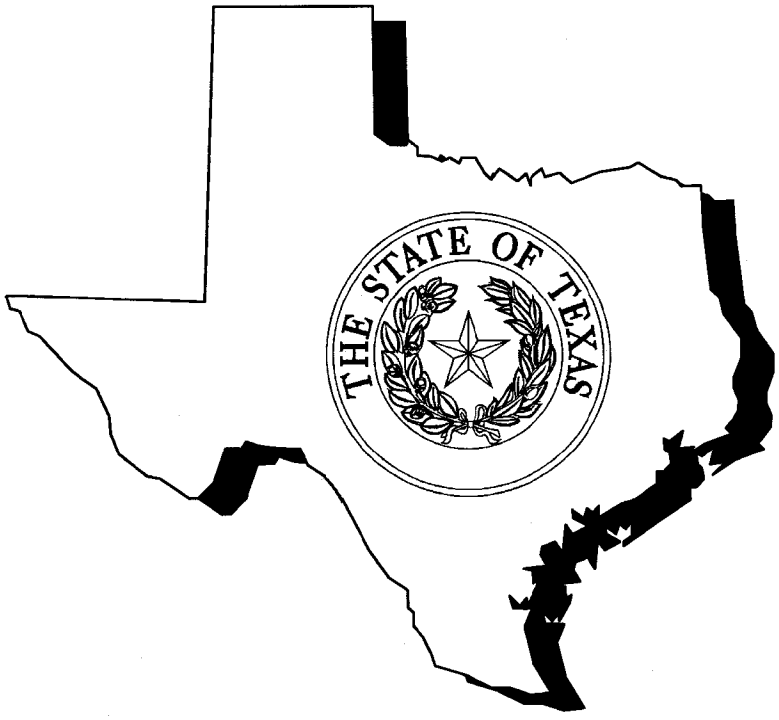
Filing Receipt

Received - 2021-08-16 02:42:58 PM
Control Number - 52322
ItemNumber - 174

DOCKET NO. 52322

APPLICATION OF THE ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC. FOR A DEBT OBLIGATION ORDER TO FINANCE UPLIFT BALANCES UNDER PURA CHAPTER 39, SUBCHAPTER N, FOR AN ORDER INITIATING AN PARALLEL DOCKET, AND FOR A GOOD CAUSE EXCEPTION	§ § § § § § § § §	**PUBLIC UTILITY COMMISSION OF TEXAS**



DIRECT TESTIMONY AND WORKPAPERS OF CARRIE BIVENS

ON BEHALF OF THE STAFF OF THE

PUBLIC UTILITY COMMISSION OF TEXAS

AUGUST 16, 2021

TABLE OF CONTENTS

ATTACHMENTS

I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Carrie Bivens. My business address is 7620 Metro Center Dr., Austin, TX 78744.

Q. By whom are you employed and in what capacity?

A. I am employed by Potomac Economics, Ltd., as Vice President and Director of the Independent Market Monitor (IMM) of the Electric Reliability Council of Texas (ERCOT) wholesale electricity market. I have held this position since 2020.

Q. What are your principal areas of responsibility at the Independent Market Monitor?

A. My principal areas of responsibility are two-fold: 1) detect and prevent market manipulation strategies and market power abuses; and 2) evaluate the operations of the wholesale market with the current market rules and propose changes to those market rules, and recommend other measures to enhance market efficiency.

Q. Please describe your educational background and professional qualifications.

A. I received a Bachelor of Business Administration Degree in Operations Management from the University of Houston in 2003. Prior to joining Potomac Economics, Ltd., I was employed by ERCOT as Director of Wholesale Operations. Prior to joining ERCOT in 2006, I was an analyst in the market-based rate group at the Federal Energy Regulatory Commission (FERC) for three years. A copy of my resume is provided as Attachment CB-1.

Q. Have you previously testified before the Public Utility Commission of Texas (Commission)?

A. Yes, in Docket No. 47576.[1]

[1] *Application of the City of Lubbock Through Lubbock Power and Light for Authority to Connect a Portion of Its System With the Electric Reliability Council of Texas*, Docket No. 47576, Order (Mar. 15, 2018).

II. PURPOSE OF TESTIMONY

Q. On whose behalf are you submitting this testimony?

A. I am submitting this testimony on behalf of the Staff of the Public Utility Commission of Texas (Staff).

Q. What is the scope and purpose of your testimony?

A. The scope and purpose of my testimony is to recommend the process for applying to receive financing proceeds, i.e., documenting the amount of exposure. I also recommend a method for prorating the remittance of proceeds from the financing should the amount of exposure documented exceed the $2.1 billion cap in PURA § 39.652(4).

Q. What did you review to prepare your testimony and the recommendations included therein?

A. My testimony is based on my review of PURA Subchapter N, the legislative history of House Bill 4492, the letters from Lt. Governor Patrick, Chairman Schwertner and various members of the Senate, and Chairman Paddie, ERCOT's application and proposed debt obligation order, the discovery responses filed in this proceeding, and any relevant ERCOT nodal protocols, as well as my past professional experience at ERCOT informing my knowledge of market participant relationships and settlements.

III. SUMMARY OF RECOMMENDATIONS

Q. Please summarize your recommendations related to ERCOT's application.

A. I recommend that the Commission establish a process for Load-Serving Entities (LSEs) from each applicable corporate entity to apply for financing proceeds and provide supporting documentation as authorized by Subchapter N based on their exposure to the defined uplift balance. Such requests should be aggregated so that the requested financing amount nets among affiliated entities. If the total financing requested by all applicants exceeds the $2.1 billion cap on the amount eligible to be financed, then each LSE that

applies should receive a prorated portion of the financing proceeds based on its pass-through amount and that percentage of the total pass-through amounts.

Q. Do you believe that financing through a Commission-issued debt obligation order will support the financial integrity of the wholesale market and is necessary to protect the public interest?

A. Yes, I do. My recommendations regarding certain elements of the debt obligation order are specifically tailored to serve the public interest by stabilizing and preserving the health of the wholesale market.

IV. DEBT OBLIGATION ORDER UNDER PURA SUBCHAPTER N

Q. Please describe the purpose of PURA Subchapter N and the accompanying debt obligation order.

A. One of the stated purposes of financing the uplift balance in the manner provided in Subchapter N is to alleviate liquidity issues and reduce the risk of additional defaults in the ERCOT wholesale market by allowing wholesale market participants to repay extraordinary uplift charges over a longer period of time.[2] The Legislature also expressly found that Subchapter N serves the public purpose of stabilizing the ERCOT wholesale electricity market.[3] Under PURA § 39.653(a), financing through a debt obligation order is permitted if the Commission finds "that such financing will support the financial integrity of the wholesale market and is necessary to protect the public interest, considering the impacts on both wholesale market participants and retail customers." Finally, PURA § 39.653(e) clearly states that proceeds from the financing in excess of the amount of an LSE's extraordinary uplift charges must be remitted to ERCOT and credited against the uplift balance.

[2] PURA § 39.651(b).

[3] PURA § 39.651(c).

Q. Are there any specific elements that the debt obligation order must include?

A. PURA § 39.653(b) requires that the debt obligation order must:

> (1) state the uplift balance to be financed; (2) state the period over which the uplift charges must be assessed to repay the debt obligations, which may not exceed 30 years; and (3) provide the process for remitting the proceeds of the financing to load-serving entities who were exposed to the costs included in the uplift balance, including a requirement for the load-serving entities to submit documentation of their exposure.

In addition, PURA § 39.653(e) states that the debt obligation order must:

> include a requirement that any load-serving entity that receives proceeds from the financing that exceed the entity's actual exposure to uplift charges from consumption during the period of emergency notify the independent organization and remit any excess receipts, and that any payments received under this subsection must be credited against the uplift balance to reduce the remaining uplift charges.

Q. Please describe the costs included in the uplift balance as defined in PURA § 39.652(4).

A. The costs included in the uplift balance are the net reliability deployment price adder (RDPA) charges and the net charges for day-ahead Ancillary Services (AS) for the amounts that were priced over the System-Wide Offer Cap (SWCAP). Specifically, the RDPA charges are those that are referred to in ERCOT protocol section 6.7.5, Real-Time Ancillary Service Imbalance Payment or Charge, as charges for a portion of the Ancillary Service imbalance for a given 15-minute Settlement Interval in the real-time market. The costs also include the net charges for day-ahead Ancillary Services (AS) for the amounts that were priced over the SWCAP in place during the defined Emergency Period.[4] These costs are based on ERCOT protocol section 4.6.4.2, Charges for Ancillary Services Procurement in the Day-Ahead Market (DAM) and trued up based on protocol section 6.7.4, Adjustments to Cost Allocations for Ancillary Services Procurement.

[4] *See* PURA § 39.652(3).

Q. What is a reliability deployment price adder?

A. As the grid operator, ERCOT must take certain actions at certain points that are outside of the normal market processes to ensure the reliability of the grid. These reliability actions necessarily result in a different real-time energy price than would have otherwise resulted absent their execution. The RDPA is an estimate of the impact to the real-time energy price of these reliability actions and is added to the originally calculated energy price when determining the final settlement price. In this case, RDPA is paid during the normal energy settlement process and are not part of uplift.

The RDPA is also used in part to pay for real-time reserves, which, broadly speaking, is capacity from generation resources that is online and available in real-time but not dispatched. It is this latter category, the one that is not part of the settlement prices, that is uplifted to load. These real-time reserves are settled as the AS imbalance, which consists of both the RDPA and the online operating reserve demand curve adder. The RDPA adder is the only adder relevant to this proceeding.

Q. Please explain AS charges.

A. Ancillary services are reliability services procured on an hourly basis in the DAM. Each Qualified Scheduling Entity (QSE) that represents LSEs is responsible for a portion of those charges, based on an allocation only to these types of QSEs. As described later in this testimony, ERCOT sets an amount of AS that it requires on behalf of load, and assigns a portion of the obligation for that AS to each QSE representing LSEs based on its load ratio share. A QSE has the option to arrange to provide all or part of its obligation through its own resources or through bilateral transactions. If the QSE does not use one of these methods to provide its AS obligation, ERCOT will procure the AS on the QSE's behalf. The charges associated with ERCOT's procurement of AS are then assigned to all such QSEs on a load-ratio share basis.

Q. Does PURA Subchapter N provide any specific guidance as to how an LSE must calculate and document its exposure to the costs included in the uplift balance?

A. No, it does not provide specific guidance.

Q. Does PURA, Subchapter N provide a definition of the term "exposure"?

A. No, it does not define this term.

V. RECOMMENDATIONS

A. PROCESS FOR CALCULATING AND DOCUMENTING EXPOSURE

Q. Does ERCOT's application recommend a process to be used by LSEs to calculate and document exposure?

A. No, the application does not include a recommendation for this process.

Q. Does ERCOT have access to the information needed to calculate and document exposure to AS costs in excess of the SWCAP or RDPA charges?

A. In general, ERCOT does not have the granularity of data needed, nor does it have access to certain contractual information regarding the pass-through of uplift costs from a QSE to LSEs. Generation and Load Resources are represented by Resource Entities (REs), and load is represented by LSEs. Each of these must then be represented by QSEs. QSEs are the entities that settle directly with ERCOT. They may represent any combination of one or more LSEs, REs, or Congestion Revenue Rights Account Holders. QSEs may have contractual relationships that directly pass-through LSE uplift costs, or different arrangements altogether. Charges are assessed at a QSE level rather than an LSE level. Therefore, if a QSE represents multiple LSEs and REs, only the QSEs and LSEs themselves have the information needed to calculate each individual LSE's exposure to charges.

However, there are limited cases in which ERCOT can calculate the exposure. In the specific scenario where: (1) a QSE contains only a single LSE or multiple LSEs that are all affiliated; (2) there are no affiliated REs; and (3) the LSE(s) affirms that the QSE costs were passed through, then ERCOT can provide the necessary information. All three of these conditions must be true for ERCOT to have the necessary information.

Q. Can a single QSE represent more than one type of market participant?

A. Yes. There is nothing in the ERCOT protocols that dictates what combination of market participants a QSE can represent. Therefore, there are some QSEs that represent some combination of LSEs and REs, while there are others who may represent only LSEs.

Q. Are affiliated market participants required to use the same QSE?

A. No. There is no requirement in the ERCOT protocols that dictates affiliated market participants must use the same QSE. For example, if a LSE that is a retail electric provider (REP) has an affiliate that is an RE, there is nothing that requires the REP and the RE to use the same QSE. Similarly, there is nothing that prevents multiple affiliated REPs from using different QSEs. Deciding what QSE to use is a business decision that each market participant must make. In the other direction, each individual QSE in practice is typically structured so as not to mix unaffiliated entities for ease of settlement.

Q. How do you recommend that an LSE calculate its exposure?

A. Based on my reading of Subchapter N, without any legal background, I agree with the August 4, 2021, briefing filed by Commission Staff. Exposure should be calculated on a net basis taking into consideration the larger corporate structure of an LSE and the other market participants within that corporate structure. I have included Staff's brief as Attachment CB-2.

Q. Is there anything other than a plain language reading of PURA Subchapter N that led you to this recommendation?

A. No, nothing other than a plain language reading of PURA Subchapter N led me to this recommendation that exposure should be calculated on a net basis. My opinion is significantly informed by my years of professional experience with market design and dynamics as well as my intimate knowledge of ERCOT's settlement processes. My opinion is also supported by the exchange between Senators Kelly Hancock and Donna Campbell that took place during floor debate on HB 4492 and is included below.

> CAMPBELL Good. A question has come up about the 2.1 billion cap, where did the cap, setting that cap, where did it come from? And before you answer that part, would you include, does this include netting? We're getting that--
>
> HANCOCK Yes.
>
> CAMPBELL It does include netting.
>
> HANCOCK Another good question. And so, what we've done with that 2.1 is on ancillary and adder charges there are amounts that you owe and there are amounts that certain participants in that market get paid. If you're a retail electric provider, you know, it's a little bit different. But what we did is *we took those participants that both got received funds and those that owed funds into that marketplace and we netted that out and that's really where we came to the 2.1* which is simply in that ancillary and adder provision. And so it is a net amount, it's not the gross of what was total, totally owed in that provision, but it was what was owed and what was paid in the net amount.[5]

Because of the extraordinary nature of the February market event, RDPA charges were uplifted to LSEs (through QSEs) to provide make-whole payments to generators for energy that was not needed or produced. There is no financial hedge that an LSE can use to avoid these RDPA charges. However, if an LSE is part of a larger corporate structure that includes affiliated Resources that received these payments, the larger corporate entity will only be "exposed" to the remaining balance, if any. Therefore, the appropriate policy

[5] Debate on Tex., H.B. 4492 on the Floor of the Senate, 87th Leg., R.S at 2:56:25 – 2:57:25 (May 26, 2021) (the video recording available at https://tlcsenate.granicus.com/MediaPlayer.php?view_id=49&clip_id=16262). (emphasis added).

outcome is to net the charges and payments. Similarly, revenues for AS over the SWCAP represent a windfall for affiliated Resources, as such prices exceeded any submitted offer and any potential real-time clearing prices for energy.

If financing is calculated on a gross basis, the total amount requested is expected to exceed the financing cap of $2.1 billion by a consequential sum. This would require a significant proration of financing proceeds that would thwart the policy objective of protecting the financial integrity of the wholesale market. Stated another way, if an LSE is part of a larger corporate structure that *received AS payments* in excess of the SWCAP *and RDPA payments* as part of the AS imbalance settlement in an amount sufficient to offset the LSE's exposure to these costs, then that LSE is necessarily less likely to have liquidity issues.

Consider two companies, A and B, that have the same load ratio share. However, assume company A owns generators that received large RDPA adder payments as part of the AS imbalance settlement totaling many millions of dollars during the emergency period. Because these payments are not for generated energy itself, but are instead for energy that was not produced, no monetary costs are associated with providing these reserves, e.g., no fuel was converted to electric energy. Assume company B owns no generation and only received uplift charges. There are many factors to consider, but, given that the total amount that may be financed is capped, company B is more likely to be at risk of default than company A, because company A had a natural hedge and company B had no ability to financially hedge.

Admittedly, both the net and gross options present unique challenges. Neither provides total equity and there are certain to be outlier situations, even when calculating on a net basis. Overall however, I believe calculating exposure on a net basis is the more sound approach and the option that most closely aligns with the stated policy objective of

stabilizing the ERCOT wholesale electricity market by alleviating liquidity issues and reducing the risk of additional defaults.

Q. Some parties have argued that netting would result in disparate treatment of end-use retail customers. What is your response?

A. The provisions of Subchapter N dictate varied treatment for differently situated retail customers because customers of LSEs that can opt out under PURA § 39.653(d) will not benefit from financing proceeds. In addition, REPs offer many products, so not all retail customers—including customers served by the same REP—were on a product that resulted in the pass-through of AS costs or RDPA uplift.

The most material concern with regard to not netting is related to the $2.1 billion cap on the financed amount. The alternative to netting is to vastly oversubscribe this financing program such that customers and LSEs alike may be deprived of sufficient financing to overcome the hardships experienced, due to significant proration. On the whole, netting provides the most benefit to the entities likely to be in financial distress.

Q. Please describe the general categories of market participants that were charged for AS costs in excess of the SWCAP or RDPA charges.

A. The general category of market participants that were charged for AS costs in excess of the SWCAP or RDPA charges is QSEs that represent LSEs. A QSE that represents LSEs is assessed AS charges for each AS type based on its load ratio share and any offsetting self-arrangement. ERCOT procures the system-wide AS plan minus any self-arrangement quantities. It then allocates costs based on the Market Clearing Prices for Capacity (MCPCs) of each service to the QSEs. QSEs that represent LSEs are also assessed charges called AS Imbalance, to assign costs for RDPA and Operating Reserve Demand Curve (ORDC) reserve payments made to Resources based on the LSEs' load ratio share. In the

QSE settlements, there is a separate billing determinant that represents the RDPA portion of the charge or payment.

Q. Please describe the general categories of market participants that received payments that included AS costs in excess of the SWCAP or RDPA charges.

A. The general category of market participants that received payments that included AS costs in excess of the SWCAP or RDPA payments is QSEs that represent REs. QSEs that represent REs are paid for ancillary services based on their AS awards and the MCPCs for each AS. They also receive payments for AS Imbalance based generally on the amount of reserves that are available on the Resources in real-time.

Q. Please describe the types of information needed to document exposure to AS costs in excess of the SWCAP or RDPA charges on a net basis.

A. As previously stated, if an LSE or a group of affiliated LSEs: (1) are all within a single QSE with no unaffiliated LSEs; (2) there are no affiliated REs; and (3) the LSE(s) affirms that the QSE costs were passed through, then ERCOT can calculate the exposure on its behalf.

For all others:

For AS costs, documentation containing hourly AS costs for each ancillary service should be provided, as well as revenues for any affiliates, for Operating Days February 12, 2021 through February 20, 2021, which encompasses the defined period of emergency. Such costs should be inclusive of the load ratio share true-up that is performed pursuant to ERCOT protocol section 6.7.4. Attachment CB-3 contains hourly percentages of the portion of AS prices that exceeded the SWCAP. These percentages can be multiplied by the initial AS costs to calculate the amount that is related to prices over SWCAP.

For RDPA charges, documentation containing the AS Imbalance charges specifically calculated under billing determinant RTRDASIAMT[6] that were passed through to LSEs should be provided, for each 15-minute interval in the defined period of emergency. Billing determinants are defined calculations that are used to derive specific settlement outcomes and are contained in ERCOT settlement statements. Payments for AS Imbalance for the corporate entity and all affiliates should also be provided under the same billing determinant for each 15-minute interval in the defined period of emergency. LSEs may need assistance from their QSEs to calculate their share of RTRDASIAMT because it is a QSE-level billing determinant. QSEs are requested to provide additional documentation in this case if the invoices/statements previously provided to the LSE are insufficiently granular. Alternatively, an LSE's load ratio share can be multiplied by the billing determinant RTRDASIAMTTOT[7] for each interval to get the LSE's share of the total amount.

Q. How should this information be used to calculate exposure on a net basis?

A. Included as Attachment CB-4 is a proposed form to be used to calculate exposure on a net basis. It requires that the requests for financing proceeds include the following information:

1) List of entity or entities filing the application. All affiliated entities must be combined in a single request. This will streamline the process by aggregating the application.

2) List of affiliated Resource Entities. This information is important when calculating exposure on a net basis.

[6] Defined in ERCOT protocol section 6.7.5(7) as "*Real-Time Reliability Deployment Ancillary Service Imbalance Amount*—The total payment or charge to QSE *q* for the Real-Time Ancillary Service imbalance associated with Reliability Deployments for each 15-minute Settlement Interval."

[7] Defined in ERCOT protocol section 6.7.6 as "*Real-Time Reliability Deployment Ancillary Service Imbalance Market Total Amount*—The total payment or charge to all QSEs for the Real-Time Ancillary Service imbalance associated with Reliability Deployments for each 15-minute Settlement Interval."

3) Confirmation that the requesting LSE(s) currently serves load in the ERCOT region, as required by PURA § 39.159(a) and (b).

4) Statement of QSE relationship. If applicable, affirm that applicant(s) are all within a single QSE with no unaffiliated LSEs, there are no affiliated REs, and applicant(s) affirms that the QSE costs were passed through. Yes or No. If yes, skip items 5-9 because exposure can be calculated by ERCOT.

5) Amount of the AS charges passed through to requesting LSE(s) above the SWCAP during the defined period of emergency. This amount should represent the initial day-ahead costs that are later trued-up in real-time settlement based on changes to load ratio shares. An attachment should be provided that lists the hourly values that make up this item's total, as well as any adjustments. AS Self-Arrangement is at the QSE level, so to the extent there is QSE self-arrangement that wholly or partially relieves an LSE of their AS charges, that information should be included. This item forms the gross basis of the AS charges.

6) AS payments received by affiliated RE(s), if any, for the portion of prices above SWCAP. This amount should reflect any later adjustments due to failure to provide settlements. An attachment should be provided that lists the hourly values that make up this item's total. This item offsets AS costs.

7) The net amount of AS charges (item 5) minus payments (item 6).

8) AS imbalance charges related to the RDPA passed through to LSE(s) during the defined period of emergency. This item should reflect any changes to load ratio shares that occurred after initial settlement, if applicable. An attachment should be provided that includes the interval values that make up the total for this item. This item forms the gross basis of the RDPA uplift.

9) AS imbalance payments related to the RDPA received by QSEs representing affiliated RE(s) during the defined period of emergency. An attachment should be provided that includes the interval values that make up the total for this item, as well as any adjustments. This item offsets RDPA uplift.

10) The net amount of AS imbalance related to RDPA charges (item 8) minus payments (item 9).

11) If answering No to item 4, amount of items 5 and 8 that were passed through to retail customers. If answering Yes to item 4, percentage of pass through. This may be used in to aid in proration in case the total requested exceeds $2.1 billion.

12) Invoices or statements must be provided that back up the values contained in items 5-6, 8-9, unless answering Yes to item 4.

13) Finally, the CEO(s) of the entity or entities filing the application should sign the form, affirming that the statements are correct, and agreeing that audits may be performed of the requested amounts. Due to previously discussed limitations in ERCOT's access to the information needed to independently calculate exposure, this affirmation is required.

Q. In the event the Commission decides that exposure must be calculated on a gross basis, please describe the types of information needed to document exposure to AS costs in excess of the SWCAP or RDPA charges on a gross basis.

A. If the LSE is: (1) represented by a QSE that does not represent any unaffiliated LSEs, and (2) the LSE affirms that the QSE costs were passed through, then ERCOT can calculate the gross amount.

For all others:

For AS costs, documentation containing hourly AS costs for each Ancillary Service should be provided for the LSE for Operating Days February 12, 2021 through February 20, 2021. For RDPA charges, documentation containing AS Imbalance charges related to the RDPA passed through to the LSE should be provided, for each 15-minute interval in the defined period of emergency.

Q. How should this information be used to calculate exposure on a gross basis?

A. If calculated on a gross basis, then no payments to affiliated REs need to be deducted from each uplift type to offset the costs.

Q. How should an LSE that serves one or more transmission-voltage customers that opt out under PURA § 39.653(d) account for those opt outs when calculating exposure?

A. To the extent that the LSE can or does pass through uplift costs, the LSE will need to determine and calculate the opted out transmission-voltage customers' load portion of its total load and use that information to remove those costs from the amount of financing proceeds requested. However, I understand that the opt-outs will be filed in a separate docket. To maintain the timeline initially proposed by Staff where the deadline to opt out and the deadline to document exposure both fall on the 30th day after the Commission issues the debt obligation order, a compliance filing would be required that trued-up the exposure calculation for each LSE based on the opted-out customers, once that list is known. At that point, amounts in excess could be returned as provided for in PURA § 39.653(e). ERCOT could redistribute these amounts on the same prorated basis as the initial disbursement. This option has the advantage of preserving the quickest timeline for allowing ERCOT to seek financing.

Another option would be to extend the timeframe for the filing of applications for financing proceeds and associated exposure calculations initially proposed by Staff to allow LSEs time to exclude opted-out transmission customer exposure from the total. This extension is necessary so that LSEs know the universe of opted-out customers before the deadline for documenting their exposure. For example, the deadline to opt out could be 30 days from the date the Commission issues the debt obligation order and the deadline for documenting exposure could be 21 days after that. This approach has the disadvantage of delaying how quickly ERCOT can obtain financing; however, it will simplify the process in that the true-up mechanism noted above would not be needed.

Q. What documentation is needed to support the exclusion of a transmission-voltage customer that opts out from the calculation of an LSE's exposure?

A. LSEs will need to provide their calculation and the underlying data used to make the calculation. This will likely include customer load data.

B. PROCESS FOR REMITTING THE PROCEEDS OF THE FINANCING

Q. Does Subchapter N cap the amount of the uplift balance that the Commission may finance?

A. The amount is capped at $2.1 billion.[8]

Q. Does Subchapter N prescribe a method for prorating the amount of proceeds from the financing received by each market participant in the event that the amount of exposure that is documented exceeds $2.1 billion?

A. No, it does not.

Q. Does ERCOT's application recommend a method for prorating the amount of proceeds from the financing received by each market participant in the event that the amount of exposure that is documented exceeds $2.1 billion?

A. No, it does not.

Q. Is it possible for the amount of exposure that is documented to exceed $2.1 billion?

A. Yes it is. My understanding is that the Texas Legislature relied on the IMM calculations contained in a March 11, 2021 letter to the Commission to determine a limit on the financing amount.[9] The IMM's letter was based on a price correction recommendation that,

[8] PURA § 39.652(4).

[9] *Issues Related to the State of Disaster for the February 2021 Winter Weather Event*, Project No. 51812, Potomac Economics' Follow Up Letter (Mar. 11, 2021).

for the RDPA uplift portion, was only related to February 18 and 19, 2021.[10] However, Subchapter N provides for RDPA uplift financing for the entire period of February 12, 2021 through February 20, 2021. Due to the extra days being eligible, the amount of exposure may exceed the legislative cap.

Q. If the amount of exposure that is documented exceeds $2.1 billion, how do you recommend prorating the amount of the $2.1 billion received by each market participant?

A. A prioritization method could be used to prorate the amount based on the uses of the financing under PURA § 39.651(d) – namely, refunding retail customers who have paid or would otherwise be obligated to pay such costs. Each LSE that applies to receive financing proceeds will provide the amount of the relevant costs that was ultimately passed through to the end use customer, and that would aid in the proration calculation. For example, if the total amount of exposure documented is $4.5 billion, and an LSE's exposure is $1 billion, but that LSE only passed through 50% of the costs, then the overall proration will be based on $500 million. From there, each LSE will receive a prorated portion based on a percentage determined by that amount. A simplified illustration is as follows:

	Exposure	Passed-through	Percentage	Prorated Amount
LSE A	$ 1,000,000,000	$ 500,000,000	15%	$ 318,181,818
LSE B	$ 2,000,000,000	$ 1,600,000,000	48%	$ 1,018,181,818
LSE C	$ 1,500,000,000	$ 1,200,000,000	36%	$ 763,636,364
Total	$ 4,500,000,000	$ 3,300,000,000		$ 2,100,000,000

Q. Why do you recommend a proration based on a market participant's pass-through costs?

[10] The letter also estimated the dollar amount based on counter-party netting. Because there are cases in which a QSE represents unaffiliated LSEs, that netting will not be the same as the netting contemplated as part of this proceeding.

A. Based on an evaluation of the wholesale market, absent the recommendation to net charges with payments, there is no clear economic basis upon which to prioritize funds to particular entities given that their relative financial health to one another cannot be easily assessed. However, PURA § 39.660 states that this financing is to offset charges that were or would otherwise be passed through to end use customers. In addition, PURA § 39.653(a) allows for financing through a debt obligation order if the Commission finds "that such financing will support the financial integrity of the wholesale market and is necessary to protect the public interest, considering the impacts on both wholesale market participants and retail customers." Therefore, it is reasonable to prorate based on pass-through costs to these customers.

Q. What is ERCOT's short pay list?

A. ERCOT's short pay list reflects the entities that either have not paid or have underpaid invoices they received from ERCOT.

Q. If an LSE that is on ERCOT's short pay list seeks to either opt-out or obtain a share of the proceeds of the financing, would that change your recommendation regarding how to prorate the $2.1 billion?

A. If an LSE on the short pay list has access to unique alternate financing opportunities outside of PURA Subchapter N,[11] enters into a payment plan with ERCOT, and otherwise meets the requirements of the opt-out process established by the Commission, then the LSE should be allowed to opt out of uplift financing. If such an entity seeks to obtain a share of the financing, then that entity should be prioritized lower than entities that do not have access to such alternate financing opportunities. Given the capped amount of funds available under PURA § 39.652(4), this approach will most effectively serve the policy

[11] Unique financing opportunities include the ability to securitize amounts owed under the newly enacted PURA Chapter 41. This is an opportunity that is not available to all market participants.

goal of preserving the health of the wholesale market by maximizing the financing available to the greatest number of eligible entities.

Q. Does this conclude your testimony?

A. Yes

CARRIE BIVENS
(512)-879-7971

WORK EXPERIENCE

Potomac Economics, Ltd. 4/2020 – Present

Vice President, ERCOT IMM Director

- Lead the Texas office to provide market monitoring services for the ERCOT region, including but not limited to detecting and preventing market manipulation strategies as well as identifying potential market design improvements

Electric Reliability Council of Texas, Inc. 9/2006 – 4/2020

Director, Wholesale Operations

- Provided leadership and strategic direction for market operations, which includes day-ahead market, congestion revenue rights auction, and demand integration (load resources, distributed generation resources, and emergency response service)

Manager, Forward Markets

- Responsible for managing operations of both the congestion revenue rights auctions and the day-ahead market, ensuring alignment with organizational objectives
- Act as a subject matter expert internally and externally, making effective oral and written presentations on technical matters and complex policies

Manager, Day-Ahead Market

- Managed a department of analysts and engineers to establish compliance with protocols, processes and procedures

Supervisor, Day-Ahead Market

- Supervised operators with the goal of publishing an on-time quality day-ahead market solution, requiring coordinated resolution of issues by working with interconnected departments and software vendors

Market Support Analyst

- Lead the day-ahead market trials, including:
  - Planning and execution of day-ahead market trials testing, integrating with other market trials leads representing upstream and downstream systems
  - Engaging with market participants to answer design questions and resolve technical issues

Federal Energy Regulatory Commission, Washington, D.C. 7/2003 – 9/2006

Energy Industry Analyst

- Conducted analyses and comprehensive review of filings to identify issues such as potential generation market power, and prepared memoranda and proposed orders containing recommendations on economic and policy issues

EDUCATION

University of Houston, Houston, Texas
Bachelor of Business Administration in Operations Management
Graduated summa cum laude

The George Washington University, Washington, D.C.
Graduate-level coursework in Economics

DOCKET NO. 52322

APPLICATION OF THE ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC. FOR A DEBT OBLIGATION ORDER TO FINANCE UPLIFT BALANCES UNDER PURA CHAPTER 39, SUBCHAPTER N, AND FOR A GOOD CAUSE EXCEPTION	§ § § § § § §	**PUBLIC UTILITY COMMISSION** **OF TEXAS**

COMMISSION STAFF'S RESPONSE TO ORDER REQUESTING BRIEFING

On July 16, 2021, The Electric Reliability Council of Texas, Inc. (ERCOT) filed an application for a debt obligation order under PURA[1] chapter 39, subchapter N. On July 21, 2021, an order was filed requesting briefing on two questions as follows:

1. Does the phrase *exposed to the costs included in the uplift* contemplate offsetting the amounts paid in excess of the commission's system-wide offer cap? If so, does this offset include amounts received by entities affiliated with the entity that made such payments?
2. What is the appropriate definition for entities affiliated with the entity that made such payments? If the entity that made such payments is part of a larger business structure, what is the highest level of the business structure (up to the ultimate part of the larger business structure) that should be used to identify the affiliated entities whose amounts received should be used as an offset when determining the exposure of the entity that made such payment?

The order also established 3:00 p.m. on August 4, 2021, as the deadline for filing a brief on these issues. Therefore, this pleading is timely filed.

I. STAFF'S RESPONSE TO QUESTION NO. 1

When read within the context of the statutory framework of PURA chapter 39, subchapter N (Subchapter N), the phrase "exposed to the costs included in the uplift" does contemplate offsetting the amounts for reliability deployment price adder (RDPA) charges and ancillary service costs in excess of the Commission's system-wide offer cap (collectively, Extraordinary Costs) with payments received for those same services. Central to this conclusion is how to interpret the word exposed.

[1] Public Utility Regulatory Act, Tex. Util. Code §§ 11.001-66.016.

Courts will consider a statute as a whole "reading the chosen words in their context and with a view to their place in the overall statutory scheme."[2] If a statute leaves a term undefined, then a court will use the plain and ordinary meaning of the term and interpret it within the context of the statute.[3] Courts will look first to dictionary definitions to determine a term's common, ordinary meaning.[4] The unambiguous language of a statute controls its construction.[5] "When a statute is clear and unambiguous ... [a court will] not resort to extrinsic interpretive aids, such as legislative history, 'because the statute's plain language is the surest guide to the Legislature's intent.'"[6]

Taken together, the provisions of Subchapter N form a clear and unambiguous statutory scheme that is designed to preserve the viability of the ERCOT market as a whole by buttressing market participants that incurred Extraordinary Costs financially and preventing them from exiting the market. One of the stated purposes of financing the uplift balance in the manner provided in Subchapter N is to alleviate liquidity issues and reduce the risk of additional defaults in the ERCOT wholesale market by allowing wholesale market participants to repay Extraordinary Costs over a longer period of time.[7] In addition, the Legislature expressly found that Subchapter N serves the public purpose of stabilizing the ERCOT wholesale electricity market.[8] Moving further into Subchapter N, PURA § 39.653(a) allows for financing *if* the Commission finds "that such financing will support the financial integrity of the wholesale market and is necessary to protect the public interest, considering the impacts on both wholesale market participants and retail customers." Finally, PURA § 39.653(e) makes it very clear that proceeds from the financing in excess of the amount of a load-serving entity's Extraordinary Costs must be remitted to ERCOT and credited against the uplift balance.

Having established the context in which the term exposed is used, the next step is to consider the word itself. The definition of exposure includes "the fact or condition of being

---

[2] *In re Acad., Ltd.*, 19-0497, 2021 WL 2635954, at *3 (Tex. June 25, 2021).

[3] *EBS Sols., Inc. v. Hegar*, 601 S.W.3d 744, 758 (Tex. 2020).

[4] *Fort Worth Transp. Auth. v. Rodriguez*, 547 S.W.3d 830, 838 (Tex. 2018).

[5] *City of Richardson v. Oncor Electric Delivery Co.*, 539 S.W.3d 252, 261 (Tex. 2018).

[6] *Id.* (quoting *Paxton v. City of Dallas*, 509 S.W.3d 247, 257 (Tex. 2017)).

[7] PURA § 39.651(b).

[8] PURA § 39.651(c).

exposed: such as…the condition of being at risk of financial loss."[9] This definition of exposure conforms with the purposes of Subchapter N—reducing risk of additional defaults and stabilizing the wholesale market. Viewed in terms of a market participant that was both charged payments and received payments that included ancillary service costs in excess of the Commission's system-wide offer cap, or one that was charged payments and received payments based on the RDPA—either on a standalone basis or through an affiliate—it is likely that such a market participant is at less risk of financial loss than a market participant that was only charged in either of these cases. In fact, the market participant may be at no risk at all. Consequently, applying the plain and ordinary meaning of exposure leads to the conclusion that the Commission must look at both sides of the equation and determine exposure on a net basis.

Should the Commission decide that Subchapter N is ambiguous, then it is appropriate to consider the legislative history of the statute. The Texas Legislature has declared that the "legislative history" should be considered in construing Texas laws.[10] The legislative history of House Bill 4492 further bolsters the conclusion that exposure to Extraordinary Costs should be calculated on a net basis.

During debate on the Senate floor, Senator Hancock laid out Amendment No. 1 to House Bill 4492.[11] That amendment included much of the language ultimately included the version of House Bill 4492 that was signed by the governor and described above.[12] Senator Campbell and Senator Hancock engaged in the following exchange related to how the $2.1 billion cap on the amount that can be financed through a debt obligation order was calculated:

> CAMPBELL Good. A question has come up about the 2.1 billion cap, where did the cap, setting that cap, where did it come from? And before you answer that part, would you include, does this include netting? We're getting that--
>
> HANCOCK Yes.
>
> CAMPBELL It does include netting.

---

[9] Merriam Webster definition of exposure, https://www.merriam-webster.com/dictionary/exposure (last visited Jul. 28, 2021).

[10] Tex. Gov't Code § 311.023(3).

[11] Debate on Tex., H.B. 4492 on the Floor of the Senate, 87th Leg., R.S. (May 26, 2021) (the video recording available at https://tlcsenate.granicus.com/MediaPlayer.php?view_id=49&clip_id=16262).

[12] S.J. of Tex., 87th Leg., R.S. 2162-73 (2021).

> HANCOCK Another good question. And so, what we've done with that 2.1 is on ancillary and adder charges there are amounts that you owe and there are amounts that certain participants in that market get paid. If you're a retail electric provider, you know, it's a little bit different. But what we did is *we took those participants that both got received funds and those that owed funds into that marketplace and we netted that out and that's really where we came to the 2.1* which is simply in that ancillary and adder provision. And so it is a net amount, it's not the gross of what was total, totally owed in that provision, but it was what was owed and what was paid in the net amount.[13]

Senator Hancock unequivocally confirmed that the $2.1 billion reflects the net amount of ancillary services costs and RDPA charges that are owed to ERCOT and are eligible to be financed using Subchapter N. To be consistent, the Commission should determine the exposure of the market participants that will receive financing on a net basis. Otherwise, there is a substantial risk that the amount of exposure documented by Load Serving Entity (LSEs) will exceed the $2.1 billion. In that event, the Commission will be required to devise a method for prorating and possibly prioritizing the remittance of the financing proceeds to market participants.[14] If that becomes necessary, priority should be given to those LSEs who have the greatest exposure, i.e., are at the greatest risk financially because they did not receive, either on a standalone basis or through an affiliate, any offsetting payments.

Determining exposure on a net basis may necessitate considering amounts paid to or received by affiliates because it is likely that it will be two separate entities within a single, larger corporate structure that were charged payments or received payments that included ancillary service costs in excess of the Commission's system-wide offer cap or based on the RDPA. This reality is reflected in the fact that the ERCOT Nodal Protocols include a definition of "Counter-Party." Specifically, Counter-Party means "[a] single Entity that is a [qualified scheduling entity] and/or a [Congestion Revenue Rights] Account Holder. A Counter-Party includes all registrations as a QSE, all subordinate QSEs, and all CRR Account Holders by the same Entity."[15] Under the

---

[13] *Id.* at 2:56:25 – 2:57:25 (emphasis added).

[14] Subchapter N does not address how the Commission should proceed if the amount of exposure documented by LSEs exceeds the $2.1 billion that is eligible to be financed.

[15] ERCOT Nodal Protocol § 2.1 at definition of Counter-Party.

Counter-Party system, credit exposure can be calculated as the net of generation and load, as well as financial-only transactions.[16] In other words, ERCOT is already grouping market participants that all report up to a single corporate parent for the purposes of determining financial exposure. Accordingly, it is appropriate to consider affiliated entities when determining exposure to Extraordinary Costs on a net basis.

Even if the Commission is not convinced that Staff's argument conclusively explains the meaning and legislative intent of Subchapter N, the Commission is still empowered to determine a reasonable interpretation of the phrase "exposed to the costs." The Legislature gave the Commission discretion to "provide the process for remitting the proceeds of financing."[17] The purpose and mandate of PURA § 39.653 is to support the "financial integrity of the wholesale market" and "protect the public interest."[18] In order to serve that purpose, a Debt Obligation Order under Subchapter N must look at the market participants as a whole as well as the whole energy market. Nothing in Subchapter N prohibits the Commission from distributing financing proceeds according to affiliate relationships, and doing so would protect the public interest.

II. STAFF'S RESPONSE TO QUESTION NO. 2

The Commission should use the plain language definitions of affiliate and affiliated to determine which entities are affiliated with an entity that was charged for RDPA uplift and for ancillary service costs in excess of the Commission's system-wide offer cap. Because neither the Commission nor ERCOT is privy to the details of the business relationships among and between load-serving entities, resource entities, qualified scheduling entities, and the corporate entities in between or upstream of these market participants, applying broad definitions of affiliate and affiliated is the most practical way to avoid the inadvertent exclusion of an entity that was charged payments or received payments. Accordingly, Staff believes it is advisable to use the following

---

[16] ERCOT Nodal Protocol § 16.11.4

[17] PURA § 39.653(b)(3); *see*, *Railroad Comm'n of Tex. v. Citizens for a Safe Future and Clean Water*, 336 S.W.3d 619 (Tex. 2011) ("[W]e will generally uphold an agency's interpretation of a statute it is charged by the Legislature with enforcing . . . .")

[18] PURA § 39.653; *see also* PURA § 11.002(c) ("It is the purpose of this title to grant the Public Utility Commission of Texas authority to make and enforce rules necessary to protect customers of telecommunications and electric services consistent with the public interest.").

definition of affiliated: "closely associated with another typically in a dependent or subordinate position."[19]

A. Using a broad definition of affiliate and affiliated has procedural benefits.

A broad definition will capture affiliated entities up to the ultimate parent company. Staff believes that taking a holistic view, inclusive of the highest levels of the corporate structure, is the most uniform way to determine exposure on a net basis. Further, using definitions of affiliate and affiliated that do not require one entity in a chain of ownership exercising control over another will eliminate possible controversy over whether an entity that only owns passive interests in a market participant is considered an affiliate. This point is particularly relevant to resource entities like power generation companies that often have tax equity investors that own interests that do not allow for the management or control of the day-to-day operations of an electric generation facility.[20]

When determining exposure on a net basis, the exercise of documenting that exposure is largely an exercise of documenting known transactions—charges incurred and payments received. As such, Staff believes that casting a wide net for the purpose of identifying affiliated entities will greatly reduce the need to debate whether an LSE has documented its exposure using the "correct" universe of affiliates. As demonstrated by the 90-day deadline for the issuance of a debt obligation order,[21] financing the uplift balance in a timely manner is of the utmost importance. Therefore, establishing a framework for determining net exposure that requires an inclusive approach is one way to limit the amount of time devoted to scrutinizing each entity within a market participant's larger corporate structure to determine whether it falls within the definition of affiliate or affiliated.

B. The definition of affiliate in PURA § 11.003(2) is not applicable.

---

[19] Merriam Webster definition of affiliated, https://www.merriam-webster.com/dictionary/affiliated (last visited Jul. 31, 2021); *see also*, Merriam Webster definition of affiliate https://www.merriam-webster.com/dictionary/affiliate (defining affiliates as "an affiliated person or organization").

[20] *See Application of Kinderwood Wind, LLC for Declaratory Order, or in the Alternative, Application Under § 39.158 of the Public Utility Regulatory Act*, Docket No. 48599, Kinderwood Wind LLC Petition for Declaratory Order, or, in the Alternative, Application Under Section 39.158 of the Public Utility Regulatory Act at 4-8 (Aug. 16, 2018) ("the purchase of passive, non-controlling membership interests, as a general matter, does not constitute a merger or consolidation of contracting entities nor does it render them affiliates") (Kinderwood's Petition); *see also*, *Application of Cleco Cajun, LLC Under § 39.158 of the Public Utility Regulatory Act*, Docket No. 48266, Order No. 4 Requesting Clarification and Documentation (Jul. 26, 2018) ("The associated entities noted in PURA § 39.158(a) are not limited by the definitional term affiliate as stated in PURA § 11.003(2)").

[21] PURA § 39.653(f).

The definition of affiliate in PURA § 11.003(2) is unworkable for the purposes of Subchapter N because it references direct or indirect ownership of a "public utility."[22] For purposes of this discussion, a public utility is an electric utility as defined in PURA § 31.002.[23] The definition of electric utility in PURA § 31.002 expressly excludes several types of entities relevant to this proceeding, such as municipal corporations, electric cooperatives, retail electric providers, and power generation companies.[24] Thus, the definition of affiliate in PURA §11.003(2) should not apply in this proceeding.

C. The definition of affiliate in Protocol § 2.1 requires modification.

If the Commission determines that the plain language definitions of affiliate and affiliated are too broad, then the Commission should apply a modified definition of affiliate found in the ERCOT Nodal Protocols. The first five paragraphs[25] of that definition read as follows:

> (1) An Entity that directly or indirectly owns or holds at least 5% of the voting securities of a Market Participant; or
>
> (2) An Entity in a chain of successive ownership of at least 5% of the voting securities of a Market Participant; or
>
> (3) An Entity that has at least 5% of its voting securities owned or controlled, directly or indirectly, by a Market Participant; or
>
> (4) An Entity that has at least 5% of its voting securities owned or controlled, directly or indirectly, by an Entity who directly or indirectly owns or controls at least 5% of the voting securities of a Market Participant or an Entity in a chain of successive ownership of at least 5% of the voting securities of a Market Participant; or
>
> (5) A person who is an officer or director of a Market Participant or of a corporation in a chain of successive ownership of at least 5% of the voting securities of a Market Participant.[26]

---

[22] PURA § 11.003(2).

[23] PURA § 11.004(1).

[24] PURA § 31.002(6).

[25] Because these paragraphs reference "voting securities" similar to the definition in PURA § 11.003(2), they may lead to the same issues noted above regarding passive investors in power generation facilities. *See* Docket No. 48599, Kinderwood's Petition at ("…the passive equity interests that are being transferred in the Transaction do not contain full voting rights over the management or control of the Project Companies or, more importantly, the right to control the day-to-day operations or sale of energy from the Projects. Therefore, Siemens will not meet the definition of an affiliate under PURA § 11.003(2).").

[26] ERCOT Nodal Protocol § 2.1 at definition of Affiliate, paragraphs 1-5.

Unlike PURA, this definition captures the universe of market participants relevant to this proceeding because the term "entity" includes natural persons, partnerships, municipal corporations, cooperative corporations, associations, governmental subdivisions, or public or private organizations.[27] In addition, the term market participant includes load-serving entities, resource entities, qualified scheduling entities, and congestion revenue rights account holders.

However, the ERCOT Protocol definition of affiliate excludes an affiliate in a chain of successive ownership of a market participant that does not own 50% or more of the voting securities of any other entity in the chain or the successive owners of such an entity.[28] Without knowing the details of the larger corporate structure specific to each market participant, there is no way to know if this exclusion would result in the elimination of upstream entities that should be included. Therefore, if the Commission decides to use the definition of affiliate from the ERCOT Nodal Protocols, it should limit the definition to paragraphs 1 through 5 of that definition.

III. CONCLUSION

Staff submits the foregoing briefing for the Commission's consideration and respectfully request that the Commission adopt a preliminary order concluding (1) that the phrase "exposed to the costs included in the uplift" contemplates determining exposure on a net basis inclusive of affiliated entities; and (2) that a broad, plain language definition of affiliate and affiliated, that allow for the inclusion of affiliates up to the ultimate parent company, is the definition that should apply when determining which affiliates that were charged costs or received payments should be included in the calculation of net exposure.

---

[27] ERCOT Nodal Protocol § 2.1 at definition of Entity.

[28] ERCOT Nodal Protocol § 2.1 at definition of Affiliate, paragraph 6.

Dated: August 16, 2021

Respectfully Submitted,

PUBLIC UTILITY COMMISSION OF TEXAS
LEGAL DIVISION

Rachelle Nicolette Robles
Division Director

Eleanor D'Ambrosio
Managing Attorney

/s/ R. Floyd Walker

R. Floyd Walker
State Bar No. 24044751
1701 N. Congress Avenue
P.O. Box 13326
Austin, Texas 78711-3326
(512) 936-7261
(512) 936-7268 (facsimile)
Floyd.Walker@puc.texas.gov

DOCKET NO. 52322

CERTIFICATE OF SERVICE

I certify that, unless otherwise ordered by the presiding officer, notice of the filing of this document was provided to all parties of record on August 16, 2021 in accordance with the Order Suspending Rules, issued in Project No. 50664.

/s/ R. Floyd Walker

R. Floyd Walker

Operating Day	Hour	Service	MCPC	Overage	Percentage
2/17/2021	1	NSPIN	9321.89	321.89	3.4531%
2/17/2021	7	NSPIN	10495.9	1495.9	14.2522%
2/17/2021	9	NSPIN	10305.1	1305.1	12.6646%
2/17/2021	10	NSPIN	10451.2	1451.2	13.8855%
2/17/2021	19	NSPIN	9215.24	215.24	2.3357%
2/17/2021	20	NSPIN	9148.15	148.15	1.6195%
2/17/2021	21	NSPIN	9236.61	236.61	2.5617%
2/19/2021	20	NSPIN	12866.7	3866.7	30.0520%
2/19/2021	21	NSPIN	11274.4	2274.4	20.1731%
2/19/2021	22	NSPIN	11446	2446	21.3699%
2/17/2021	8	REGDN	9760.9	760.9	7.7954%
2/17/2021	9	REGDN	17925.1	8925.1	49.7911%
2/17/2021	10	REGDN	17882.1	8882.1	49.6703%
2/17/2021	11	REGDN	17701.5	8701.5	49.1569%
2/17/2021	12	REGDN	17511.5	8511.5	48.6052%
2/17/2021	13	REGDN	17359.8	8359.8	48.1561%
2/17/2021	14	REGDN	16922.3	7922.3	46.8157%
2/17/2021	15	REGDN	9813.97	813.97	8.2940%
2/17/2021	16	REGDN	9831.92	831.92	8.4614%
2/17/2021	22	REGDN	11756.7	2756.7	23.4479%
2/18/2021	9	REGDN	9225.63	225.63	2.4457%
2/18/2021	10	REGDN	9215.78	215.78	2.3414%
2/19/2021	9	REGDN	9208.32	208.32	2.2623%
2/19/2021	10	REGDN	9204.27	204.27	2.2193%
2/19/2021	11	REGDN	9204.19	204.19	2.2184%
2/15/2021	6	REGUP	16006.2	7006.2	43.7718%
2/15/2021	7	REGUP	12763.5	3763.5	29.4864%
2/15/2021	13	REGUP	9264.67	264.67	2.8568%
2/15/2021	16	REGUP	9929.41	929.41	9.3602%
2/15/2021	17	REGUP	11570.5	2570.5	22.2160%
2/15/2021	18	REGUP	13819.9	4819.9	34.8765%
2/15/2021	19	REGUP	13807.4	4807.4	34.8176%
2/16/2021	6	REGUP	20487.6	11487.6	56.0710%
2/16/2021	7	REGUP	14338	5338	37.2297%
2/16/2021	8	REGUP	20953.2	11953.2	57.0471%
2/16/2021	11	REGUP	21119.3	12119.3	57.3850%
2/16/2021	12	REGUP	20737	11737	56.5993%
2/16/2021	13	REGUP	19927	10927	54.8351%
2/16/2021	15	REGUP	18774.5	9774.5	52.0626%
2/16/2021	16	REGUP	14345.4	5345.4	37.2621%

2/16/2021	17	REGUP	13038.1	4038.1	30.9715%
2/16/2021	18	REGUP	12820.7	3820.7	29.8010%
2/16/2021	19	REGUP	15760.1	6760.1	42.8938%
2/17/2021	1	REGUP	9326.89	326.89	3.5048%
2/17/2021	2	REGUP	14997.9	5997.9	39.9916%
2/17/2021	3	REGUP	14719	5719	38.8545%
2/17/2021	4	REGUP	15589.5	6589.5	42.2688%
2/17/2021	5	REGUP	16234.8	7234.8	44.5635%
2/17/2021	6	REGUP	24992.9	15992.9	63.9898%
2/17/2021	7	REGUP	17782.8	8782.8	49.3893%
2/17/2021	8	REGUP	24919	15919	63.8830%
2/17/2021	9	REGUP	16604.8	7604.8	45.7988%
2/17/2021	10	REGUP	17184.2	8184.2	47.6263%
2/17/2021	11	REGUP	16950.9	7950.9	46.9055%
2/17/2021	12	REGUP	16756.1	7756.1	46.2882%
2/17/2021	13	REGUP	16634.4	7634.4	45.8953%
2/17/2021	14	REGUP	16269.6	7269.6	44.6821%
2/17/2021	15	REGUP	17875.8	8875.8	49.6526%
2/17/2021	16	REGUP	24462.1	15462.1	63.2084%
2/17/2021	17	REGUP	22549.8	13549.8	60.0883%
2/17/2021	18	REGUP	17242	8242	47.8019%
2/17/2021	19	REGUP	24718.2	15718.2	63.5896%
2/17/2021	20	REGUP	9153.15	153.15	1.6732%
2/17/2021	21	REGUP	9241.61	241.61	2.6144%
2/17/2021	22	REGUP	9005	5	0.0555%
2/18/2021	1	REGUP	15384.6	6384.6	41.4999%
2/18/2021	2	REGUP	15476.7	6476.7	41.8481%
2/18/2021	3	REGUP	15034.3	6034.3	40.1369%
2/18/2021	4	REGUP	15193.6	6193.6	40.7645%
2/18/2021	5	REGUP	15872.9	6872.9	43.2996%
2/18/2021	6	REGUP	23288.2	14288.2	61.3538%
2/18/2021	7	REGUP	16884.5	7884.5	46.6967%
2/18/2021	8	REGUP	23945.7	14945.7	62.4150%
2/18/2021	9	REGUP	16056.9	7056.9	43.9493%
2/18/2021	10	REGUP	16305.2	7305.2	44.8029%
2/18/2021	11	REGUP	20897.1	11897.1	56.9318%
2/18/2021	12	REGUP	20943.6	11943.6	57.0274%
2/18/2021	13	REGUP	22258.1	13258.1	59.5653%
2/18/2021	14	REGUP	22697.9	13697.9	60.3488%
2/18/2021	15	REGUP	22679.3	13679.3	60.3162%
2/18/2021	16	REGUP	22482.4	13482.4	59.9687%
2/18/2021	17	REGUP	21562	12562	58.2599%
2/18/2021	18	REGUP	16419.7	7419.7	45.1878%

2/18/2021	19	REGUP	17676.5	8676.5	49.0849%
2/18/2021	20	REGUP	23330.6	14330.6	61.4241%
2/18/2021	21	REGUP	22174.4	13174.4	59.4127%
2/18/2021	22	REGUP	21983.3	12983.3	59.0598%
2/18/2021	23	REGUP	22834.9	13834.9	60.5866%
2/18/2021	24	REGUP	22021.6	13021.6	59.1310%
2/19/2021	1	REGUP	9025	25	0.2770%
2/19/2021	4	REGUP	16120	7120	44.1687%
2/19/2021	5	REGUP	16539.8	7539.8	45.5858%
2/19/2021	6	REGUP	16755	7755	46.2847%
2/19/2021	7	REGUP	16989.2	7989.2	47.0252%
2/19/2021	8	REGUP	23013.1	14013.1	60.8918%
2/19/2021	9	REGUP	16076.9	7076.9	44.0191%
2/19/2021	10	REGUP	16123.6	7123.6	44.1812%
2/19/2021	11	REGUP	16212.3	7212.3	44.4866%
2/19/2021	12	REGUP	19413.7	10413.7	53.6410%
2/19/2021	13	REGUP	16571.4	7571.4	45.6896%
2/19/2021	14	REGUP	14596.9	5596.9	38.3431%
2/19/2021	15	REGUP	14744.2	5744.2	38.9590%
2/19/2021	16	REGUP	10787.6	1787.6	16.5709%
2/19/2021	17	REGUP	10126.2	1126.2	11.1216%
2/19/2021	18	REGUP	9865.56	865.56	8.7736%
2/19/2021	19	REGUP	10816.9	1816.9	16.7969%
2/19/2021	20	REGUP	12891.7	3891.7	30.1876%
2/19/2021	21	REGUP	11284.4	2284.4	20.2439%
2/19/2021	22	REGUP	11456	2456	21.4385%
2/20/2021	5	REGUP	9019.79	19.79	0.2194%
2/20/2021	6	REGUP	9162.34	162.34	1.7718%
2/20/2021	7	REGUP	9093.17	93.17	1.0246%
2/15/2021	6	RRS	16087.7	7087.7	44.0566%
2/15/2021	7	RRS	12916.9	3916.9	30.3238%
2/15/2021	8	RRS	14376.9	5376.9	37.3996%
2/15/2021	9	RRS	12807.9	3807.9	29.7309%
2/15/2021	10	RRS	21819.4	12819.4	58.7523%
2/15/2021	11	RRS	9551.15	551.15	5.7705%
2/15/2021	12	RRS	10768.1	1768.1	16.4198%
2/15/2021	13	RRS	9699.25	699.25	7.2093%
2/15/2021	14	RRS	10691.1	1691.1	15.8178%
2/15/2021	15	RRS	9501.71	501.71	5.2802%
2/15/2021	16	RRS	10028	1028	10.2513%
2/15/2021	17	RRS	11724.3	2724.3	23.2364%
2/15/2021	18	RRS	14132.2	5132.2	36.3156%
2/15/2021	19	RRS	14006.2	5006.2	35.7427%

2/15/2021	20	RRS	14023	5023	35.8197%
2/15/2021	21	RRS	12162.9	3162.9	26.0045%
2/15/2021	22	RRS	14579.9	5579.9	38.2712%
2/15/2021	23	RRS	15409.5	6409.5	41.5945%
2/16/2021	1	RRS	17201.2	8201.2	47.6781%
2/16/2021	2	RRS	13607.4	4607.4	33.8595%
2/16/2021	3	RRS	13166.5	4166.5	31.6447%
2/16/2021	4	RRS	15100.3	6100.3	40.3985%
2/16/2021	5	RRS	15765.8	6765.8	42.9144%
2/16/2021	6	RRS	20487.6	11487.6	56.0710%
2/16/2021	7	RRS	15188.7	6188.7	40.7454%
2/16/2021	8	RRS	22493.2	13493.2	59.9879%
2/16/2021	9	RRS	14914.4	5914.4	39.6556%
2/16/2021	10	RRS	14898.7	5898.7	39.5920%
2/16/2021	11	RRS	22790.2	13790.2	60.5093%
2/16/2021	12	RRS	22941.3	13941.3	60.7694%
2/16/2021	13	RRS	21999.8	12999.8	59.0905%
2/16/2021	14	RRS	21074.1	12074.1	57.2935%
2/16/2021	15	RRS	20228.5	11228.5	55.5083%
2/16/2021	16	RRS	15365.2	6365.2	41.4261%
2/16/2021	17	RRS	13736.2	4736.2	34.4797%
2/16/2021	18	RRS	13551.1	4551.1	33.5847%
2/16/2021	19	RRS	16533.3	7533.3	45.5644%
2/16/2021	20	RRS	17317.5	8317.5	48.0294%
2/16/2021	21	RRS	16197.4	7197.4	44.4355%
2/16/2021	22	RRS	20540.2	11540.2	56.1835%
2/16/2021	23	RRS	24284	15284	62.9386%
2/16/2021	24	RRS	20478.9	11478.9	56.0523%
2/17/2021	1	RRS	23829.9	14829.9	62.2323%
2/17/2021	2	RRS	16079.2	7079.2	44.0271%
2/17/2021	3	RRS	16317.4	7317.4	44.8442%
2/17/2021	4	RRS	16642.7	7642.7	45.9222%
2/17/2021	5	RRS	16950.6	7950.6	46.9045%
2/17/2021	6	RRS	25250.2	16250.2	64.3567%
2/17/2021	7	RRS	17865	8865	49.6222%
2/17/2021	8	RRS	25674.3	16674.3	64.9455%
2/17/2021	9	RRS	17908.3	8908.3	49.7440%
2/17/2021	10	RRS	17849.1	8849.1	49.5773%
2/17/2021	11	RRS	17571	8571	48.7792%
2/17/2021	12	RRS	17462.7	8462.7	48.4616%
2/17/2021	13	RRS	17301.6	8301.6	47.9817%
2/17/2021	14	RRS	16861.9	7861.9	46.6252%
2/17/2021	15	RRS	18344.3	9344.3	50.9384%

2/17/2021	16	RRS	24839.1	15839.1	63.7668%
2/17/2021	17	RRS	22735.5	13735.5	60.4143%
2/17/2021	18	RRS	17435.4	8435.4	48.3809%
2/17/2021	19	RRS	24988.4	15988.4	63.9833%
2/17/2021	20	RRS	25466.9	16466.9	64.6600%
2/17/2021	21	RRS	24368.7	15368.7	63.0674%
2/17/2021	22	RRS	25629.9	16629.9	64.8848%
2/17/2021	23	RRS	25561.4	16561.4	64.7907%
2/17/2021	24	RRS	25127	16127	64.1820%
2/18/2021	1	RRS	16392.3	7392.3	45.0962%
2/18/2021	2	RRS	16396.7	7396.7	45.1109%
2/18/2021	3	RRS	16396.4	7396.4	45.1099%
2/18/2021	4	RRS	16395.6	7395.6	45.1072%
2/18/2021	5	RRS	16696.3	7696.3	46.0958%
2/18/2021	6	RRS	23894.8	14894.8	62.3349%
2/18/2021	7	RRS	16884.5	7884.5	46.6967%
2/18/2021	8	RRS	24902.2	15902.2	63.8586%
2/18/2021	9	RRS	17378.3	8378.3	48.2113%
2/18/2021	10	RRS	17409.6	8409.6	48.3044%
2/18/2021	11	RRS	21916.4	12916.4	58.9349%
2/18/2021	12	RRS	22205.8	13205.8	59.4700%
2/18/2021	13	RRS	23631.8	14631.8	61.9157%
2/18/2021	14	RRS	23768.3	14768.3	62.1344%
2/18/2021	15	RRS	23541.5	14541.5	61.7696%
2/18/2021	16	RRS	23176.2	14176.2	61.1671%
2/18/2021	17	RRS	22126.8	13126.8	59.3253%
2/18/2021	18	RRS	16882.8	7882.8	46.6913%
2/18/2021	19	RRS	18198	9198	50.5440%
2/18/2021	20	RRS	24466.1	15466.1	63.2144%
2/18/2021	21	RRS	23298.5	14298.5	61.3709%
2/18/2021	22	RRS	23068.9	14068.9	60.9864%
2/18/2021	23	RRS	23970.5	14970.5	62.4538%
2/18/2021	24	RRS	23280	14280	61.3402%
2/19/2021	1	RRS	17374.2	8374.2	48.1991%
2/19/2021	2	RRS	17381	8381	48.2193%
2/19/2021	3	RRS	17381.2	8381.2	48.2199%
2/19/2021	4	RRS	17381.6	8381.6	48.2211%
2/19/2021	5	RRS	17382	8382	48.2223%
2/19/2021	6	RRS	17381.8	8381.8	48.2217%
2/19/2021	7	RRS	17597	8597	48.8549%
2/19/2021	8	RRS	24108.4	15108.4	62.6686%
2/19/2021	9	RRS	17596.2	8596.2	48.8526%
2/19/2021	10	RRS	17382.3	8382.3	48.2232%

2/19/2021	11	RRS	17382.2	8382.2	48.2229%
2/19/2021	12	RRS	20862.1	11862.1	56.8596%
2/19/2021	13	RRS	18061.8	9061.8	50.1711%
2/19/2021	14	RRS	15800.6	6800.6	43.0401%
2/19/2021	15	RRS	15715.8	6715.8	42.7328%
2/19/2021	16	RRS	11570.1	2570.1	22.2133%
2/19/2021	17	RRS	10762.3	1762.3	16.3748%
2/19/2021	18	RRS	10408.1	1408.1	13.5289%
2/19/2021	19	RRS	11409	2409	21.1149%
2/19/2021	20	RRS	14666.4	5666.4	38.6352%
2/19/2021	21	RRS	13023.2	4023.2	30.8926%
2/19/2021	22	RRS	13196.2	4196.2	31.7985%
2/19/2021	23	RRS	12645.2	3645.2	28.8267%
2/19/2021	24	RRS	11280.1	2280.1	20.2135%
2/20/2021	1	RRS	9100.52	100.52	1.1046%
2/20/2021	2	RRS	9091.13	91.13	1.0024%
2/20/2021	3	RRS	9089.51	89.51	0.9848%
2/20/2021	4	RRS	9088.41	88.41	0.9728%
2/20/2021	5	RRS	9145.59	145.59	1.5919%
2/20/2021	6	RRS	9234.65	234.65	2.5410%
2/20/2021	7	RRS	9088.78	88.78	0.9768%

Proposed Form

1) List of LSE(s) filing application:

   _____
   _____
   _____
   _____

2) List all affiliated Resource Entities to the above:

   _____
   _____
   _____
   _____

3) Does applicant currently represent load in the ERCOT region: Yes or No
4) Statement of QSE relationship. If applicable, affirm that applicant(s) are all within a single QSE with no unaffiliated LSEs, there are no affiliated REs, and applicant(s) affirms that the QSE costs were passed through. Yes or No. If yes, skip items 5-10.
5) AS charges passed through to LSE(s) during period of emergency, for the portion of the prices above SWCAP: $_____
   a. Attach hourly values for the above
6) AS payments received by any affiliated RE(s), for the portion of the prices above SWCAP: $_____
   a. Attach hourly values for the above
7) Net amount requested for AS above SWCAP (item 5 minus item 6): $_____
8) AS Imbalance charges related to RDPA passed through to LSE(s) during period of emergency: $_____
   a. Attach interval values for the above
9) AS Imbalance payments related to RDPA received by RE(s) during the period of emergency: $_____
   a. Attach interval values for the above
10) Net amount for AS Imbalance related to RDPA (item 8 minus item 9): $_____
11) Total (item 7 plus item 10) $_____
12) Attach itemized invoices/statements related to items 5-6, 8-9 if No on item 4.
13) Amount or percentage of relevant uplift charges that were passed through to end use customers.

I affirm that the above is true and correct. I agree to audits of any representations contained in this form.

_____

CEO signature

Workpapers

The Senate of
The State of Texas

DAN PATRICK
LIEUTENANT GOVERNOR

CAPITOL OFFICE
State Capitol, Room 2E.13
Post Office Box 12068
Austin, Texas 78711
(512) 463-0001
Fax: (512) 463-8668

August 11, 2021

Commissioner Peter M. Lake
Presiding Officer
Public Utility Commission of Texas
Post Office Box 13326
Austin, Texas 78711-3326

Dear Commissioner Lake:

I have reviewed the August 2, 2021, letter Chairman Chris Paddie wrote to you where he makes the claim that House Bill 4492 from the 87th Regular Legislative Session "does not contemplate or authorize any 'netting' between companies." That may have been his view, but it was never presented or shared in the Texas Senate. The Senate would not have passed a bill giving taxpayer dollars to companies that profited during the storm.

If you review the Senate floor debate, you can plainly and clearly hear Senator Kelly Hancock, the Senate sponsor of the bill, state the $2.1B cap includes netting.

House Bill 4492 had no reason to exist other than to provide relief for ERCOT market participants who were adversely affected by exorbitant ancillary service prices and help alleviate charges that would be passed on to customers.

Chairman Paddie's interpretation is in stark contrast to the intent and plain reading of the bill. If it was his intent to give taxpayer dollars to companies that profited during the storm instead of to those who were actually exposed to extraordinary costs and damages, I can confidently say that was not the understanding or intent of the Texas Senate when it passed HB 4492.

Chairman Paddie, who inexplicably and without notice removed the $2.1 B cap all-together from the conference committee report, only to replace it the next day once discovered by the Senate, has once again tried to alter the purpose of this bill from what the Senate passed.

I urge you to follow the plain meaning of HB 4492 as the Texas Senate considered and passed it and calculate cost exposure on a net basis. Thank you for all you do for Texas.

Sincerely,

Dan Patrick
Lieutenant Governor

August 10, 2021

The Honorable Peter Lake, Chair, Public Utility Commission
The Honorable Will McAdams, Commissioner, Public Utility Commission
The Honorable Lori Cobos, Commissioner, Public Utility Commission

Dear Commissioners,

The Electric Reliability Council of Texas (ERCOT) recently submitted an application to the Texas Public Utility Commission (PUC) for a debt obligation order authorized by HB 4492 (87R). The PUC is now tasked with developing the method for allocating the financing proceeds to eligible entities impacted by Winter Storm Uri. In response to the letter sent from the House, this letter is meant to provide additional clarity regarding the Senate's legislative intent to use netting when executing the debt obligation order.

HB 4492 was enacted during the 87th Legislative Session to stabilize the competitive electricity market in Texas by providing financial relief to load-serving entities for extraordinary unanticipated costs resulting from Winter Storm Uri. To achieve this objective, HB 4492 authorizes the use of securitization financing to fund substantial balances that would otherwise be uplifted to the entire wholesale market as a result of market participants defaulting on amounts owed.

To ensure this relief is ultimately distributed in the most appropriate manner, HB 4492 requires the PUC to establish a documentation process for entities to demonstrate their exposure to ancillary service costs and Reliability Deployment Price Adder (RDPA) charges included in the uplift balance. The legislation further stipulates that this documentation should include any proceeds received for these same purposes.

Based on a calculation by the Independent Market Monitor (IMM), the Texas Legislature placed a limit of $2.1 billion on the amount available for securitization financing; an amount that was estimated to cover the total exposure to ancillary service costs and RDPA charges of each affected entity after considering their consolidated corporate umbrella. Without considering the financial impact of these offsets, the total cost of the uplift balance would far exceed the $2.1 billion cap set by the Legislature and hinder ERCOT's ability to efficiently distribute this relief in a manner consistent with the requirements in HB 4492 that reduces the risk of additional defaults, supports the financial integrity of the wholesale market, and is necessary to protect the public interest, most importantly, Texas ratepayers.

In summary, HB 4492 and the Senate's legislative intent, stipulates that netting is required to ensure the overall monetary situation for each company and its affiliates is considered and any securitized funds are only utilized to prevent unnecessary uplift charges due to defaults. We stress that the PUC should strongly reference the bill and the Senate's legislative intent in their methodology development in implementing HB 4492.

Thank you for your continued service in helping the state recover from this unprecedented event. Should you have any questions, please do not hesitate to contact my office.

Sincerely,

Senator Charles Schwertner

Senator Juan "Chuy" Hinojosa

Senator Angela Paxton

Senator Paul Bettencourt

Senator Joan Huffman

Senator Charles Perry

Senator Brian Birdwell

Senator Kel Seliger

Senator Dawn Buckingham

Senator Brian Hughes

Senator Drew Springer

Senator Donna Campbell

Senator Lois Kolkhorst

Senator Larry Taylor

Senator Brandon Creighton

Senator Jane Nelson

Senator Judith Zaffirini

Senator Bob Hall

Senator Robert Nichols

Senator Kelly Hancock

CHRIS D. PADDIE
TEXAS HOUSE OF REPRESENTATIVES
DISTRICT 9

August 2, 2021

The Honorable Peter Lake, Chair, Public Utility Commission
The Honorable Will McAdams, Commissioner, Public Utility Commission
The Honorable Lori Cobos, Commissioner, Public Utility Commission

52322

Dear Commissioners,

In accordance with the Legislature's direction, the Electric Reliability Council of Texas (ERCOT) has filed an application seeking Commission issuance of a financing order to allow securitization of uplift balances as defined in PURA Subchapter N, as established by House Bill No. 4492.

As the House sponsor of the bill, I want to share with you the legislative intent. Via a July 21, 2021 "Briefing Order," the Commission is examining whether it can or should "net" a load-serving entity's exposure to uplift costs. The Briefing Order goes so far as to postulate that such "netting" might occur between separate companies, even if only one of the companies "made such payments" for the uplift costs.

The legislation is clear that each load-serving entity is to provide documentation of its own exposure to the uplift costs (see, for example Section 39.653(b)(3)). It does not contemplate or authorize any "netting" between companies. As I stated on the House floor when the House was voting to adopt the conference committee report on the bill, the overall $2.1 billion cap must "be applied to all load serving entities on a load-proportionate and equitable basis." I stated: "It is crucial that we do not discriminate between load-serving entities, in order to protect against market imbalances."

That emphasis on non-discrimination was purposeful and remains essential. Each load-serving entity must be treated without discrimination, including without regard to whether it might or might not have an affiliate whose exposure was different. I was directly involved in all the discussions that resulted in the final bill language being adopted in the House, and at no time was "netting" between a load-serving entity and any other company—affiliated or not—considered or intended.

I will be watching this proceeding closely, and I look forward to working together to ensure Texans have a world-class reliable and affordable electric grid.

Sincerely,

Representative Chris Paddie

CHRIS.PADDIE@HOUSE.TEXAS.GOV
P.O. BOX 2910 • AUSTIN, TEXAS 78768-2910 • (512) 463-0556 • (512) 463-0611 FAX
102 WEST HOUSTON • MARSHALL, TEXAS 75670 • (903) 935-1141 • (903) 935-1142 FAX

r	none	A Resource.
q	none	A QSE.

4.6.4.2 Charges for Ancillary Services Procurement in the DAM

4.6.4.2.1 Regulation Up Service Charge

(1) Each QSE shall pay to ERCOT or be paid by ERCOT a Reg-Up Service charge for each hour as follows:

$$DARUAMT_q = DARUPR * DARUQ_q$$

Where:

$$DARUPR = (-1) * PCRUAMTTOT / DARUQTOT$$

$$PCRUAMTTOT = \sum_q PCRUAMT_q$$

$$DARUQTOT = \sum_q DARUQ_q$$

$$DARUQ_q = DARUO_q - DASARUQ_q$$

The above variables are defined as follows:

Variable	Unit	Definition
$DARUAMT_q$	$	*Day-Ahead Reg-Up Amount per QSE*—QSE *q*'s share of the DAM cost for Reg-Up, for the hour.
DARUPR	$/MW per hour	*Day-Ahead Reg-Up Price*—The Day-Ahead Reg-Up price for the hour.
$DARUQ_q$	MW	*Day-Ahead Reg-Up Quantity per QSE*—The QSE *q*'s Day-Ahead Ancillary Service Obligation minus its self-arranged Reg-Up quantity for the hour.
PCRUAMTTOT	$	*Procured Capacity for Reg-Up Amount Total in DAM*—The total of the DAM Reg-Up payments for all QSEs for the hour.
$PCRUAMT_q$	$	*Procured Capacity for Reg-Up Amount per QSE in DAM*—The DAM Reg-Up payment for QSE *q* for the hour.
DARUQTOT	MW	*Day-Ahead Reg-Up Quantity Total*—The sum of every QSE's Day-Ahead Ancillary Service Obligation minus its self-arranged Reg-Up quantity for the hour.
$DARUO_q$	MW	*Day-Ahead Reg-Up Obligation per QSE*—The Reg-Up capacity obligation for QSE *q* for the DAM for the hour.
$DASARUQ_q$	MW	*Day-Ahead Self-Arranged Reg-Up Quantity per QSE*—The self-arranged Reg-Up quantity submitted by QSE *q* before 1000 in the Day-Ahead.
q	none	A QSE.

[NPRR1008: Replace paragraph (1) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]

(1) Each QSE shall pay to ERCOT or be paid by ERCOT a Reg-Up Service charge for each hour as follows:

$$DARUAMT_q = DARUPR * DARUQ_q$$

Where:

$$DARUPR = (-1) * DAPCRUAMTTOT / DARUQTOT$$

$$DAPCRUAMTTOT = \sum_q (PCRUAMT_q + DAPCRUOAMT_q)$$

$$DARUQTOT = \sum_q DARUQ_q$$

$$DARUQ_q = DARUO_q - DASARUQ_q$$

The above variables are defined as follows:

Variable	Unit	Definition
$DARUAMT_q$	$	*Day-Ahead Reg-Up Amount per QSE*—QSE *q*'s share of the DAM cost for Reg-Up, for the hour.
DARUPR	$/MW	*Day-Ahead Reg-Up Price*—The Day-Ahead Reg-Up price for the hour.
$DARUQ_q$	MW	*Day-Ahead Reg-Up Quantity per QSE*—The QSE *q*'s Day-Ahead Ancillary Service Obligation minus its self-arranged Reg-Up quantity for the hour.
DAPCRUAMTTOT	$	*Day-Ahead Procured Capacity for Reg-Up Amount Total* —The total of the DAM Reg-Up payments for all QSEs for the hour.
$PCRUAMT_q$	$	*Procured Capacity for Reg-Up Amount per QSE in DAM*—The DAM Reg-Up payment for QSE *q* for the hour.
$DAPCRUOAMT_q$	$	*Day-Ahead Procured Capacity for Reg-Up Only Amount per QSE*—The payment to QSE *q* for all Reg-Up only awards in DAM for the hour.
DARUQTOT	MW	*Day-Ahead Reg-Up Quantity Total*—The sum of every QSE's Day-Ahead Ancillary Service Obligation minus its self-arranged Reg-Up quantity for the hour.
$DARUO_q$	MW	*Day-Ahead Reg-Up Obligation per QSE*—The Reg-Up capacity obligation for QSE *q* for the DAM for the hour.
$DASARUQ_q$	MW	*Day-Ahead Self-Arranged Reg-Up Quantity per QSE*—The self-arranged Reg-Up quantity submitted by QSE *q* before 1000 in the Day-Ahead.
q	none	A QSE.

4.6.4.2.2 Regulation Down Service Charge

(1) Each QSE shall pay to ERCOT or be paid by ERCOT a Reg-Down Service charge for each hour as follows:

$$DARDAMT_q = DARDPR * DARDQ_q$$

Where:

$$DARDPR = (-1) * PCRDAMTTOT / DARDQTOT$$

$$PCRDAMTTOT = \sum_q PCRDAMT_q$$

$$DARDQTOT = \sum_q DARDQ_q$$

$$DARDQ_q = DARDO_q - DASARDQ_q$$

The above variables are defined as follows:

Variable	Unit	Definition
$DARDAMT_q$	$	*Day-Ahead Reg-Down Amount per QSE*—QSE *q*'s share of the DAM cost for Reg-Down, for the hour.
DARDPR	$/MW per hour	*Day-Ahead Reg-Down Price*—The Day-Ahead Reg-Down price for the hour.
$DARDQ_q$	MW	*Day-Ahead Reg-Down Quantity per QSE*—The QSE *q*'s Day-Ahead Ancillary Service Obligation minus its self-arranged Reg-Down quantity for the hour.
PCRDAMTTOT	$	*Procured Capacity for Reg-Down Amount Total in DAM*—The total of the DAM Reg-Down payments for all QSEs for the hour.
$PCRDAMT_q$	$	*Procured Capacity for Reg-Down Amount per QSE in DAM*—The DAM Reg-Down payment for QSE *q* for the hour.
DARDQTOT	MW	*Day-Ahead Reg-Down Quantity Total*—The sum of every QSE's Day-Ahead Ancillary Service Obligation minus its self-arranged Reg-Down quantity for the hour.
$DARDO_q$	MW	*Day-Ahead Reg-Down Obligation per QSE*—The Reg-Down capacity obligation for QSE *q* for the DAM for the hour.
$DASARDQ_q$	MW	*Day-Ahead Self-Arranged Reg-Down Quantity per QSE*—The self-arranged Reg-Down quantity submitted by QSE *q* before 1000 in the Day-Ahead.
q	none	A QSE.

[NPRR1008: Replace paragraph (1) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]

(1) Each QSE shall pay to ERCOT or be paid by ERCOT a Reg-Down Service charge for each hour as follows:

$$DARDAMT_q = DARDPR * DARDQ_q$$

Where:

$$DARDPR = (-1) * DAPCRDAMTTOT / DARDQTOT$$

$$DAPCRDAMTTOT = \sum_q (PCRDAMT_q + DAPCRDOAMT_q)$$

$$DARDQTOT = \sum_q DARDQ_q$$

$$DARDQ_q = DARDO_q - DASARDQ_q$$

The above variables are defined as follows:

Variable	Unit	Definition
$DARDAMT_q$	$	*Day-Ahead Reg-Down Amount per QSE*—QSE *q*'s share of the DAM cost for Reg-Down, for the hour.
DARDPR	$/MW	*Day-Ahead Reg-Down Price*—The Day-Ahead Reg-Down price for the hour.
$DARDQ_q$	MW	*Day-Ahead Reg-Down Quantity per QSE*—The QSE *q*'s Day-Ahead Ancillary Service Obligation minus its self-arranged Reg-Down quantity for the hour.
DAPCRDAMTTOT	$	*Day-Ahead Procured Capacity for Reg-Down Amount Total*—The total of the DAM Reg-Down payments for all QSEs for the hour.
$PCRDAMT_q$	$	*Procured Capacity for Reg-Down Amount per QSE in DAM*—The DAM Reg-Down payment for QSE *q* for the hour.
$DAPCRDOAMT_q$	$	*Day-Ahead Procured Capacity for Reg-Down Only Amount per QSE*—The payment to QSE *q* for all Reg-Down only awards in DAM for the hour.
DARDQTOT	MW	*Day-Ahead Reg-Down Quantity Total*—The sum of every QSE's Day-Ahead Ancillary Service Obligation minus its self-arranged Reg-Down quantity for the hour.
$DARDO_q$	MW	*Day-Ahead Reg-Down Obligation per QSE*—The Reg-Down capacity obligation for QSE *q* for the DAM for the hour.
$DASARDQ_q$	MW	*Day-Ahead Self-Arranged Reg-Down Quantity per QSE*—The self-arranged Reg-Down quantity submitted by QSE *q* before 1000 in the Day-Ahead.
q	none	A QSE.

4.6.4.2.3 Responsive Reserve Charge

(1) Each QSE shall pay to ERCOT or be paid by ERCOT an RRS charge for each hour as follows:

$$DARRAMT_q = DARRPR * DARRQ_q$$

Where:

MCPCECR $_m$	$/MW per hour	*Market Clearing Price for Capacity for ERCOT Contingency Reserve Service per market*—The MCPC for ECRS in the market *m*, for the hour.
MCPCECR $_{rs}$	$/MW per hour	*Market Clearing Price for Capacity for ERCOT Contingency Reserve Service per RSASM*—The MCPC for ECRS in the RSASM *rs*, for the hour.
ECRFQ $_q$	MW	*ERCOT Contingency Reserve Service Failure Quantity per QSE* - QSE *q*'s total capacity associated with failures on its Ancillary Service Supply Responsibility for ECRS, for the hour.
RECRFQ $_{q, rs}$	MW	*Reconfiguration ERCOT Contingency Reserve Service Failure Quantity per QSE*—QSE *q*'s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for ECRS, for the hour.
rs	none	The RSASM for the given Operating Hour.
m	none	The DAM, SASM, or RSASM for the given Operating Hour.
q	none	A QSE.

[NPRR1010: Delete Section 6.7.3 above upon system implementation of the Real-Time Co-Optimization (RTC) project.]

6.7.4 Adjustments to Cost Allocations for Ancillary Services Procurement

(1) Each QSE for which ERCOT purchases Ancillary Service capacity in the DAM, a SASM, or an RSASM, is charged for the QSE's share of the net costs incurred for each service. For each QSE, its share of the DAM costs has been calculated in Section 4.6.4, Settlement of Ancillary Services Procured in the DAM; its share of the net total costs incurred in the DAM, a SASM, or an RSASM less its DAM charge is calculated in this section.

(2) For Reg-Up, if applicable:

(a) The net total costs for Reg-Up for a given Operating Hour is calculated as follows:

$$\mathbf{RUCOSTTOT} = \mathbf{(-1)} * \left(\sum_m \mathbf{RTPCRUAMTTOT}_m\right) + \mathbf{PCRUAMTTOT} + \mathbf{RUFQAMTTOT} + \mathbf{RUINFQAMTTOT})$$

Where:

Total payment of SASM- and RSASM-procured capacity for Reg-Up by market

$$\text{RTPCRUAMTTOT}_m = \sum_q \text{RTPCRUAMT}_{q, m}$$

Total payment of DAM-procured capacity for Reg-Up

$$PCRUAMTTOT = \sum_{q} PCRUAMT_{q}$$

Total charge of failure on Ancillary Service Supply Responsibility for Reg-Up

$$RUFQAMTTOT = \sum_{q} RUFQAMTQSETOT_{q}$$

Total payment of SASM- and RSASM-procured capacity for Reg-Up by QSE

$$RTPCRUAMTQSETOT_{q} = \sum_{m} RTPCRUAMT_{q,m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for Reg-Up

$$RUINFQAMTTOT = \sum_{q} RUINFQAMT_{q}$$

The above variables are defined as follows:

Variable	Unit	Description
RUCOSTTOT	$	*Reg-Up Cost Total*—The net total costs for Reg-Up for the hour.
$RTPCRUAMTTOT_{m}$	$	*Procured Capacity for Reg-Up Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for Reg-Up, for the hour.
$RTPCRUAMT_{q,m}$	$	*Procured Capacity for Reg-Up Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for Reg-Up, for the hour.
RUFQAMTTOT	$	*Reg-Up Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures and reconfiguration reductions on their Ancillary Service Supply Responsibilities for Reg-Up, for the hour.
$RUFQAMTQSETOT_{q}$	$	*Reg-Up Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Up, for the hour.
$RTPCRUAMTQSETOT_{q}$	$	*Procured Capacity for Reg-Up Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for Reg-Up, for the hour.
$PCRUAMT_{q}$	$	*Procured Capacity for Reg-Up Amount per QSE in DAM*—The DAM Reg-Up payment for QSE *q*, for the hour.
RUINFQAMTTOT	$	*Reg-Up Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Reg-Up, for the hour.
$RUINFQAMT_{q}$	$	*Reg-Up Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Reg-Up, for the hour.
PCRUAMTTOT	$	*Procured Capacity for Reg-Up Amount Total in DAM*—The total of the DAM Reg-Up payments for all QSEs, for the hour.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

[NPRR841: Replace paragraph (a) above with the following upon system implementation:]

(a) The net total costs for Reg-Up for a given Operating Hour is calculated as follows:

$$\mathbf{RUCOSTTOT} = \mathbf{(-1) * (\sum_{m} (RTPCRUAMTTOT_{m}) + PCRUAMTTOT + RUFQAMTTOT + RUINFQAMTTOT + RUMWINFATOT)}$$

Where:

Total payment of SASM- and RSASM-procured capacity for Reg-Up by market

$$RTPCRUAMTTOT_{m} = \sum_{q} RTPCRUAMT_{q, m}$$

Total payment of DAM-procured capacity for Reg-Up

$$PCRUAMTTOT = \sum_{q} PCRUAMT_{q}$$

Total charge of failure on Ancillary Service Supply Responsibility for Reg-Up

$$RUFQAMTTOT = \sum_{q} RUFQAMTQSETOT_{q}$$

Total payment of SASM- and RSASM-procured capacity for Reg-Up by QSE

$$RTPCRUAMTQSETOT_{q} = \sum_{m} RTPCRUAMT_{q, m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for Reg-Up

$$RUINFQAMTTOT = \sum_{q} RUINFQAMT_{q}$$

Total Real-Time DAM Make-Whole Payment for Reg-Up

$$RUMWINFATOT = \sum_{q} RUMWINFA_{q, h}$$

The above variables are defined as follows:

Variable	Unit	Description
RUCOSTTOT	$	*Reg-Up Cost Total*—The net total costs for Reg-Up for the hour.
$RTPCRUAMTTOT_{m}$	$	*Procured Capacity for Reg-Up Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for Reg-Up, for the hour.
RUMWINFATOT	$	*Reg-Up Make-Whole Infeasible Amount total*— The total Real-Time calculated payment to all QSEs, for their contribution of Reg-Up, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour.
$RUMWINFA_{q, h}$	$	*Reg-Up Make-Whole Infeasible Amount per QSE per hour*— The total Real-Time calculated payment to QSE *q*, for its contribution of Reg-Up,

		to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour *h*.
RTPCRUAMT $_{q, m}$	$	*Procured Capacity for Reg-Up Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for Reg-Up, for the hour.
RUFQAMTTOT	$	*Reg-Up Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures and reconfiguration reductions on their Ancillary Service Supply Responsibilities for Reg-Up, for the hour.
RUFQAMTQSETOT $_{q}$	$	*Reg-Up Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Up, for the hour.
RTPCRUAMTQSETOT $_{q}$	$	*Procured Capacity for Reg-Up Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for Reg-Up, for the hour.
PCRUAMT $_{q}$	$	*Procured Capacity for Reg-Up Amount per QSE in DAM*—The DAM Reg-Up payment for QSE *q*, for the hour.
RUINFQAMTTOT	$	*Reg-Up Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Reg-Up, for the hour.
RUINFQAMT $_{q}$	$	*Reg-Up Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Reg-Up, for the hour.
PCRUAMTTOT	$	*Procured Capacity for Reg-Up Amount Total in DAM*—The total of the DAM Reg-Up payments for all QSEs, for the hour.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(b) Each QSE's share of the net total costs for Reg-Up for the Operating Hour is calculated as follows:

$$\mathbf{RUCOST}_{q} = \mathbf{RUPR} * \mathbf{RUQ}_{q}$$

Where:

$$RUPR = RUCOSTTOT / RUQTOT$$

$$RUQTOT = \sum_{q} RUQ_{q}$$

$$RUQ_{q} = RUO_{q} - SARUQ_{q}$$

$$RUO_{q} = \sum_{q} (SARUQ_{q} + \sum_{m} (RTPCRU_{q, m}) + PCRU_{q} - RUFQ_{q} - RRUFQ_{q}) * HLRS_{q}$$

$$SARUQ_{q} = DASARUQ_{q} + RTSARUQ_{q}$$

The above variables are defined as follows:

Variable	Unit	Description
$RUCOST_q$	$	*Reg-Up Cost per QSE*—QSE *q*'s share of the net total costs for Reg-Up, for the hour.
RUPR	$/MW per hour	*Reg-Up Price*—The price for Reg-Up calculated based on the net total costs for Reg-Up, for the hour.
RUCOSTTOT	$	*Reg-Up Cost Total*—The net total costs for Reg-Up, for the hour. See item (2)(a) above.
RUQTOT	MW	*Reg-Up Quantity Total*—The sum of every QSE's Ancillary Service Obligation minus its self-arranged Reg-Up quantity in the DAM and any and all SASMs, for the hour.
RUQ_q	MW	*Reg-Up Quantity per QSE*—The QSE *q*'s Ancillary Service Obligation minus its self-arranged Reg-Up quantity in the DAM and any and all SASMs, for the hour.
RUO_q	MW	*Reg-Up Obligation per QSE*—The Ancillary Service Obligation of QSE *q*, for the hour.
$DASARUQ_q$	MW	*Day-Ahead Self-Arranged Reg-Up Quantity per QSE*—The self-arranged Reg-Up quantity submitted by QSE *q* before 1000 in the Day-Ahead.
$RTSARUQ_q$	MW	*Self-Arranged Reg-Up Quantity per QSE for all SASMs*—The sum of all self-arranged Reg-Up quantities submitted by QSE *q* for all SASMs due to an increase in the Ancillary Service Plan per Section 4.4.7.1, Self-Arranged Ancillary Service Quantities.
$RTPCRU_{q,m}$	MW	*Procured Capacity for Reg-Up per QSE by market*—The MW portion of QSE *q*'s Ancillary Service Offers cleared in the market *m* to provide Reg-Up, for the hour.
$RUFQ_q$	MW	*Reg-Up Failure Quantity per QSE*—QSE *q*'s total capacity associated with failures on its Ancillary Service Supply Responsibility for Reg-Up, for the hour.
$RRUFQ_q$	MW	*Reconfiguration Reg-Up Failure Quantity per QSE*—QSE *q* total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Up, for the hour.
$HLRS_q$	none	*The Hourly Load Ratio Share calculated for QSE q for the hour.* See Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour.
$PCRU_q$	MW	*Procured Capacity for Reg-Up per QSE in DAM*—The total Reg-Up capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by the QSE, for the hour.
$SARUQ_q$	MW	*Total Self-Arranged Reg-Up Quantity per QSE for all markets*—The sum of all self-arranged Reg-Up quantities submitted by QSE *q* for DAM and all SASMs.
q	none	A QSE.
m	none	A SASM for the given Operating Hour.

(c) The adjustment to each QSE's DAM charge for the Reg-Up for the Operating Hour, due to changes during the Adjustment Period or Real-Time operations, is calculated as follows:

$$\mathbf{RTRUAMT}_q = \mathbf{RUCOST}_q - \mathbf{DARUAMT}_q$$

The above variables are defined as follows:

Variable	Unit	Description

RTRUAMT $_q$	$	*Real-Time Reg-Up Amount per QSE*—The adjustment to QSE *q*'s share of the costs for Reg-Up, for the hour.
RUCOST $_q$	$	*Reg-Up Cost per QSE*—QSE *q*'s share of the net total costs for Reg-Up, for the hour.
DARUAMT $_q$	$	*Day-Ahead Reg-Up Amount per QSE*—QSE *q*'s share of the DAM cost for Reg-Up, for the hour.
q	none	A QSE.

(3) For Reg-Down, if applicable:

(a) The net total costs for Reg-Down for a given Operating Hour is calculated as follows:

$$\mathbf{RDCOSTTOT} = \mathbf{(-1) * (} \sum_m \mathbf{(RTPCRDAMTTOT}_m\mathbf{)} + \mathbf{PCRDAMTTOT + RDFQAMTTOT + RDINFQAMTTOT)}$$

Where:

Total payment of SASM- and RSASM-procured capacity for Reg-Down by market

$$\text{RTPCRDAMTTOT}_m = \sum_q \text{RTPCRDAMT}_{q,m}$$

Total payment of DAM-procured capacity for Reg-Down

$$\text{PCRDAMTTOT} = \sum_q \text{PCRDAMT}_q$$

Total charge of failure on Ancillary Service Supply Responsibility for Reg-Down

$$\text{RDFQAMTTOT} = \sum_q \text{RDFQAMTQSETOT}_q$$

Total payment of SASM- and RSASM-procured capacity for Reg-Down by QSE

$$\text{RTPCRDAMTQSETOT}_q = \sum_m \text{RTPCRDAMT}_{q,m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for Reg-Down

$$\text{RDINFQAMTTOT} = \sum_q \text{RDINFQAMT}_q$$

The above variables are defined as follows:

Variable	Unit	Description
RDCOSTTOT	$	*Reg-Down Cost Total*—The net total costs for Reg-Down, for the hour.
RTPCRDAMTTOT $_m$	$	*Procured Capacity for Reg-Down Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for Reg-Down, for the hour.
RTPCRDAMT $_{q, m}$	$	*Procured Capacity for Reg-Down Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for Reg-Down, for the hour.

Variable	Unit	Description
RDFQAMTTOT	$	*Reg-Down Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures on their Ancillary Service Supply Responsibilities for Reg-Down, for the hour.
RDFQAMTQSETOT $_q$	$	*Reg-Down Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Down, for the hour.
RTPCRDAMTQSETOT $_q$	$	*Procured Capacity for Reg-Down Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for Reg-Down, for the hour.
PCRDAMT $_q$	$	*Procured Capacity for Reg-Down Amount per QSE for DAM*—The DAM Reg-Down payment for QSE *q*, for the hour.
PCRDAMTTOT	$	*Procured Capacity for Reg-Down Amount Total in DAM*—The total of the DAM Reg-Down payments for all QSEs for the hour.
RDINFQAMTTOT	$	*Reg-Down Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Reg-Down, for the hour.
RDINFQAMT $_q$	$	*Reg-Down Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of its Ancillary Service Supply Responsibilities for Reg-Down, for the hour.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

[NPRR841: Replace paragraph (a) above with the following upon system implementation:]

(a) The net total costs for Reg-Down for a given Operating Hour is calculated as follows:

$$\mathbf{RDCOSTTOT} = \mathbf{(-1) * (} \sum_m \mathbf{(RTPCRDAMTTOT}_m\mathbf{) + PCRDAMTTOT + RDFQAMTTOT + RDINFQAMTTOT + RDMWINFATOT)}$$

Where:

Total payment of SASM- and RSASM-procured capacity for Reg-Down by market

$$\text{RTPCRDAMTTOT}_m = \sum_q \text{RTPCRDAMT}_{q,m}$$

Total payment of DAM-procured capacity for Reg-Down

$$\text{PCRDAMTTOT} = \sum_q \text{PCRDAMT}_q$$

Total charge of failure on Ancillary Service Supply Responsibility for Reg-Down

$$\text{RDFQAMTTOT} = \sum_q \text{RDFQAMTQSETOT}_q$$

Total payment of SASM- and RSASM-procured capacity for Reg-Down by QSE

$$RTPCRDAMTQSETOT_{q} = \sum_{m} RTPCRDAMT_{q, m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for Reg-Down

$$RDINFQAMTTOT = \sum_{q} RDINFQAMT_{q}$$

Total Real-Time Day-Ahead Make-Whole Payment for Reg-Down

$$RDMWINFATOT = \sum_{q} RDMWINFA_{q, h}$$

The above variables are defined as follows:

Variable	Unit	Description
RDCOSTTOT	$	*Reg-Down Cost Total*—The net total costs for Reg-Down, for the hour.
$RTPCRDAMTTOT_{m}$	$	*Procured Capacity for Reg-Down Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for Reg-Down, for the hour.
$RTPCRDAMT_{q, m}$	$	*Procured Capacity for Reg-Down Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for Reg-Down, for the hour.
RDFQAMTTOT	$	*Reg-Down Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures on their Ancillary Service Supply Responsibilities for Reg-Down, for the hour.
RDMWINFATOT	$	*Reg-Down Make-Whole Infeasible Amount total*— The total Real-Time calculated payment to all QSEs, for their contribution of Reg-Down, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour.
$RDMWINFA_{q, h}$	$	*Reg-Down Make-Whole Infeasible Amount per QSE per hour*— The total Real-Time calculated payment to QSE *q*, for its contribution of Reg-Down, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour *h*.
$RDFQAMTQSETOT_{q}$	$	*Reg-Down Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Down, for the hour.
$RTPCRDAMTQSETOT_{q}$	$	*Procured Capacity for Reg-Down Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for Reg-Down, for the hour.
$PCRDAMT_{q}$	$	*Procured Capacity for Reg-Down Amount per QSE for DAM*—The DAM Reg-Down payment for QSE *q*, for the hour.
PCRDAMTTOT	$	*Procured Capacity for Reg-Down Amount Total in DAM*—The total of the DAM Reg-Down payments for all QSEs for the hour.
RDINFQAMTTOT	$	*Reg-Down Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Reg-Down, for the hour.
$RDINFQAMT_{q}$	$	*Reg-Down Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of its Ancillary Service Supply Responsibilities for Reg-Down, for the hour.
q	none	A QSE.

m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(b) Each QSE's share of the net total costs for Reg-Down for the Operating Hour is calculated as follows:

$$\mathbf{RDCOST}_{q} = \mathbf{RDPR} * \mathbf{RDQ}_{q}$$

Where:

$$RDPR = RDCOSTTOT / RDQTOT$$

$$RDQTOT = \sum_{q} RDQ_{q}$$

$$RDQ_{q} = RDO_{q} - SARDQ_{q}$$

$$RDO_{q} = \sum_{q} (SARDQ_{q} + \sum_{m} (RTPCRD_{q,m}) + PCRD_{q} - RDFQ_{q} - RRDFQ_{q}) * HLRS_{q}$$

$$SARDQ_{q} = DASARDQ_{q} + RTSARDQ_{q}$$

The above variables are defined as follows:

Variable	Unit	Description
$RDCOST_{q}$	$	*Reg-Down Cost per QSE*—QSE *q*'s share of the net total costs for Reg-Down, for the hour.
RDPR	$/MW per hour	*Reg-Down Price*—The price for Reg-Down calculated based on the net total costs for Reg-Down, for the hour.
RDCOSTTOT	$	*Reg-Down Cost Total*—The net total costs for Reg-Down, for the hour. See item (3)(a) above.
RDQTOT	MW	*Reg-Down Quantity Total*—The sum of every QSE's Ancillary Service Obligation minus its self-arranged Reg-Down quantity in the DAM and any and all SASMs for the hour.
RDQ_{q}	MW	*Reg-Down Quantity per QSE*—The QSE *q*'s Ancillary Service Obligation minus its self-arranged Reg-Down quantity in the DAM and any and all SASMs, for the hour.
RDO_{q}	MW	*Reg-Down Obligation per QSE*—The Ancillary Service Obligation of QSE *q*, for the hour.
$DASARDQ_{q}$	MW	*Self-Arranged Reg-Down Quantity per QSE for DAM*—The self-arranged Reg-Down quantity submitted by QSE *q* before 1000 in the Day-Ahead.
$RTSARDQ_{q}$	MW	*Self-Arranged Reg-Down Quantity per QSE for all SASMs*—The sum of all self-arranged Reg-Down quantities submitted by QSE *q* for all SASMs due to an increase in the Ancillary Service Plan per Section 4.4.7.1.

Variable	Unit	Description
RTPCRD $_{q, m}$	MW	*Procured Capacity for Reg-Down per QSE by market*—The MW portion of QSE *q*'s Ancillary Service Offers cleared in the market *m* to provide Reg-Down, for the hour.
RDFQ $_{q}$	MW	*Reg-Down Failure Quantity per QSE*—QSE *q*'s total capacity associated with failures on its Ancillary Service Supply Responsibility for Reg-Down, for the hour.
RRDFQ $_{q}$	MW	*Reconfiguration Reg-Down Failure Quantity per QSE*—QSE *q*'s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Down, for the hour.
HLRS $_{q}$		*The Hourly Load Ratio Share calculated for QSE q for the hour.* See Section 6.6.2.4.
PCRD $_{q}$	MW	*Procured Capacity for Reg-Down per QSE in DAM*—The total Reg-Down capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by the QSE, for the hour.
SARDQ $_{q}$	MW	*Total Self-Arranged Reg-Down Quantity per QSE for all markets*—The sum of all self-arranged Reg-Down quantities submitted by QSE *q* for DAM and all SASMs.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(c) The adjustment to each QSE's DAM charge for the Reg-Down for the Operating Hour, due to changes during the Adjustment Period or Real-Time operations, is calculated as follows:

$$\mathbf{RTRDAMT}_{q} = \mathbf{RDCOST}_{q} - \mathbf{DARDAMT}_{q}$$

The above variables are defined as follows:

Variable	Unit	Description
RTRDAMT $_{q}$	$	*Real-Time Reg-Down Amount per QSE*—The adjustment to QSE *q*'s share of the costs for Reg-Down, for the hour.
RDCOST $_{q}$	$	*Reg-Down Cost per QSE*—QSE *q*'s share of the net total costs for Reg-Down, for the hour.
DARDAMT $_{q}$	$	*Day-Ahead Reg-Down Amount per QSE*—QSE *q*'s share of the DAM cost for Reg-Down, for the hour.
q	none	A QSE.

(4) For RRS, if applicable:

(a) The net total costs for RRS for a given Operating Hour is calculated as follows:

$$\mathbf{RRCOSTTOT} = \mathbf{(-1)} * \left(\sum_{m} \mathbf{RTPCRRAMTTOT}_{m}\right) + \mathbf{PCRRAMTTOT} + \mathbf{RRFQAMTTOT} + \mathbf{RRINFQAMTTOT)}$$

Where:

Total payment of SASM- and RSASM-procured capacity for RRS by market

$$RTPCRRAMTTOT_{m} = \sum_{q} RTPCRRAMT_{q, m}$$

Total payment of DAM-procured capacity for RRS

$$PCRRAMTTOT = \sum_{q} PCRRAMT_{q}$$

Total charge of failure on Ancillary Service Supply Responsibility for RRS

$$RRFQAMTTOT = \sum_{q} RRFQAMTQSETOT_{q}$$

Total payment of SASM- and RSASM-procured capacity RRS Service by QSE

$$RTPCRRAMTQSETOT_{q} = \sum_{m} RTPCRRAMT_{q, m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for RRS

$$RRINFQAMTTOT = \sum_{q} RRINFQAMT_{q}$$

The above variables are defined as follows:

Variable	Unit	Description
RRCOSTTOT	$	*Responsive Reserve Cost Total*—The net total costs for RRS, for the hour.
$RTPCRRAMTTOT_{m}$	$	*Procured Capacity for Responsive Reserve Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for RRS, for the hour.
$RTPCRRAMT_{q, m}$	$	*Procured Capacity for Responsive Reserve Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for RRS, for the hour.
RRFQAMTTOT	$	*Responsive Reserve Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures and reconfiguration reductions on their Ancillary Service Supply Responsibilities for RRS, for the hour.
$RRFQAMTQSETOT_{q}$	$	*Responsive Reserve Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for RRS, for the hour.
$RTPCRRAMTQSETOT_{q}$	$	*Procured Capacity for Responsive Reserve Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for RRS, for the hour.
$PCRRAMT_{q}$	$	*Procured Capacity for Responsive Reserve Amount per QSE for DAM*—The DAM RRS payment for QSE *q*, for the hour.
PCRRAMTTOT	$	*Procured Capacity for Responsive Reserve Amount Total in DAM*—The total of the DAM RRS payments for all QSEs, for the hour.
RRINFQAMTTOT	$	*Responsive Reserve Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for RRS, for the hour.
$RRINFQAMT_{q}$	$	*Responsive Reserve Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for RRS, for the hour.
q	none	A QSE.

Variable	Unit	Description
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

[NPRR841: Replace paragraph (a) above with the following upon system implementation:]

(a) The net total costs for RRS for a given Operating Hour is calculated as follows:

$$\mathbf{RRCOSTTOT} = \mathbf{(-1) * (} \sum_{m} \mathbf{(RTPCRRAMTTOT}_{m}\mathbf{) + PCRRAMTTOT + RRFQAMTTOT + RRINFQAMTTOT + RRMWINFATOT)}$$

Where:

Total payment of SASM- and RSASM-procured capacity for RRS by market

$$\text{RTPCRRAMTTOT}_{m} = \sum_{q} \text{RTPCRRAMT}_{q, m}$$

Total payment of DAM-procured capacity for RRS

$$\text{PCRRAMTTOT} = \sum_{q} \text{PCRRAMT}_{q}$$

Total charge of failure on Ancillary Service Supply Responsibility for RRS

$$\text{RRFQAMTTOT} = \sum_{q} \text{RRFQAMTQSETOT}_{q}$$

Total payment of SASM- and RSASM-procured capacity for RRS by QSE

$$\text{RTPCRRAMTQSETOT}_{q} = \sum_{m} \text{RTPCRRAMT}_{q, m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for RRS

$$\text{RRINFQAMTTOT} = \sum_{q} \text{RRINFQAMT}_{q}$$

Total Real-Time Day-Ahead Make-Whole Payment for RRS

$$\text{RRMWINFATOT} = \sum_{q} \text{RRMWINFA}_{q, h}$$

The above variables are defined as follows:

Variable	Unit	Description
RRCOSTTOT	$	*Responsive Reserve Cost Total*—The net total costs for RRS, for the hour.
RTPCRRAMTTOT_{m}	$	*Procured Capacity for Responsive Reserve Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for RRS, for the hour.

RTPCRRAMT $_{q, m}$	$	*Procured Capacity for Responsive Reserve Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for RRS, for the hour.
RRFQAMTTOT	$	*Responsive Reserve Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures and reconfiguration reductions on their Ancillary Service Supply Responsibilities for RRS, for the hour.
RRMWINFATOT	$	*Responsive Reserve Make-Whole Infeasible Amount total*— The total Real-Time calculated payment to all QSEs, for their contribution of RRS, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour.
RRMWINFA $_{q, h}$	$	*Responsive Reserve Make-Whole Infeasible Amount per QSE per hour*—The total Real-Time calculated payment to QSE *q*, for its contribution of RRS, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour *h*.
RRFQAMTQSETOT $_{q}$	$	*Responsive Reserve Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for RRS, for the hour.
RTPCRRAMTQSETOT $_{q}$	$	*Procured Capacity for Responsive Reserve Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for RRS, for the hour.
PCRRAMT $_{q}$	$	*Procured Capacity for Responsive Reserve Amount per QSE in DAM*—The DAM RRS payment for QSE *q*, for the hour.
PCRRAMTTOT	$	*Procured Capacity for Responsive Reserve Amount Total in DAM*—The total of the DAM RRS payments for all QSEs, for the hour.
RRINFQAMTTOT	$	*Responsive Reserve Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for RRS, for the hour.
RRINFQAMT $_{q}$	$	*Responsive Reserve Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for RRS, for the hour.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(b) Each QSE's share of the net total costs for RRS for the Operating Hour is calculated as follows:

$$\mathbf{RRCOST}_{q} = \mathbf{RRPR} * \mathbf{RRQ}_{q}$$

Where:

$$RRPR = RRCOSTTOT / RRQTOT$$

$$RRQTOT = \sum_{q} RRQ_{q}$$

$$RRQ_{q} = RRO_{q} - SARRQ_{q}$$

$$RRO_q = \sum_q (SARRQ_q + \sum_m (RTPCRR_{q,m}) + PCRR_q - RRFQ_q - RRRFQ_q) * HLRS_q$$

$$SARRQ_q = DASARRQ_q + RTSARRQ_q$$

The above variables are defined as follows:

Variable	Unit	Description
$RRCOST_q$	$	*Responsive Reserve Cost per QSE*—QSE *q*'s share of the net total costs for RRS, for the hour.
RRPR	$/MW per hour	*Responsive Reserve Price*—The price for RRS calculated based on the net total costs for RRS, for the hour.
RRCOSTTOT	$	*Responsive Reserve Cost Total*—The net total costs for RRS, for the hour. See item (4)(a) above.
RRQTOT	MW	*Responsive Reserve Quantity Total*—The sum of every QSE's Ancillary Service Obligation minus its self-arranged RRS quantity in the DAM and any and all SASMs for the hour.
RRQ_q	MW	*Responsive Reserve Quantity per QSE*—The QSE *q*'s Ancillary Service Obligation minus its self-arranged RRS quantity in the DAM and any and all SASMs, for the hour.
RRO_q	MW	*Responsive Reserve Obligation per QSE*—The Ancillary Service Obligation of QSE *q*, for the hour.
$DASARRQ_q$	MW	*Day-Ahead Self-Arranged Responsive Reserve Quantity per QSE*—The self-arranged RRS quantity submitted by QSE *q* before 1000 in the Day-Ahead.
$RTSARRQ_q$	MW	*Self-Arranged Responsive Reserve Quantity per QSE for all SASMs*—The sum of all self-arranged RRS quantities submitted by QSE *q* for all SASMs due to an increase in the Ancillary Service Plan per Section 4.4.7.1.
$RTPCRR_{q,m}$	MW	*Procured Capacity for Responsive Reserve per QSE by market*—The MW portion of QSE *q*'s Ancillary Service Offers cleared in the market *m* to provide RRS, for the hour.
$RRFQ_q$	MW	*Responsive Reserve Failure Quantity per QSE*—QSE *q*'s total capacity associated with failures on its Ancillary Service Supply Responsibility for RRS, for the hour.
$RRRFQ_q$	MW	*Reconfiguration Responsive Reserve Failure Quantity per QSE*—QSE *q*'s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for RRS, for the hour.
$HLRS_q$	none	*The Hourly Load Ratio Share calculated for QSE q for the hour*. See Section 6.6.2.4.
$PCRR_q$	MW	*Procured Capacity for Responsive Reserve per QSE in DAM*—The total RRS capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by the QSE, for the hour.
$SARRQ_q$	MW	*Total Self-Arranged Responsive Reserve Quantity per QSE for all markets*—The sum of all self-arranged RRS quantities submitted by QSE *q* for DAM and all SASMs.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(c) The adjustment to each QSE's DAM charge for the RRS for the Operating Hour, due to changes during the Adjustment Period or Real-Time operations, is calculated as follows:

$$\mathbf{RTRRAMT}_{q} = \mathbf{RRCOST}_{q} - \mathbf{DARRAMT}_{q}$$

The above variables are defined as follows:

Variable	Unit	Description
$RTRRAMT_q$	$	*Real-Time Responsive Reserve Amount per QSE*—The adjustment to QSE *q*'s share of the costs for RRS, for the hour.
$RRCOST_q$	$	*Responsive Reserve Cost per QSE*—QSE *q*'s share of the net total costs for RRS, for the hour.
$DARRAMT_q$	$	*Day-Ahead Responsive Reserve Amount per QSE*—QSE *q*'s share of the DAM cost for RRS, for the hour.
q	none	A QSE.

(5) For Non-Spin, if applicable:

(a) The net total costs for Non-Spin for a given Operating Hour is calculated as follows:

$$\mathbf{NSCOSTTOT} = \mathbf{(-1)} * \mathbf{(} \sum_{m} \mathbf{(RTPCNSAMTTOT}_{m}\mathbf{)} + \mathbf{PCNSAMTTOT + NSFQAMTTOT + NSINFQAMTTOT)}$$

Where:

Total payment of SASM- and RSASM-procured capacity for Non-Spin by market

$$RTPCNSAMTTOT_{m} = \sum_{q} RTPCNSAMT_{q,m}$$

Total payment of DAM-procured capacity for Non-Spin

$$PCNSAMTTOT = \sum_{q} PCNSAMT_{q}$$

Total charge of failure on Ancillary Service Supply Responsibility for Non-Spin

$$NSFQAMTTOT = \sum_{q} NSFQAMTQSETOT_{q}$$

Total payment of SASM- and RSASM-procured capacity for Non-Spin by QSE

$$RTPCNSAMTQSETOT_{q} = \sum_{m} RTPCNSAMT_{q,m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for Non-Spin

$$NSINFQAMTTOT = \sum_{q} NSINFQAMT_{q}$$

The above variables are defined as follows:

Variable	Unit	Description
NSCOSTTOT	$	*Non-Spin Cost Total*—The net total costs for Non-Spin, for the hour.
RTPCNSAMTTOT $_m$	$	*Procured Capacity for Non-Spin Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for Non-Spin, for the hour.
RTPCNSAMT $_{q, m}$	$	*Procured Capacity for Non-Spin Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for Non-Spin, for the hour.
NSFQAMTTOT	$	*Non-Spin Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures and reconfiguration reductions on their Ancillary Service Supply Responsibilities for Non-Spin, for the hour.
NSFQAMTQSETOT $_q$	$	*Non-Spin Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Non-Spin, for the hour.
RTPCNSAMTQSETOT $_q$	$	*Procured Capacity for Non-Spin Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for Non-Spin, for the hour.
PCNSAMT $_q$	$	*Procured Capacity for Non-Spin Amount per QSE in DAM*—The DAM Non-Spin payment for QSE *q*, for the hour.
PCNSAMTTOT	$	*Procured Capacity for Non-Spin Amount Total in DAM*—The total of the DAM Non-Spin payments for all QSEs, for the hour.
NSINFQAMTTOT	$	*Non-Spin Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Non-Spin, for the hour.
NSINFQAMT $_q$	$	*Non-Spin Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Non-Spin, for the hour.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

[NPRR841: Replace paragraph (a) above with the following upon system implementation:]

(a) The net total costs for Non-Spin for a given Operating Hour is calculated as follows:

$$\mathbf{NSCOSTTOT} = \mathbf{(-1) * (} \sum_m \mathbf{(RTPCNSAMTTOT}_m\mathbf{) + PCNSAMTTOT + NSFQAMTTOT + NSINFQAMTTOT + NSMWINFATOT)}$$

Where:

Total payment of SASM- and RSASM-procured capacity for Non-Spin by market

$$\text{RTPCNSAMTTOT}_m = \sum_q \text{RTPCNSAMT}_{q, m}$$

Total payment of DAM-procured capacity for Non-Spin

$$PCNSAMTTOT = \sum_{q} PCNSAMT_{q}$$

Total charge of failure on Ancillary Service Supply Responsibility for Non-Spin

$$NSFQAMTTOT = \sum_{q} NSFQAMTQSETOT_{q}$$

Total payment of SASM- and RSASM-procured capacity for Non-Spin by QSE

$$RTPCNSAMTQSETOT_{q} = \sum_{m} RTPCNSAMT_{q, m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for Non-Spin

$$NSINFQAMTTOT = \sum_{q} NSINFQAMT_{q}$$

Total Real-Time Day-Ahead Make-Whole Payment for Non-Spin

$$NSMWINFATOT = \sum_{q} NSMWINFA_{q, h}$$

The above variables are defined as follows:

Variable	Unit	Description
NSCOSTTOT	$	*Non-Spin Cost Total*—The net total costs for Non-Spin, for the hour.
$RTPCNSAMTTOT_{m}$	$	*Procured Capacity for Non-Spin Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for Non-Spin, for the hour.
$RTPCNSAMT_{q, m}$	$	*Procured Capacity for Non-Spin Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for Non-Spin, for the hour.
NSFQAMTTOT	$	*Non-Spin Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures and reconfiguration reductions on their Ancillary Service Supply Responsibilities for Non-Spin, for the hour.
NSMWINFATOT	$	*Non Spin Make-Whole Infeasible Amount total*— The total Real-Time calculated payment to all QSEs, for their contribution of Non-Spin, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour.
$NSMWINFA_{q, h}$	$	*Non Spin Make-Whole Infeasible Amount per QSE per hour*— The total Real-Time calculated payment to QSE *q*, for its contribution of Non-Spin, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour *h*.
$NSFQAMTQSETOT_{q}$	$	*Non-Spin Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Non-Spin, for the hour.
$RTPCNSAMTQSETOT_{q}$	$	*Procured Capacity for Non-Spin Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for Non-Spin, for the hour.
$PCNSAMT_{q}$	$	*Procured Capacity for Non-Spin Amount per QSE in DAM*—The DAM Non-Spin payment for QSE *q*, for the hour.
PCNSAMTTOT	$	*Procured Capacity for Non-Spin Amount Total in DAM*—The total of the DAM Non-Spin payments for all QSEs, for the hour.

NSINFQAMTTOT	$	*Non-Spin Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Non-Spin, for the hour.
NSINFQAMT $_q$	$	*Non-Spin Infeasible Quantity Amount per QSE*—The total charge to QSE q for its total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Non-Spin, for the hour.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(b) Each QSE's share of the net total costs for Non-Spin for the Operating Hour is calculated as follows:

$$\mathbf{NSCOST}_q = \mathbf{NSPR} * \mathbf{NSQ}_q$$

Where:

$$NSPR = NSCOSTTOT / NSQTOT$$

$$NSQTOT = \sum_q NSQ_q$$

$$NSQ_q = NSO_q - SANSQ_q$$

$$NSO_q = \sum_q (SANSQ_q + \sum_m (RTPCNS_{q,m}) + PCNS_q - NSFQ_q - RNSFQ_q) * HLRS_q$$

$$SANSQ_q = DASANSQ_q + RTSANSQ_q$$

The above variables are defined as follows:

Variable	Unit	Description
NSCOST $_q$	$	*Non-Spin Cost per QSE*—QSE q's share of the net total costs for Non-Spin, for the hour.
NSPR	$/MW per hour	*Non-Spin Price*—The price for Non-Spin calculated based on the net total costs for Non-Spin, for the hour.
NSCOSTTOT	$	*Non-Spin Cost Total*—The net total costs for Non-Spin for the hour. See item (5)(a) above.
NSQTOT	MW	*Non-Spin Quantity Total*—The sum of every QSE's Ancillary Service Obligation minus its self-arranged Non-Spin quantity in the DAM and any and all SASMs, for the hour.
NSQ $_q$	MW	*Non-Spin Quantity per QSE*—The difference in QSE q's Ancillary Service Obligation minus its self-arranged Non-Spin quantity in the DAM and any and all SASMs, for the hour.
NSO $_q$	MW	*Non-Spin Obligation per QSE*—The Ancillary Service Obligation of QSE q, for the hour.
DASANSQ $_q$	MW	*Day-Ahead Self-Arranged Non-Spin Quantity per QSE for DAM*—The self-arranged Non-Spin quantity submitted by QSE q before 1000 in the Day-Ahead.

Variable	Unit	Description
RTSANSQ $_q$	MW	*Self-Arranged Non-Spin Quantity per QSE for all SASMs*—The sum of all self-arranged Non-Spin quantities submitted by QSE *q* for all SASMs due to an increase in the Ancillary Service Plan per Section 4.4.7.1.
RTPCNS $_{q, m}$	MW	*Procured Capacity for Non-Spin per QSE by market*—The MW portion of QSE *q*'s Ancillary Service Offers cleared in the market *m* to provide Non-Spin, for the hour.
NSFQ $_q$	MW	*Non-Spin Failure Quantity per QSE*—QSE *q*'s total capacity associated with failures on its Ancillary Service Supply Responsibility for Non-Spin, for the hour.
RNSFQ $_q$	MW	*Reconfiguration Non-Spin Failure Quantity per QSE*—QSE *q*'s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Non-Spin, for the hour.
HLRS $_q$	none	*The Hourly Load Ratio Share calculated for QSE q for the hour*. See Section 6.6.2.4.
PCNS $_q$	MW	*Procured Capacity for Non-Spin Service per QSE in DAM*—The total Non-Spin capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by the QSE, for the hour.
SANSQ $_q$	MW	*Total Self-Arranged Non-Spin Supplied Quantity per QSE for all markets*—The sum of all self-arranged Non-Spin quantities submitted by QSE *q* for DAM and all SASMs.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(c) The adjustment to each QSE's DAM charge for the Non-Spin for the Operating Hour, due to changes during the Adjustment Period or Real-Time operations, is calculated as follows:

RTNSAMT $_q$ = NSCOST $_q$ – DANSAMT $_q$

The above variables are defined as follows:

Variable	Unit	Description
RTNSAMT $_q$	$	*Real-Time Non-Spin Amount per QSE*—The adjustment to QSE *q*'s share of the costs for Non-Spin, for the hour.
NSCOST $_q$	$	*Non-Spin Cost per QSE*—QSE *q*'s share of the net total costs for Non-Spin, for the hour.
DANSAMT $_q$	$	*Day-Ahead Non-Spin Amount per QSE*—QSE *q*'s share of the DAM cost for Non-Spin, for the hour.
q	none	A QSE.

[NPRR841 and NPRR863: Insert applicable portions of paragraph (6) below upon system implementation:]

(6) For ECRS, if applicable:

(a) The net total costs for ECRS for a given Operating Hour is calculated as follows:

ECRCOSTTOT = (-1) * ($\sum_{m}$ (RTPCECRAMTTOT $_m$) + PCECRAMTTOT + ECRFQAMTTOT + ECRINFQAMTTOT + ECRMWINFATOT)

Where:

Total payment of SASM- and RSASM-procured capacity for ECRS by market

RTPCECRAMTTOT $_m$ = $\sum_{q}$ RTPCECRAMT $_{q, m}$

Total payment of DAM-procured capacity for ECRS

PCECRAMTTOT = $\sum_{q}$ PCECRAMT $_q$

Total charge of failure on Ancillary Service Supply Responsibility for ECRS

ECRFQAMTTOT = $\sum_{q}$ ECRFQAMTQSETOT $_q$

Total payment of SASM- and RSASM-procured capacity ECRS Service by QSE

RTPCECRAMTQSETOT $_q$ = $\sum_{m}$ RTPCECRAMT $_{q, m}$

Total charge of infeasible Ancillary Service Supply Responsibility for ECRS

ECRINFQAMTTOT = $\sum_{q}$ ECRINFQAMT $_q$

Total Real-Time Day-Ahead Make-Whole Payment for ECRS

ECRMWINFATOT = $\sum_{q}$ ECRMWINFA $_{q, h}$

The above variables are defined as follows:

Variable	Unit	Description
ECRCOSTTOT	$	*ERCOT Contingency Reserve Service Cost Total*—The net total costs for ECRS, for the hour.
RTPCECRAMTTOT $_m$	$	*Procured Capacity for ERCOT Contingency Reserve Service Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for ECRS, for the hour.
RTPCECRAMT $_{q, m}$	$	*Procured Capacity for ERCOT Contingency Reserve Service Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for ECRS, for the hour.
ECRFQAMTTOT	$	*ERCOT Contingency Reserve Service Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures and reconfiguration reductions on their Ancillary Service Supply Responsibilities for ECRS, for the hour.
ECRMWINFATOT	$	*ERCOT Contingency Reserve Service Make-Whole Infeasible Amount total*— The total Real-Time calculated payment to all QSEs, for their contribution of ECRS, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour.

ECRMWINFA $_{q, h}$	$	*ERCOT Contingency Reserve Service Make-Whole Infeasible Amount per QSE per hour*— The total Real-Time calculated payment to QSE *q*, for its contribution of ECRS, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour *h*.
ECRFQAMTQSETOT $_{q}$	$	*ERCOT Contingency Reserve Service Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for ECRS, for the hour.
RTPCECRAMTQSETOT $_{q}$	$	*Procured Capacity for ERCOT Contingency Reserve Service Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for ECRS, for the hour.
PCECRAMT $_{q}$	$	*Procured Capacity for ERCOT Contingency Reserve Service Amount per QSE for DAM*—The DAM ECRS payment for QSE *q*, for the hour.
PCECRAMTTOT	$	*Procured Capacity for ERCOT Contingency Reserve Service Amount Total in DAM*—The total of the DAM ECRS payments for all QSEs, for the hour.
ECRINFQAMTTOT	$	*ERCOT Contingency Reserve Service Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for ECRS, for the hour.
ECRINFQAMT $_{q}$	$	*ERCOT Contingency Reserve Service Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for ECRS, for the hour.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(b) Each QSE's share of the net total costs for ECRS for the Operating Hour is calculated as follows:

$$\mathbf{ECRCOST}_{q} = \mathbf{ECRPR} * \mathbf{ECRQ}_{q}$$

Where:

$$ECRPR = ECRCOSTTOT / ECRQTOT$$

$$ECRQTOT = \sum_{q} ECRQ_{q}$$

$$ECRQ_{q} = ECRO_{q} - SAECRQ_{q}$$

$$ECRO_{q} = \sum_{q} (SAECRQ_{q} + \sum_{m} (RTPCECR_{q, m}) + PCECR_{q} - ECRFQ_{q} - RECRFQ_{q}) * HLRS_{q}$$

$$SAECRQ_{q} = DASAECRQ_{q} + RTSAECRQ_{q}$$

The above variables are defined as follows:

Variable	Unit	Description
ECRCOST $_q$	$	*ERCOT Contingency Reserve Service Cost per QSE*—QSE *q*'s share of the net total costs for ECRS, for the hour.
ECRPR	$/MW per hour	*ERCOT Contingency Reserve Service Price*—The price for ECRS calculated based on the net total costs for ECRS, for the hour.
ECRCOSTTOT	$	*ERCOT Contingency Reserve Service Cost Total*—The net total costs for ECRS, for the hour. See item (6)(a) above.
ECRQTOT	MW	*ERCOT Contingency Reserve Service Quantity Total*—The sum of every QSE's Ancillary Service Obligation minus its self-arranged ECRS quantity in the DAM and any and all SASMs for the hour.
ECRQ $_q$	MW	*ERCOT Contingency Reserve Service Quantity per QSE*—The QSE *q*'s Ancillary Service Obligation minus its self-arranged ECRS quantity in the DAM and any and all SASMs, for the hour.
ECRO $_q$	MW	*ERCOT Contingency Reserve Service Obligation per QSE*—The Ancillary Service Obligation of QSE *q*, for the hour.
DASAECRQ $_q$	MW	*Day-Ahead Self-Arranged ERCOT Contingency Reserve Service Quantity per QSE*—The self-arranged ECRS quantity submitted by QSE *q* before 1000 in the Day-Ahead.
RTSAECRQ $_q$	MW	*Self-Arranged ERCOT Contingency Reserve Service Quantity per QSE for all SASMs*—The sum of all self-arranged ECRS quantities submitted by QSE *q* for all SASMs due to an increase in the Ancillary Service Plan per Section 4.4.7.1.
RTPCECR $_{q, m}$	MW	*Procured Capacity for ERCOT Contingency Reserve Service per QSE by market*—The MW portion of QSE *q*'s Ancillary Service Offers cleared in the market *m* to provide ECRS, for the hour.
ECRFQ $_q$	MW	*ERCOT Contingency Reserve Service Failure Quantity per QSE*—QSE *q*'s total capacity associated with failures on its Ancillary Service Supply Responsibility for ECRS, for the hour.
RECRFQ $_q$	MW	*Reconfiguration ERCOT Contingency Reserve Service Failure Quantity per QSE*—QSE *q*'s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for ECRS, for the hour.
HLRS $_q$	none	*The Hourly Load Ratio Share calculated for QSE q for the hour.* See Section 6.6.2.4.
PCECR $_q$	MW	*Procured Capacity for ERCOT Contingency Reserve Service per QSE in DAM*—The total ECRS capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by the QSE, for the hour.
SAECRQ $_q$	MW	*Total Self-Arranged ERCOT Contingency Reserve Service Quantity per QSE for all markets*—The sum of all self-arranged ECRS quantities submitted by QSE *q* for DAM and all SASMs.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(c) The adjustment to each QSE's DAM charge for the ECRS for the Operating Hour, due to changes during the Adjustment Period or Real-Time operations, is calculated as follows:

RTECRAMT $_q$ = ECRCOST $_q$ – DAECRAMT $_q$

The above variables are defined as follows:

Variable	Unit	Description
RTECRAMT $_q$	$	*Real-Time ERCOT Contingency Reserve Service Amount per QSE*—The adjustment to QSE *q*'s share of the costs for ECRS, for the hour.
ECRCOST $_q$	$	*ERCOT Contingency Reserve Service Cost per QSE*—QSE *q*'s share of the net total costs for ECRS, for the hour.
DAECRAMT $_q$	$	*Day-Ahead ERCOT Contingency Reserve Service Amount per QSE*—QSE *q*'s share of the DAM cost for ECRS, for the hour.
q	none	A QSE.

[NPRR1010: Replace Section 6.7.4 above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]

6.7.4 Real-Time Settlement for Updated Day-Ahead Market Ancillary Service Obligations

(1) Each QSE is charged or paid for net obligations for each Ancillary Service procured in the DAM. DAM costs are calculated for each QSE in accordance with Section 4.6.4, Settlement of Ancillary Services Procured in the DAM. DAM net total costs for Ancillary Service procured in the DAM are re-calculated for each QSE under this Section based on Real-Time Load Ratio Share (LRS). Payments and/or charges for Ancillary Service obligations are calculated by Operating Hour as follows:

(a) For Regulation Up Service (Reg-Up), if applicable:

$$DARTPCRUAMT_q = (DARUNOBL_q - DASARUQ_q) * DARUPR - DARUAMT_q$$

Where:

$$DARUNOBL_q = DAPCRUQTOT * HLRS_q$$

$$DAPCRUQTOT = \sum_q \left(\sum_r PCRUR_{r,q,DAM} + DARUOAWD_q + DASARUQ_q \right)$$

The above variables are defined as follows:

Variable	Unit	Description
DARTPCRUAMT $_q$	$	*Day-Ahead Updated Real-Time Procured Capacity for Reg-Up Amount by QSE* - The payment or charge to QSE *q* for Reg-Up, for the re-calculated Real-Time obligation, for the Operating Hour.
DARUPR	$/MW	*Day-Ahead Reg-Up Price*—The DAM Reg-Up price for the Operating Hour.
DARUNOBL $_q$	MW	*Day-Ahead Reg-Up New Obligation per QSE*—The updated Reg-Up Ancillary Service Obligation in Real-Time for QSE *q* for the Operating Hour.
DARUAMT $_q$	$	*Day-Ahead Reg-Up Amount per QSE*—QSE *q*'s share of the DAM costs for Reg-Up for the Operating Hour.

$PCRUR_{r, q, DAM}$	MW	*Procured Capacity for Reg-Up per Resource per QSE in DAM*—The Reg-Up capacity awarded to QSE *q* in the DAM for Resource *r* for the Operating Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$DARUOAWD_q$	MW	*Day-Ahead Reg-Up Award for the QSE* —The Reg-Up Only capacity awarded in the DAM to QSE *q* for the Operating Hour.
$HLRS_q$	none	*Hourly Load Ratio Share per QSE*—The Real-Time LRS as defined in Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour, for QSE *q*, for the Operating Hour.
DAPCRUQTOT	MW	*Day-Ahead Procured Capacity for Reg-Up Total*—The total Reg-Up capacity for all QSEs for all Reg-Up awarded and self-arranged in the DAM for the Operating Hour.
$DASARUQ_q$	MW	*Day-Ahead Self-Arranged Reg-Up Quantity per QSE*—The self-arranged Reg-Up capacity submitted by QSE *q* before 1000 in the DAM for the Operating Hour.
q	none	A QSE.
r	none	A Resource.

(b) For Regulation Down Service (Reg-Down), if applicable:

$$DARTPCRDAMT_q = (DARDNOBL_q - DASARDQ_q) * DARDPR - DARDAMT_q$$

Where:

$$DARDNOBL_q = DAPCRDQTOT * HLRS_q$$

$$DAPCRDQTOT = \sum_q \left(\sum_r PCRDR_{r, q, DAM} + DARDOAWD_q + DASARDQ_q \right)$$

The above variables are defined as follows:

Variable	Unit	Description
$DARTPCRDAMT_q$	$	*Day-Ahead Updated Real-Time Procured Capacity for Reg-Down Amount by QSE* - The payment or charge to QSE *q* for Reg-Down, for the re-calculated Real-Time obligation, for the Operating Hour.
DARDPR	$/MW	*Day-Ahead Reg-Down Price*—The DAM Reg-Down price for the Operating Hour.
$DARDNOBL_q$	MW	*Day-Ahead Reg-Down New Obligation per QSE*—The updated Reg-Down Ancillary Service Obligation in Real-Time, for QSE *q*, for the Operating Hour.
$DARDAMT_q$	$	*Day-Ahead Reg-Down Amount per QSE*—QSE *q*'s share of the DAM cost for Reg-Down, for the Operating Hour.
$PCRDR_{r, q, DAM}$	MW	*Procured Capacity for Reg-Down per Resource per QSE in DAM*—The Reg-Down capacity awarded to QSE *q* in the DAM for Resource *r* for the Operating Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$DARDOAWD_q$	MW	*Day-Ahead Reg-Down Only Award for the QSE* —The Reg-Down Only capacity awarded in the DAM to QSE *q* for the Operating Hour.

$HLRS_q$	none	*Hourly Load Ratio Share per QSE*—The Real-Time as defined in Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour for QSE *q*, for the Operating Hour.
DAPCRDQTOT	MW	*Day-Ahead Procured Capacity for Reg-Down Total*—The total Reg-Down capacity for all QSEs for all Reg-Down awarded and self-arranged, in the DAM for the Operating Hour.
$DASARDQ_q$	MW	*Day-Ahead Self-Arranged Reg-Down Quantity per QSE*—The self-arranged Reg-Down capacity submitted by QSE *q* before 1000 in the DAM for the Operating Hour.
q	none	A QSE.
r	none	A Resource.

(c) For Responsive Reserve (RRS), if applicable:

$$DARTPCRRAMT_q = (DARRNOBL_q - DASARRQ_q) * DARRPR - DARRAMT_q$$

Where:

$$DARRNOBL_q = DAPCRRQTOT * HLRS_q$$

$$DAPCRRQTOT = \sum_q (PCRRR_{r, q, DAM} + DARROAWD_q + DASARRQ_q)$$

The above variables are defined as follows:

Variable	Unit	Description
$DARTPCRRAMT_q$	$	*Day-Ahead Updated Real-Time Procured Capacity for Responsive Reserve Amount by QSE* - The payment or charge to QSE *q* for RRS, for the re-calculated Real-Time obligation, for the Operating Hour.
DARRPR	$/MW	*Day-Ahead Responsive Reserve Price*—The DAM RRS price for the Operating Hour.
$DARRNOBL_q$	MW	*Day-Ahead Responsive Reserve New Obligation per QSE*—The updated RRS Ancillary Service Obligation in Real-Time for QSE *q* for the Operating Hour.
$DARRAMT_q$	$	*Day-Ahead Responsive Reserve Amount per QSE*—QSE *q*'s share of the DAM cost for RRS for the Operating Hour.
$PCRRR_{r, q, DAM}$	MW	*Procured Capacity for Responsive Reserve per Resource per QSE in DAM*—The RRS capacity awarded to QSE *q* in the DAM for Resource *r* for the Operating Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$DARROAWD_q$	MW	*Day-Ahead Responsive Reserve Only Award for the QSE* —The RRS Only capacity awarded in the DAM to QSE *q* for the Operating Hour.
$HLRS_q$	none	Hourly Load Ratio Share per QSE—The Real-Time LRS as defined in Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour for QSE *q* for the Operating Hour.
DAPCRRQTOT	MW	*Day-Ahead Procured Capacity for Responsive Reserve Total* —The total RRS capacity for all QSEs for all RRS awarded and self-arranged in the DAM for the Operating Hour.

$DASARRQ_q$	MW	*Day-Ahead Self-Arranged Responsive Reserve Quantity per QSE*—The self-arranged RRS capacity submitted by QSE *q* before 1000 in the DAM for the Operating Hour.
q	none	A QSE.
r	none	A Resource.

(d) For Non-Spinning Reserve (Non-Spin), if applicable:

$$DARTPCNSAMT_q = (DANSNOBL_q - DASANSQ_q) * DANSPR - DANSAMT_q$$

Where:

$$DANSNOBL_q = DAPCNSQTOT * HLRS_q$$

$$DAPCNSQTOT = \sum_q \left(\sum_r PCNSR_{r,q,DAM} + DANSOAWD_q + DASANSQ_q\right)$$

The above variables are defined as follows:

Variable	Unit	Description
$DARTPCNSAMT_q$	$	*Day-Ahead Updated Real-Time Procured Capacity for Non-Spin Amount by QSE* - The payment or charge to QSE *q* for Non-Spin for the re-calculated Real-Time obligation for the Operating Hour.
DANSPR	$/MW	*Day-Ahead Non-Spin Price*—The DAM Non-Spin price for the Operating Hour.
$DANSNOBL_q$	MW	*Day-Ahead Non-Spin New Obligation per QSE*—The updated Non-Spin Ancillary Service Obligation in Real-Time for QSE *q* for the Operating Hour.
$PCNSR_{r,q,DAM}$	MW	*Procured Capacity for Non-Spin per Resource per QSE in DAM*—The Non-Spin capacity awarded to QSE *q* in the DAM for Resource *r* for the Operating Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$DANSOAWD_q$	MW	*Day-Ahead Non-Spin Only Award for the QSE* — The Non-Spin Only capacity awarded in the DAM to QSE *q* for the Operating Hour.
$DANSAMT_q$	$	*Day-Ahead Non-Spin Amount per QSE*—QSE *q*'s share of the DAM cost for Non-Spin for the Operating Hour.
$HLRS_q$	none	*Hourly Load Ratio Share per QSE*—The Real-Time LRS as defined in Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour for QSE *q* for the Operating Hour.
DAPCNSQTOT	MW	*Day-Ahead Procured Capacity for Non-Spin Total* —The total Non-Spin capacity for all QSEs for all Non-Spin awarded and self-arranged in the DAM for the Operating Hour.
$DASANSQ_q$	MW	*Day-Ahead Self-Arranged Non-Spin Quantity per QSE*—The self-arranged Non-Spin capacity submitted by QSE *q* before 1000 in the DAM for the Operating Hour.
q	none	A QSE.
r	none	A Resource.

(e) For ERCOT Contingency Reserve Service (ECRS), if applicable:

$$DARTPCECRAMT_q = (DAECRNOBL_q - DASAECRQ_q) * DAECRPR - DAECRAMT_q$$

Where:

$$DAECRNOBL_q = DAPCECRQTOT * HLRS_q$$

$$DAPCECRQTOT = \sum_q (\sum_r PCECRR_{r, q, DAM} + DAECROAWD_q + DASAECRQ_q)$$

The above variables are defined as follows:

Variable	Unit	Description
$DARTPCECRAMT_q$	$	*Day-Ahead Updated Real-Time Procured Capacity for ERCOT Contingency Reserve Service Amount by QSE* - The payment or charge to QSE *q* for ECRS for the re-calculated Real-Time obligation for the Operating Hour.
DAECRPR	$/MW	*Day-Ahead ERCOT Contingency Reserve Price*—The DAM ECRS price for the Operating Hour.
$DAECRNOBL_q$	MW	*Day-Ahead ERCOT Contingency Reserve Service New Obligation per QSE*—The updated ECRS Ancillary Service Obligation in Real-Time for QSE *q* for the Operating Hour.
$PCECRR_{r, q, DAM}$	MW	*Procured Capacity for ERCOT Contingency Reserve Service per Resource per QSE in DAM*—The ECRS capacity awarded to QSE *q* in the DAM for Resource *r* for the Operating Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$DAECROAWD_q$	MW	*Day-Ahead ERCOT Contingency Reserve Service Only Award for the QSE* — The ECRS Only capacity awarded in the DAM to QSE *q* for the Operating Hour.
$DAECRAMT_q$	$	*Day-Ahead ERCOT Contingency Reserve Amount per QSE*—QSE *q*'s share of the DAM cost for ECRS for the Operating Hour.
$HLRS_q$	none	*Hourly Load Ratio Share per QSE*—The Real-Time LRS as defined in Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour for QSE *q* for the Operating Hour.
DAPCECRQTOT	MW	*Day-Ahead Procured Capacity for ERCOT Contingency Reserve Total*—The total ECRS capacity for all QSEs for all ECRS awarded and self-arranged in the DAM for the Operating Hour.
$DASAECRQ_q$	MW	*Day-Ahead Self-Arranged ERCOT Contingency Reserve Quantity per QSE*—The self-arranged ECRS capacity submitted by QSE *q* before 1000 in the DAM for the Operating Hour.
q	none	A QSE.
r	none	A Resource.

6.7.5 Real-Time Ancillary Service Imbalance Payment or Charge

(1) Based on the Real-Time On-Line Reliability Deployment Price Adders, Real-Time On-Line Reserve Price Adders and a Real-Time Off-Line Reserve Price Adders, ERCOT shall calculate Ancillary Service imbalance Settlement, which will make Resources indifferent to the utilization of their capacity for energy or Ancillary Service reserves, as set forth in this Section.

(2) The payment or charge to each QSE for Ancillary Service imbalance is calculated based on the price calculation set forth in paragraph (12) of Section 6.5.7.3, Security Constrained Economic Dispatch, and applied to the following amounts for each QSE:

(a) The amount of Real-Time Metered Generation from all Generation Resources, represented by the QSE for the 15-minute Settlement Interval;

[NPRR987: Replace paragraph (a) above with the following upon system implementation:]

(a) The amount of Real-Time Metered Generation from all Generation Resources and Energy Storage Resources (ESRs), represented by the QSE for the 15-minute Settlement Interval;

(b) The amount of On-Line capacity based on the telemetered High Sustained Limit (HSL) for all On-Line Generation Resources, the telemetered consumption from Load Resources with a validated Ancillary Service Schedule for RRS controlled by high-set under-frequency relay, and the capacity from Controllable Load Resources available to SCED;

[NPRR863 and NPRR987: Replace applicable portions of paragraph (b) above with the following upon system implementation:]

(b) The amount of On-Line capacity based on the telemetered High Sustained Limit (HSL) for all On-Line Generation Resources and ESRs, the telemetered consumption from Load Resources with a validated Ancillary Service Schedule for ECRS or RRS controlled by high-set under-frequency relay, and the capacity from Controllable Load Resources available to SCED, including capacity from modeled Controllable Load Resources associated with ESRs;

(c) The amount of Ancillary Service Resource Responsibility for Reg-Up, RRS and Non-Spin for all Generation and Load Resources represented by the QSE for the 15-minute Settlement Interval.

[NPRR863 and NPRR987: Replace applicable portions of paragraph (c) above with the following upon system implementation:]

(c) The amount of Ancillary Service Resource Responsibility for Reg-Up, ECRS, RRS and Non-Spin for all Generation Resources, ESRs, and Load Resources represented by the QSE for the 15-minute Settlement Interval.

(3) Resources meeting one or more of the following conditions will be excluded from the amounts calculated pursuant to paragraphs (2)(a) and (b) above:

(a) Nuclear Resources;

(b) Resources with a telemetered ONTEST, STARTUP (except Resources with Non-Spin Ancillary Service Resource Responsibility greater than zero), or SHUTDOWN Resource Status excluding Resources telemetering both STARTUP Resource Status and greater than zero Non-Spin Ancillary Service Responsibility; or

(c) Resources with a telemetered net real power (in MW) less than 95% of their telemetered Low Sustained Limit (LSL) excluding Resources telemetering both STARTUP Resource Status and greater than zero Non-Spin Ancillary Service Responsibility.

[NPRR987: Replace paragraph (c) above with the following upon system implementation:]

(c) Resources with a telemetered net real power (in MW) less than 95% of their telemetered Low Sustained Limit (LSL) excluding the following:

(i) Resources telemetering both STARTUP Resource Status and greater than zero Non-Spin Ancillary Service Responsibility; or

(ii) ESRs.

(4) Reliability Must-Run (RMR) Units and Reliability Unit Commitment (RUC) Resources On-Line during the hour due to an ERCOT instruction, except for any RUC Resource committed by a RUC Dispatch Instruction where that Resource's QSE subsequently opted out of RUC Settlement pursuant to paragraph (12) of Section 5.5.2, Reliability Unit Commitment (RUC) Process, those RUC Resources that had a Three-Part Supply Offer cleared in the DAM for the hour, or a Switchable Generation Resource (SWGR) released by a non-ERCOT Control Area Operator (CAO) to operate in the ERCOT Control Area due to an ERCOT RUC instruction for an actual or anticipated Energy Emergency Alert (EEA) condition, and any Combined Cycle Generation Resource that was RUC-committed from one On-Line configuration to a different configuration with additional capacity, as described in paragraph (3) of Section 5.5.2, will be excluded from the

amounts calculated for the 15-minute Settlement Interval pursuant to paragraphs (2)(a), (b), and (c) above.

[NPRR885: Replace paragraph (4) above with the following upon system implementation:]

(4) Reliability Must-Run (RMR) Units, and Must-Run Alternatives (MRAs), and Reliability Unit Commitment (RUC) Resources On-Line during the hour due to an ERCOT instruction, except for any RUC Resource committed by a RUC Dispatch Instruction where that Resource's QSE subsequently opted out of RUC Settlement pursuant to paragraph (12) of Section 5.5.2, Reliability Unit Commitment (RUC) Process, those RUC Resources that had a Three-Part Supply Offer cleared in the DAM for the hour, or a Switchable Generation Resource (SWGR) released by a non-ERCOT Control Area Operator (CAO) to operate in the ERCOT Control Area due to an ERCOT RUC instruction for an actual or anticipated Energy Emergency Alert (EEA) condition, and any Combined Cycle Generation Resource that was RUC-committed from one On-Line configuration to a different configuration with additional capacity, as described in paragraph (3) of Section 5.5.2, will be excluded from the amounts calculated for the 15-minute Settlement Interval pursuant to paragraphs (2)(a), (b), and (c) above.

(5) The Real-Time Off-Line Reserve Capacity for the QSE (RTOFFCAP) shall be administratively set to zero when the SCED snapshot of the Physical Responsive Capability (PRC) is less than or equal to the PRC MW at which EEA Level 1 is initiated.

(6) Resources that have a Under Generation Volume (UGEN) greater than zero, and are not-exempt from a Base Point Deviation Charge, as set forth in Section 6.6.5, Base Point Deviation Charge, or are not already excluded in paragraphs (3) or (4) above, for the 15-minute Settlement Interval will have the UGEN amounts removed from the amounts calculated pursuant to paragraphs (2)(a) and (b) above.

[NPRR987: Replace paragraph (6) above with the following upon system implementation:]

(6) Resources that have an Under Generation Volume (UGEN) or an Under Performance Volume (UPESR) greater than zero, and are not exempt from a Base Point Deviation Charge, as set forth in Section 6.6.5, Base Point Deviation Charge, or are not already excluded in paragraphs (3) or (4) above, for the 15-minute Settlement Interval will have the UGEN or UPESR amounts removed from the amounts calculated pursuant to paragraphs (2)(a) and (b) above.

(7) The payment or charge to each QSE for the Ancillary Service imbalance for a given 15-minute Settlement Interval is calculated as follows:

$$\mathbf{RTASIAMT}_{q} = \mathbf{(-1) * [(RTASOLIMB}_{q}\mathbf{ * RTRSVPOR) + (RTASOFFIMB}_{q}\mathbf{ * RTRSVPOFF)]}$$

$RTRDASIAMT_q$ = (-1) * ($RTASOLIMB_q$ * RTRDP)

Where:

$RTASOLIMB_q$ = $RTOLCAP_q$ – [((SYS_GEN_DISCFACTOR * $RTASRESP_q$) * ¼) – $RTASOFF_q$ – $RTRUCNBBRESP_q$ – $RTCLRNSRESP_q$ – $RTRMRRESP_q$]

Where:

$RTASOFF_q$ = SYS_GEN_DISCFACTOR * $\sum_r \sum_p RTASOFFR_{q,r,p}$

$RTRUCNBBRESP_q$ = SYS_GEN_DISCFACTOR * $\sum_r RTRUCASA_{q,r}$ * ¼

$RTCLRNSRESP_q$ = SYS_GEN_DISCFACTOR * $\sum_r \sum_p RTCLRNSRESPR_{q,r,p}$

$RTRMRRESP_q$ = SYS_GEN_DISCFACTOR * $\sum_q \sum_r \sum_p$ (HRRADJ $_{q,r,p}$ + HRUADJ $_{q,r,p}$ + HNSADJ $_{q,r,p}$) * ¼

[NPRR863: Replace the formula "$RTRMRRESP_q$" above with the following upon system implementation:]

$RTRMRRESP_q$ = SYS_GEN_DISCFACTOR * $\sum_q \sum_r \sum_p$ (HRRADJ $_{q,r,p}$ + HECRADJ $_{q,r,p}$ + HRUADJ $_{q,r,p}$ + HNSADJ $_{q,r,p}$) * ¼

$RTOLCAP_q$ = (RTOLHSL $_q$ – RTMGQ $_q$ – SYS_GEN_DISCFACTOR * ($\sum_r \sum_p UGENA_{q,r,p}$)) + $RTCLRCAP_q$ + $RTNCLRCAP_q$

[NPRR987: Replace the formula "$RTOLCAP_q$" above with the following upon system implementation:]

$RTOLCAP_q$ = (RTOLHSL $_q$ – RTMGQ $_q$ – SYS_GEN_DISCFACTOR * ($\sum_r \sum_p$ (UGENA $_{q,r,p}$ + UPESRA $_{q,r,p}$))) + $RTCLRCAP_q$ + $RTNCLRCAP_q$ + $RTESRCAP_q$

Where:

$RTNCLRCAP_q$ = Min(Max($RTNCLRNPC_q$ – $RTNCLRLPC_q$, 0.0), $RTNCLRRRS_q$ * 1.5)

[NPRR863: Replace the formula "RTNCLRCAP$_q$" above with the following upon system implementation:]

$$RTNCLRCAP_q = \text{Min}(\text{Max}(RTNCLRNPC_q - RTNCLRLPC_q, 0.0), (RTNCLRECRS_q + RTNCLRRRS_q) * 1.5)$$

$$RTNCLRRRS_q = SYS\_GEN\_DISCFACTOR * \sum_r \sum_p RTNCLRRRSR_{q,r,p}$$

[NPRR863: Insert the formula "RTNCLRECRS$_q$" below upon system implementation:]

$$RTNCLRECRS_q = SYS\_GEN\_DISCFACTOR * \sum_r \sum_p RTNCLRECRSR_{q,r,p}$$

$$RTNCLRNPC_q = SYS\_GEN\_DISCFACTOR * \sum_r \sum_p RTNCLRNPCR_{q,r,p}$$

$$RTNCLRLPC_q = SYS\_GEN\_DISCFACTOR * \sum_r \sum_p RTNCLRLPCR_{q,r,p}$$

$$RTOLHSL_q = SYS\_GEN\_DISCFACTOR * \sum_r \sum_p RTOLHSLRA_{q,r,p}$$

$$RTMGQ_q = SYS\_GEN\_DISCFACTOR * \sum_r \sum_p RTMGA_{q,r,p}$$

If $RTMGA_{q,r,p} > RTOLHSLRA_{q,r,p}$

Then $RTMGA_{q,r,p} = RTOLHSLRA_{q,r,p}$

[NPRR987: Insert the language below upon system implementation:]

Where for a Controllable Load Resource other than a modeled Controllable Load Resource associated with an Energy Storage Resource (ESR):

$$RTCLRCAP_q = RTCLRNPC_q - RTCLRLPC_q - RTCLRNS_q + RTCLRREG_q$$

$$RTCLRNPC_q = SYS\_GEN\_DISCFACTOR * \sum_r \sum_p RTCLRNPCR_{q,r,p}$$

$$RTCLRLPC_q = SYS\_GEN\_DISCFACTOR * \sum_r \sum_p RTCLRLPCR_{q,r,p}$$

$$RTCLRNS_q = SYS\_GEN\_DISCFACTOR * \sum_r \sum_p RTCLRNSR_{q,r,p}$$

$$RTCLRREG_q = SYS\_GEN\_DISCFACTOR * \sum_r \sum_p RTCLRREGR_{q,r,p}$$

Where:

$$RTRSVPOR = \sum_y (RNWF_y * RTORPA_y)$$

$$RTASOFFIMB_q = RTOFFCAP_q - (RTASOFF_q + RTCLRNSRESP_q)$$

$$RTOFFCAP_q = (SYS\_GEN\_DISCFACTOR * RTCST30HSL_q) + (SYS\_GEN\_DISCFACTOR * RTOFFNSHSL_q) + RTCLRNS_q$$

$$RTRSVPOFF = \sum_y (RNWF_y * RTOFFPA_y)$$

$$RTRDP = \sum_y (RNWF_y * RTORDPA_y)$$

$$RNWF_y = TLMP_y / \sum_y TLMP_y$$

[NPRR987: Insert the language below upon system implementation:]

Where for an ESR:

$$RTESRCAP_q = \sum_g (RTESRCAPR_{q,g,p})$$

Where:

$$RTESRCAPR_{q,g,p} = \text{Min}[(RTOLHSLRA_{q,r,p} - RTMGA_{q,r,p} + RTCLRNPCR_{q,r,p}), (RTCLRNPCR_{q,r,p} + SOCT_{q,r} - SOCOM_{q,r})]$$

The above variables are defined as follows:

Variable	Unit	Description
$RTASIAMT_q$	$	*Real-Time Ancillary Service Imbalance Amount*—The total payment or charge to QSE *q* for the Real-Time Ancillary Service imbalance associated with Operating Reserve Demand Curve (ORDC) for each 15-minute Settlement Interval.
$RTRDASIAMT_q$	$	*Real-Time Reliability Deployment Ancillary Service Imbalance Amount*—The total payment or charge to QSE *q* for the Real-Time Ancillary Service imbalance associated with Reliability Deployments for each 15-minute Settlement Interval.

Variable	Unit	Description
$RTASOLIMB_q$	MWh	*Real-Time Ancillary Service On-Line Reserve Imbalance for the QSE* —The Real-Time Ancillary Service On-Line reserve imbalance for the QSE *q*, for each 15-minute Settlement Interval.
$RTORPA_y$	$/MWh	*Real-Time On-Line Reserve Price Adder per interval*—The Real-Time Price Adder for On-Line Reserves for the SCED interval *y*.
$RTOFFPA_y$	$/MWh	*Real-Time Off-Line Reserve Price Adder per interval*—The Real-Time Price Adder for Off-Line Reserves for the SCED interval *y*.
$TLMP_y$	second	*Duration of SCED interval per interval*—The duration of the SCED interval *y*.
RTRDP	$/MWh	*Real-Time On-Line Reliability Deployment Price*—The Real-Time price for the 15-minute Settlement Interval, reflecting the impact of reliability deployments on energy prices that is calculated from the Real-Time On-Line Reliability Deployment Price Adder.
$RTORDPA_y$	$/MWh	*Real-Time On-Line Reliability Deployment Price Adder*—The Real-Time Price Adder that captures the impact of reliability deployments on energy prices for the SCED interval *y*.
$RNWF_y$	none	*Resource Node Weighting Factor per interval*—The weight used in the Resource Node Settlement Point Price calculation for the portion of the SCED interval *y* within the 15-minute Settlement Interval.
RTRSVPOR	$/MWh	*Real-Time Reserve Price for On-Line Reserves*—The Real-Time Reserve Price for On-Line Reserves for the 15-minute Settlement Interval.
RTRSVPOFF	$/MWh	*Real-Time Reserve Price for Off-Line Reserves*—The Real-Time Reserve Price for Off-Line Reserves for the 15-minute Settlement Interval.
$RTOLCAP_q$	MWh	*Real-Time On-Line Reserve Capacity for the QSE*—The Real-Time reserve capacity of On-Line Resources available for the QSE *q*, for the 15-minute Settlement Interval.
$RTOLHSLRA_{q,r,p}$	MWh	*Real-Time Adjusted On-Line High Sustained Limit for the Resource*—The Real-Time telemetered HSL for the Resource *r* represented by QSE *q* at Resource Node *p* that is available to SCED, integrated over the 15-minute Settlement Interval, and adjusted pursuant to paragraphs (3) and (4) above.
$RTOLHSL_q$	MWh	*Real-Time On-Line High Sustained Limit for the QSE*—The Real-Time telemetered HSL for all Generation Resources available to SCED, pursuant to paragraphs (3) and (4) above, integrated over the 15-minute Settlement Interval for the QSE *q*, discounted by the system-wide discount factor. ***[NPRR987: Replace the description above with the following upon system implementation:]*** *Real-Time On-Line High Sustained Limit for the QSE*—The integrated Real-Time telemetered HSL for all Generation Resources, not including modeled Generation Resources associated with ESRs, available to SCED, pursuant to paragraphs (3) and (4) above, integrated over the 15-minute Settlement Interval for the QSE *q*, discounted by the system-wide discount factor.

Variable	Unit	Description
RTASRESP $_q$	MW	*Real-Time Ancillary Service Supply Responsibility for the QSE*—The Real-Time Ancillary Service Supply Responsibility for Reg-Up, RRS and Non-Spin pursuant to Section 4.4.7.4, Ancillary Service Supply Responsibility, for all Generation and Load Resources for the QSE *q*, for the 15-minute Settlement Interval. ***[NPRR863: Replace the description above with the following upon system implementation:]*** *Real-Time Ancillary Service Supply Responsibility for the QSE*—The Real-Time Ancillary Service Supply Responsibility for Reg-Up, ECRS, RRS and Non-Spin pursuant to Section 4.4.7.4, Ancillary Service Supply Responsibility, for all Generation and Load Resources for the QSE *q*, for the 15-minute Settlement Interval.
RTCLRCAP $_q$	MWh	*Real-Time Capacity from Controllable Load Resources for the QSE*—The Real-Time capacity and Reg-Up minus Non-Spin available from all Controllable Load Resources available to SCED for the QSE *q*, integrated over the 15-minute Settlement Interval. ***[NPRR987: Replace the description above with the following upon system implementation:]*** *Real-Time Capacity from Controllable Load Resources for the QSE*—The Real-Time capacity and Reg-Up minus Non-Spin available from all Controllable Load Resources, not including modeled Controllable Load Resources associated with ESRs available to SCED for the QSE *q*, integrated over the 15-minute Settlement Interval.
RTNCLRCAP $_q$	MWh	*Real-Time Capacity from Non-Controllable Load Resources carrying Responsive Reserve for the QSE*—The Real-Time capacity for all Load Resources other than Controllable Load Resources that have a validated Real-Time RRS Ancillary Service Schedule for the QSE *q*, integrated over the 15-minute Settlement Interval. ***[NPRR863: Replace the description above with the following upon system implementation:]*** *Real-Time Capacity from Non-Controllable Load Resources carrying ERCOT Contingency Reserve or Responsive Reserve for the QSE*—The Real-Time capacity for all Load Resources other than Controllable Load Resources that have a validated Real-Time ECRS or RRS Ancillary Service Schedule for the QSE *q*, integrated over the 15-minute Settlement Interval.
RTNCLRRRS $_q$	MWh	*Real-Time Non-Controllable Load Resources Responsive Reserve for the QSE*—The validated Real-Time telemetered RRS Ancillary Service Supply Responsibility for all Load Resources other than Controllable Load Resources for QSE *q* discounted by the system-wide discount factor, integrated over the 15-minute Settlement Interval.

Variable	Unit	Description
RTNCLRRRSR $_{q, r, p}$	MWh	*Real-Time Non-Controllable Load Resource Responsive Reserve*—The validated Real-Time telemetered RRS Ancillary Service Resource Responsibility for the Load Resource *r* (which is not a Controllable Load Resource) represented by QSE *q* at Resource Node *p*, integrated over the 15-minute Settlement Interval.

[NPRR863: Insert the variables "RTNCLRECRS $_q$" and "RTNCLRECRSR $_{q, r, p}$" below upon system implementation:]

RTNCLRECRS $_q$	MWh	*Real-Time Non-Controllable Load Resources ERCOT Contingency Reserve for the QSE*—The validated Real-Time telemetered ECRS Ancillary Service Supply Responsibility for all Load Resources other than Controllable Load Resources for QSE *q* discounted by the system-wide discount factor, integrated over the 15-minute Settlement Interval.
RTNCLRECRSR $_{q, r, p}$	MWh	*Real-Time Non-Controllable Load Resource ERCOT Contingency Reserve* —The validated Real-Time telemetered ECRS Ancillary Service Resource Responsibility for the Load Resource *r* (which is not a Controllable Load Resource) represented by QSE *q* at Resource Node *p*, integrated over the 15-minute Settlement Interval.
RTNCLRNPCR $_{q, r, p}$	MWh	*Real-Time Non-Controllable Load Resource Net Power Consumption*—The Real-Time net real power consumption from the Load Resource *r* (which is not a Controllable Load Resource) represented by QSE *q* at Resource Node *p* that has a validated Real-Time RRS Ancillary Service Schedule integrated over the 15-minute Settlement Interval.

[NPRR863: Replace the description above with the following upon system implementation:]

Real-Time Non-Controllable Load Resource Net Power Consumption—The Real-Time net real power consumption from the Load Resource *r* (which is not a Controllable Load Resource) represented by QSE *q* at Resource Node *p* that has a validated Real-Time ECRS or RRS Ancillary Service Schedule integrated over the 15-minute Settlement Interval.

Variable	Unit	Description
RTNCLRLPCR $_{q, r, p}$	MWh	*Real-Time Non-Controllable Load Resource Low Power Consumption*—The Real-Time Low Power Consumption (LPC) from the Load Resource *r* (which is not a Controllable Load Resource) represented by QSE *q* at Resource Node *p* that has a validated Real-Time RRS Ancillary Service Schedule integrated over the 15-minute Settlement Interval. ***[NPRR863: Replace the description above with the following upon system implementation:]*** *Real-Time Non-Controllable Load Resource Low Power Consumption*—The Real-Time Low Power Consumption (LPC) from the Load Resource *r* (which is not a Controllable Load Resource) represented by QSE *q* at Resource Node *p* that has a validated Real-Time ECRS or RRS Ancillary Service Schedule integrated over the 15-minute Settlement Interval
RTNCLRNPC $_{q}$	MWh	*Real-Time Non-Controllable Load Resource Net Power Consumption for the QSE*—The Real-Time net real power consumption from all Load Resources other than Controllable Load Resources for QSE *q* that have a validated Real-Time RRS Ancillary Service Schedule integrated over the 15-minute Settlement Interval discounted by the system-wide discount factor. ***[NPRR863: Replace the description above with the following upon system implementation:]*** *Real-Time Non-Controllable Load Resource Net Power Consumption for the QSE*—The Real-Time net real power consumption from all Load Resources other than Controllable Load Resources for QSE *q* that have a validated Real-Time ECRS or RRS Ancillary Service Schedule integrated over the 15-minute Settlement Interval discounted by the system-wide discount factor.
RTNCLRLPC $_{q}$	MWh	*Real-Time Non-Controllable Load Resource Low Power Consumption for the QSE*—The Real-Time LPC from all Load Resources other than Controllable Load Resources for QSE *q* that have a validated Real-Time RRS Ancillary Service Schedule integrated over the 15-minute Settlement Interval discounted by the system-wide discount factor. ***[NPRR863: Replace the description above with the following upon system implementation:]*** *Real-Time Non-Controllable Load Resource Low Power Consumption for the QSE*—The Real-Time LPC from all Load Resources other than Controllable Load Resources for QSE *q* that have a validated Real-Time ECRS or RRS Ancillary Service Schedule integrated over the 15-minute Settlement Interval discounted by the system-wide discount factor.

Variable	Unit	Description
RTCLRNPCR $_{q, r, p}$	MWh	*Real-Time Net Power Consumption from the Controllable Load Resource*—The Real-Time net real power consumption from the Controllable Load Resource *r* represented by QSE *q* at Resource Node *p* available to SCED integrated over the 15-minute Settlement Interval. ***[NPRR987: Replace the description above with the following upon system implementation:]*** *Real-Time Net Power Consumption from the Controllable Load Resource*—The Real-Time net real power consumption from the Controllable Load Resource or modeled Controllable Load Resource associated with an ESR, *r* represented by QSE *q* at Resource Node *p* available to SCED integrated over the 15-minute Settlement Interval.
RTCLRNPC $_{q}$	MWh	*Real-Time Net Power Consumption from Controllable Load Resources for the QSE*—The Real-Time net real power consumption from all Controllable Load Resources available to SCED integrated over the 15-minute Settlement Interval for the QSE *q* discounted by the system-wide discount factor. ***[NPRR987: Replace the description above with the following upon system implementation:]*** *Real-Time Net Power Consumption from Controllable Load Resources for the QSE*—The Real-Time net real power consumption from all Controllable Load Resources, not including modeled Controllable Load Resources associated with ESRs, available to SCED integrated over the 15-minute Settlement Interval for the QSE *q* discounted by the system-wide discount factor.
RTCLRLPCR $_{q, r, p}$	MWh	*Real-Time Low Power Consumption for the Controllable Load Resource*—The Real-Time LPC from the Controllable Load Resource *r* represented by QSE *q* at Resource Node *p* available to SCED integrated over the 15-minute Settlement Interval. ***[NPRR987: Replace the description above with the following upon system implementation:]*** *Real-Time Low Power Consumption for the Controllable Load Resource*—The Real-Time LPC from the Controllable Load Resource or modeled Controllable Load Resource associated with an ESR, *r* represented by QSE *q* at Resource Node *p* available to SCED integrated over the 15-minute Settlement Interval.

Variable	Unit	Description
RTCLRLPC $_q$	MWh	*Real-Time Low Power Consumption from Controllable Load Resources for the QSE*—The Real-Time LPC from Controllable Load Resources available to SCED integrated over the 15-minute Settlement Interval for the QSE *q* discounted by the system-wide discount factor. ***[NPRR987: Replace the description above with the following upon system implementation:]*** *Real-Time Low Power Consumption from Controllable Load Resources for the QSE*—The Real-Time LPC from Controllable Load Resources, not including modeled Controllable Load Resources associated with ESRs, available to SCED integrated over the 15-minute Settlement Interval for the QSE *q* discounted by the system-wide discount factor.
RTCLRREG $_q$	MWh	*Real-Time Controllable Load Resources Regulation-Up Schedule for the QSE*—The Real-Time Reg-Up Ancillary Service Schedule from all Controllable Load Resources with Primary Frequency Response for the QSE *q*, integrated over the 15-minute Settlement Interval discounted by the system-wide discount factor. ***[NPRR987: Replace the description above with the following upon system implementation:]*** *Real-Time Controllable Load Resources Regulation-Up Schedule for the QSE*—The Real-Time Reg-Up Ancillary Service Schedule from all Controllable Load Resources, not including modeled Controllable Load Resources associated with ESRs, with Primary Frequency Response for the QSE *q*, integrated over the 15-minute Settlement Interval discounted by the system-wide discount factor.
RTCLRREGR $_{q, r, p}$	MWh	*Real-Time Controllable Load Resource Regulation-Up Schedule for the Resource*—The validated Real-Time Reg-Up Ancillary Service Schedule for the Controllable Load Resource *r* represented by QSE *q* at Resource Node *p* with Primary Frequency Response, integrated over the 15-minute Settlement Interval. ***[NPRR987: Replace the description above with the following upon system implementation:]*** *Real-Time Controllable Load Resource Regulation-Up Schedule for the Resource*—The validated Real-Time Reg-Up Ancillary Service Schedule for the Controllable Load Resource or modeled Controllable Load Resource associated with an ESR, *r* represented by QSE *q* at Resource Node *p* with Primary Frequency Response, integrated over the 15-minute Settlement Interval.

Variable	Unit	Description
RTMGA $_{q, r, p}$	MWh	*Real-Time Adjusted Metered Generation per QSE per Settlement Point per Resource*—The adjusted metered generation, pursuant to paragraphs (3) and (4) above, of Generation Resource *r* represented by QSE *q* at Resource Node *p* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTMGQ $_{q}$	MWh	*Real-Time Metered Generation per QSE*—The metered generation, discounted by the system-wide discount factor, of all generation Resources represented by QSE *q* in Real-Time for the 15-minute Settlement Interval, pursuant to paragraphs (3) and (4) above. ***[NPRR987: Replace the description above with the following upon system implementation:]*** *Real-Time Metered Generation per QSE*—The metered generation, discounted by the system-wide discount factor, of all Generation Resources, not including modeled Generation Resources associated with ESRs, represented by QSE *q* in Real-Time for the 15-minute Settlement Interval, pursuant to paragraphs (3) and (4) above.

[NPRR987: Insert the variables "RTESRCAPR $_{q, g, p}$", "RTESRCAP $_{q}$", "SOCT $_{q, r}$", and "SOCOM $_{q, r}$" below upon system implementation:]

RTESRCAPR $_{q, g, p}$	MWh	*Real-Time Capacity from an Energy Storage Resource* – Capacity provided by an ESR *g*, represented by QSE *q* at Resource Node *p*, which considers energy limitations of the ESR and potentially higher contribution when charging for the15-minute Settlement Interval.
RTESRCAP $_{q}$	MWh	*Real-Time Capacity from Energy Storage Resources per QSE* – Capacity provided by all ESRs, represented by QSE *q*, for the 15-minute Settlement Interval.
SOCT $_{q, r}$	MWh	*State of Charge Telemetered by an Energy Storage Resource* – The average telemetered state of charge of Resource *r*, represented by QSE *q*, over the 15-minute Settlement Interval.
SOCOM $_{q, r}$	MWh	*State of Charge Operating Minimum for an Energy Storage Resource* –The average telemetered state of charge operating minimum of Resource *r*, represented by QSE *q*, over the 15-minute Settlement Interval.

RTASOFFIMB $_{q}$	MWh	*Real-Time Ancillary Service Off-Line Reserve Imbalance for the QSE*—The Real-Time Ancillary Service Off-Line reserve imbalance for the QSE *q*, for each 15-minute Settlement Interval.

Variable	Unit	Description
RTOFFCAP $_q$	MWh	*Real-Time Off-Line Reserve Capacity for the QSE*—The Real-Time reserve capacity of Off-Line Resources available for the QSE q, for the 15-minute Settlement Interval. ***[NPRR1069: Replace the description above with the following upon system implementation of NPRR987:]*** *Real-Time Off-Line Reserve Capacity for the QSE*—The Real-Time reserve capacity of Off-Line Resources, not including modeled Generation Resources associated with ESRs, available for the QSE q, for the 15-minute Settlement Interval.
RTCST30HSL $_q$	MWh	*Real-Time Generation Resources with Cold Start Available in 30 Minutes*—The Real-Time telemetered HSLs of Generation Resources, excluding Intermittent Renewable Resources (IRRs), that have telemetered an OFF Resource Status and can be started from a cold temperature state in 30 minutes for the QSE q, time-weighted over the 15-minute Settlement Interval. ***[NPRR1069: Replace the description above with the following upon system implementation of NPRR987:]*** *Real-Time Generation Resources with Cold Start Available in 30 Minutes*—The Real-Time telemetered HSLs of Generation Resources, excluding Intermittent Renewable Resources (IRRs) and modeled Generation Resources associated with ESRs, that have telemetered an OFF Resource Status and can be started from a cold temperature state in 30 minutes for the QSE q, time-weighted over the 15-minute Settlement Interval.
RTOFFNSHSL $_q$	MWh	*Real-Time Generation Resources with Off-Line Non-Spin Schedule*—The Real-Time telemetered HSLs of Generation Resources that have telemetered an OFFNS Resource Status for the QSE q, time-weighted over the 15-minute Settlement Interval. ***[NPRR1069: Replace the description above with the following upon system implementation of NPRR987:]*** *Real-Time Generation Resources with Off-Line Non-Spin Schedule*—The Real-Time telemetered HSLs of Generation Resources, not including modeled Generation Resources associated with ESRs, that have telemetered an OFFNS Resource Status for the QSE q, time-weighted over the 15-minute Settlement Interval.

Variable	Unit	Description
RTASOFFR $_{q, r, p}$	MWh	*Real-Time Ancillary Service Schedule for the Off-Line Generation Resource*—The validated Real-Time telemetered Ancillary Service Schedule for the Off-Line Generation Resource *r* represented by QSE *q* at Resource Node *p*, integrated over the 15-minute Settlement Interval.
RTASOFF $_{q}$	MWh	*Real-Time Ancillary Service Schedule for Off-Line Generation Resources for the QSE*—The Real-Time telemetered Ancillary Service Schedule for all Off-Line Generation Resources discounted by the system-wide discount factor for the QSE *q*, integrated over the 15-minute Settlement Interval. ***[NPRR1069: Replace the description above with the following upon system implementation of NPRR987:]*** *Real-Time Ancillary Service Schedule for Off-Line Generation Resources for the QSE*—The Real-Time telemetered Ancillary Service Schedule for all Off-Line Generation Resources, not including modeled Generation Resources associated with ESRs, discounted by the system-wide discount factor for the QSE *q*, integrated over the 15-minute Settlement Interval.
HRRADJ $_{q, r, p}$	MW	*Ancillary Service Resource Responsibility Capacity for Responsive Reserve at Adjustment Period*—The RRS Ancillary Service Resource Responsibility for the Resource *r* represented by QSE *q* at Resource Node *p* as seen in the last Current Operating Plan (COP) and Trades Snapshot at the end of the Adjustment Period, for the hour that includes the 15-minute Settlement Interval.

[NPRR863: Insert the variable "HECRADJ $_{q, r, p}$" below upon system implementation:]

HECRADJ $_{q, r, p}$	MW	*Ancillary Service Resource Responsibility Capacity for ERCOT Contingency Reserve Service at Adjustment Period*—The ECRS Ancillary Service Resource Responsibility for the Resource *r* represented by QSE *q* at Resource Node *p* as seen in the last Current Operating Plan (COP) and Trades Snapshot at the end of the Adjustment Period, for the hour that includes the 15-minute Settlement Interval.

HRUADJ $_{q, r, p}$	MW	*Ancillary Service Resource Responsibility Capacity for Reg-Up at Adjustment Period*—The Regulation Up Ancillary Service Resource Responsibility for the Resource *r* represented by QSE *q* at Resource Node *p* as seen in the last COP and Trades Snapshot at the end of the Adjustment Period, for the hour that includes the 15-minute Settlement Interval.
HNSADJ $_{q, r, p}$	MW	*Ancillary Service Resource Responsibility Capacity for Non-Spin at Adjustment Period*—The Non-Spin Ancillary Service Resource Responsibility for the Resource *r* represented by QSE *q* at Resource Node *p* as seen in the last COP and Trades Snapshot at the end of the Adjustment Period, for the hour that includes the 15-minute Settlement Interval.

Variable	Unit	Description
RTRUCNBBRESP $_q$	MWh	*Real-Time RUC Ancillary Service Supply Responsibility for the QSE in Non-Buy-Back hours*—The Real-Time Ancillary Service Supply Responsibility for Reg-Up, RRS and Non-Spin pursuant to the Ancillary Service awards, for the 15-minute Settlement Interval that falls within a RUC-Committed Hour, discounted by the system-wide discount factor for the QSE *q*. ***[NPRR863: Replace the description above with the following upon system implementation:]*** *Real-Time RUC Ancillary Service Supply Responsibility for the QSE in Non-Buy-Back hours*—The Real-Time Ancillary Service Supply Responsibility for Reg-Up, ECRS, RRS, and Non-Spin pursuant to the Ancillary Service awards, for the 15-minute Settlement Interval that falls within a RUC-Committed Hour, discounted by the system-wide discount factor for the QSE *q*.
RTRUCASA $_{q, r}$	MW	*Real-Time RUC Ancillary Service Awards*—The Real-Time Ancillary Service award to the RUC Resource *r* for Reg-Up, RRS, and Non-Spin for the hour that includes the 15-minute Settlement Interval that falls within a RUC-Committed Hour for the QSE *q*. ***[NPRR863: Replace the description above with the following upon system implementation:]*** *Real-Time RUC Ancillary Service Awards*—The Real-Time Ancillary Service award to the RUC Resource *r* for Reg-Up, ECRS, RRS, and Non-Spin for the hour that includes the 15-minute Settlement Interval that falls within a RUC-Committed Hour for the QSE *q*.
RTCLRNSRESP $_q$	MWh	*Real-Time Controllable Load Resource Non-Spin Responsibility for the QSE*—The Real Time telemetered Non-Spin Ancillary Service Supply Responsibility for all Controllable Load Resources available to SCED discounted by the system-wide discount factor for the QSE *q*, integrated over the 15-minute Settlement Interval. ***[NPRR1069: Replace the description above with the following upon system implementation of NPRR987:]*** *Real-Time Controllable Load Resource Non-Spin Responsibility for the QSE*—The Real Time telemetered Non-Spin Ancillary Service Supply Responsibility for all Controllable Load Resources, not including modeled Controllable Load Resources associated with ESRs, available to SCED discounted by the system-wide discount factor for the QSE *q*, integrated over the 15-minute Settlement Interval.

Variable	Unit	Description
RTCLRNSRESPR $_{q, r, p}$	MWh	*Real-Time Controllable Load Resource Non-Spin Responsibility for the Resource*—The Real-Time telemetered Non-Spin Ancillary Service Resource Responsibility for the Controllable Load Resource *r* represented by QSE *q* at Resource Node *p* available to SCED, integrated over the 15-minute Settlement Interval. ***[NPRR1069: Replace the description above with the following upon system implementation of NPRR987:]*** *Real-Time Controllable Load Resource Non-Spin Responsibility for the Resource*—The Real-Time telemetered Non-Spin Ancillary Service Resource Responsibility for the Controllable Load Resource *r* or modeled Controllable Load Resource associated with an ESR represented by QSE *q* at Resource Node *p* available to SCED, integrated over the 15-minute Settlement Interval.
RTRMRRESP $_{q}$	MWh	*Real-Time Ancillary Service Supply Responsibility for RMR Units represented by the QSE*—The Real-Time Ancillary Service Supply Responsibility as set forth in the end of the Adjustment Period COP for Reg-Up, RRS, and Non-Spin for all RMR Units discounted by the system-wide discount factor for the QSE *q*, integrated over the 15-minute Settlement Interval. ***[NPRR863: Replace the description above with the following upon system implementation:]*** *Real-Time Ancillary Service Supply Responsibility for RMR Units represented by the QSE*—The Real-Time Ancillary Service Supply Responsibility as set forth in the end of the Adjustment Period COP for Reg-Up, ECRS, RRS, and Non-Spin for all RMR Units discounted by the system-wide discount factor for the QSE *q*, integrated over the 15-minute Settlement Interval.
RTCLRNSR $_{q, r, p}$	MWh	*Real-Time Non-Spin Schedule for the Controllable Load Resource* —The validated Real-Time telemetered Non-Spin Ancillary Service Schedule for the Controllable Load Resource *r* represented by QSE *q* at Resource Node *p*, integrated over the 15-minute Settlement Interval. ***[NPRR987: Replace the description above with the following upon system implementation:]*** *Real-Time Non-Spin Schedule for the Controllable Load Resource* —The validated Real-Time telemetered Non-Spin Ancillary Service Schedule for the Controllable Load Resource or modeled Controllable Load Resource associated with an ESR, *r* represented by QSE *q* at Resource Node *p*, integrated over the 15-minute Settlement Interval.

Variable	Unit	Description
RTCLRNS $_q$	MWh	*Real-Time Non-Spin Schedule for Controllable Load Resources for the QSE*—The Real-Time telemetered Non-Spin Ancillary Service Schedule for all Controllable Load Resources for the QSE *q*, integrated over the 15-minute Settlement Interval discounted by the system-wide discount factor. ***[NPRR987: Replace the description above with the following upon system implementation:]*** *Real-Time Non-Spin Schedule for Controllable Load Resources for the QSE*—The Real-Time telemetered Non-Spin Ancillary Service Schedule for all Controllable Load Resources, not including modeled Controllable Load Resources associated with ESRs, for the QSE *q*, integrated over the 15-minute Settlement Interval discounted by the system-wide discount factor.
SYS_GEN_DISCFACTOR	none	*System-Wide Discount Factor* – The system-wide discount factor used to discount inputs used in the calculation of Real-Time Ancillary Services Imbalance payment or charge is calculated as the average of the currently approved Reserve Discount Factors (RDFs) applied to the temperatures from the current Season from the year prior.
UGEN $_{q, r, p}$	MWh	*Under Generation Volumes per QSE per Settlement Point per Resource*—The amount under-generated by the Generation Resource *r* represented by QSE *q* at Resource Node *p* for the 15-minute Settlement Interval.
UGENA $_{q, r, p}$	MWh	*Adjusted Under Generation Volumes per QSE per Settlement Point per Resource*—The amount under-generated by the Generation Resource *r* represented by QSE *q* at Resource Node *p* for the 15-minute Settlement Interval adjusted pursuant to paragraph (6) above.
[NPRR987: Insert the variables "UPESR $_{q, r, p}$" and "UPESRA $_{q, r, p}$" below upon system implementation:]		
UPESR $_{q, r, p}$	MWh	*Under-Performance Volumes per QSE per Settlement Point per Resource*—The amount the ESR under-performed divided evenly among the modeled Generation and Controllable Load Resources *r* in the ESR, represented by QSE *q* at Resource Node *p*, for the 15-minute Settlement Interval.
UPESRA $_{q, r, p}$	MWh	*Adjusted Under-Performance Volumes per QSE per Settlement Point per Resource* — The amount the ESR under-performed divided evenly among the modeled Generation and Controllable Load Resources *r* in the ESR, represented by QSE *q* at Resource Node *p*, for the 15-minute Settlement Interval adjusted pursuant to paragraph (6) above.
r	none	A Generation or Load Resource.
y	none	A SCED interval in the 15-minute Settlement Interval. The summation is over the total number of SCED runs that cover the 15-minute Settlement Interval.
q	none	A QSE.

Variable	Unit	Description
p	none	A Resource Node Settlement Point.
[NPRR987: Insert the variable "g" below upon system implementation:]		
g	none	An ESR.

(8) The payment to each QSE for the Ancillary Service reserves associated with RUC Resources that have received a RUC Dispatch to provide Ancillary Services in which the 15-minute Settlement Interval is part of a RUC Buy-Back Hour based on the RUC opt out provision set forth in paragraph (12) of Section 5.5.2 for a given 15-minute Settlement Interval is calculated as follows:

$$\mathbf{RTRUCRSVAMT}_q = \mathbf{(-1) * (RTRUCRESP}_q \mathbf{* RTRSVPOR)}$$

$$\mathbf{RTRDRUCRSVAMT}_q = \mathbf{(-1) * (RTRUCRESP}_q \mathbf{* RTRDP)}$$

Where:

$$\text{RTRUCRESP}_q = \sum_r \text{RTRUCASA}_{q,r} * ¼$$

The above variables are defined as follows:

Variable	Unit	Description
RTRUCRSVAMT_q	$	*Real-Time RUC Ancillary Service Reserve Amount*—The total payment |to QSE *q* for the Real-Time RUC Ancillary Service Reserve payment associated with ORDC for each 15-minute Settlement Interval.
RTRDRUCRSVAMT_q	$	*Real-Time Reliability Deployment RUC Ancillary Service Reserve Amount*—The total payment |to QSE *q* for the Real-Time RUC Ancillary Service Reserve payment associated with reliability deployments for each 15-minute Settlement Interval.
RTRUCRESP_q	MWh	*Real-Time RUC Ancillary Service Supply Responsibility for the QSE*—The Real-Time Ancillary Service Supply Responsibility pursuant to the Ancillary Service awards for Reg-Up, RRS, and Non-Spin for all RUC Resources that have opted out per paragraph (12) of Section 5.5.2 for the QSE *q*, for the 15-minute Settlement Interval. ***[NPRR863: Replace the description above with the following upon system implementation:]*** *Real-Time RUC Ancillary Service Supply Responsibility for the QSE*—The Real-Time Ancillary Service Supply Responsibility pursuant to the Ancillary Service awards for Reg-Up, ECRS, RRS, and Non-Spin for all RUC Resources that have opted out per paragraph (12) of Section 5.5.2 for the QSE *q*, for the 15-minute Settlement Interval.

Variable	Unit	Description
$RTRUCASA_{q,r}$	MW	*Real-Time RUC Ancillary Service Awards*—The Real-Time Ancillary Service award to the RUC Resource *r* for Reg-Up, RRS, and Non-Spin for the 15-minute Settlement Interval that falls within a RUC-Committed Hour for the QSE *q*. ***[NPRR863: Replace the description above with the following upon system implementation:]*** *Real-Time RUC Ancillary Service Awards*—The Real-Time Ancillary Service award to the RUC Resource *r* for Reg-Up, ECRS, RRS, and Non-Spin for the 15-minute Settlement Interval that falls within a RUC-Committed Hour for the QSE *q*.
RTRSVPOR	$/MWh	*Real-Time Reserve Price for On-Line Reserves*—The Real-Time Reserve Price for On-Line Reserves for the 15-minute Settlement Interval.
RTRDP	$/MWh	*Real-Time On-Line Reliability Deployment Price* —The Real-Time price for the 15-minute Settlement Interval, reflecting the impact of reliability deployments on energy prices that is calculated from the Real-Time On-Line Reliability Deployment Price Adder.
q	none	A QSE.
r	none	A Generation Resource.

[NPRR1010: Replace Section 6.7.5 above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]

6.7.5 Real-Time Ancillary Service Charges and Payments

[NPRR1010: Insert Section 6.7.5.1 below upon system implementation of the Real-Time Co-Optimization (RTC) project:]

6.7.5.1 Real-Time Ancillary Service Imbalance Payment or Charge

(1) The payments or charges to each QSE for Real-Time Ancillary Services are as follows:

(a) Ancillary Service Imbalance payment or charges based on Real-Time Ancillary Service prices with an imbalance quantity determined by:

(i) The Real-Time Ancillary Service awarded; minus

(ii) The amount of Day-Ahead Market (DAM) Ancillary Service awards cleared in the DAM; minus

(iii) The amount of DAM Self Arranged Ancillary Services; plus

(iv) The amount of Ancillary Service Trades where the QSE is the buyer; minus

(v) The amount of Ancillary Service Trades where the QSE is the seller.

(b) Charges for Ancillary Service Only Offers purchased in the DAM.

(c) Charges for any Ancillary Service trade overage per paragraph (7) of Section 4.4.7.1, Self-Arranged Ancillary Service Quantities.

[NPRR1010: Insert Section 6.7.5.2 below upon system implementation of the Real-Time Co-Optimization (RTC) project:]

6.7.5.2 Regulation Up Service Payments and Charges

(1) Reg-Up Imbalance Payment or Charge:

$$\mathbf{RTRUIMBAMT}_q = \mathbf{(-1)} * [\sum_r \mathbf{[RTRUREV}_{q,r} - \mathbf{(1/4)} * \mathbf{(PCRUR}_{r,q,DAM} * \mathbf{RTMCPCRU)}] - \mathbf{(1/4)} * \mathbf{(DASARUQ}_q * \mathbf{RTMCPCRU)} + \mathbf{(1/4)} * \mathbf{(RUTP}_q - \mathbf{RUTS}_q) * \mathbf{RTMCPCRU}]$$

Where:

$$\mathbf{RTRUREV}_{q,r} = \mathbf{(1/4)} * \mathbf{RTRUAWD}_{q,r} * \mathbf{RTMCPCRUR}_{q,r}$$

$$\mathbf{RTMCPCRUR}_{q,r} = \sum_y \mathbf{(RURWF}_{q,r,p,y} * \mathbf{(RTMCPCRUS}_y + \mathbf{RTRDPARUS}_y))$$

$$\mathbf{RTRUAWD}_{q,r} = \sum_y \mathbf{(RNWF}_y * \mathbf{RTRUAWDS}_{q,r,p,y})$$

Where:

$$RURWF_{q,r,p,y} = [\max(0.001, RTRUAWDS_{q,r,p,y}) * TLMP_y] / [\sum_y \max(0.001, RTRUAWDS_{q,r,p,y}) * TLMP_y]$$

And:

$$RNWF_y = TLMP_y / \sum_y TLMP_y$$

The above variables are defined as follows:

Variable	Unit	Description
RTRUIMBAMT $_q$	$	*Real-Time Reg-Up Imbalance Amount for the QSE*— The total payment or charge to QSE *q* for the Real-Time Reg-Up imbalance for each 15-minute Settlement Interval.
RTRUREV $_{q, r}$	$	*Real-Time Reg-Up Revenue*— The Real-Time Reg-Up revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRDPARUS $_y$	$/MW	*Real-Time Reliability Deployment Price Adder for Ancillary Service for Reg-Up per SCED interval* - The Real-Time price adder for Reg-Up that captures the impact of reliability deployments on Reg-Up prices for the SCED interval y.
RTRUAWD $_{q, r}$	MW	*Real-Time Reg-Up Award per Resource per QSE*— The Reg-Up amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRUAWDS $_{q, r, p, y}$	MW	*Real-Time Reg-Up Award per Resource per QSE per SCED interval* - The Reg-Up amount awarded to QSE *q* for Resource *r* in Real-Time for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTMCPCRUR $_{q, r}$	$/MW	*Real-Time Market Clearing Price for Capacity for Reg-Up per Resource per QSE*— The Real-Time MCPC for Reg-Up for Resource *r*, represented by QSE *q* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource r is the Combined Cycle Train.
RTMCPCRUS $_y$	$/MW	*Real-Time Market Clearing Price for Capacity for Reg-Up per SCED interval* - The Real-Time MCPC for Reg-Up for the SCED interval *y*.
PCRUR $_{r, q, DAM}$	MW	*Procured Capacity for Reg-Up per Resource per QSE in DAM*— The Reg-Up capacity awarded to QSE *q* in the DAM for Resource *r* for the Operating Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTMCPCRU	$/MW	*Real-Time Market Clearing Price for Capacity for Reg-Up* - The Real-Time MCPC for Reg-Up for the 15-minute Settlement Interval.
DASARUQ $_q$	MW	*Day-Ahead Self-Arranged Reg-Up Quantity per QSE*—The self-arranged Reg-Up quantity submitted by QSE *q* before 1000 in the DAM for the Operating Hour.
RUTP $_q$	MW	*Trade Purchases for Reg-Up for the QSE*— The final approved trade purchases for QSE *q* for Reg-Up for the Operating Hour.
RUTS $_q$	MW	*Trade Sales for Reg-Up for the QSE*— The final approved trade sales for QSE *q* for Reg-Up for the Operating Hour.
TLMP $_y$	second	*Duration of SCED interval per interval* - The duration of the SCED interval *y*.
RNWF $_y$	none	*Resource Node Weighting Factor per interval* - The weight used in the Ancillary Service award calculation for the portion of the SCED interval *y* within the Settlement Interval.

$RURWF_{q, r, p, y}$	none	*Reg-Up Resource Node Weighting Factor per interval* - The Reg-Up Resource weight, based on Reg-Up awards, used in the Real-Time MCPC calculation for the portion of the SCED interval *y* within the Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
r	none	A Resource.
q	none	A QSE.
y	none	A SCED interval in the 15-minute Settlement Interval.
p	none	A Resource Node Settlement Point.

(2) Reg-Up Only Charge:

$RTRUOAMT_q$ = (1/4) * $DARUOAWD_q$ * RTMCPCRU

The above variables are defined as follows:

Variable	Unit	Description
$RTRUOAMT_q$	$	*Real-Time Reg-Up Only Amount for the QSE*— The total charge to QSE *q* in Real-Time for Reg-Up Only awards for each 15-minute Settlement Interval.
$DARUOAWD_q$	MW	*Day-Ahead Reg-Up Only Award for the QSE*— The Reg-Up only capacity awarded in the DAM to the QSE *q* for the Operating Hour.
RTMCPCRU	$/MW	*Real-Time Market Clearing Price for Capacity for Reg-Up* - The Real-Time MCPC for Reg-Up for the 15-minute Settlement Interval.
q	none	A QSE.

(3) Reg-Up Trade Overage Charges:

$RTRUTOAMT_q$ = (1/4) * $RTRUTO_q$ * RTMCPCRU

The above variables are defined as follows:

Variable	Unit	Description
$RTRUTOAMT_q$	$	*Real-Time Reg-Up Trade Overage Amount for the QSE*— The total charge to QSE *q* in Real-Time for Reg-Up trade overages for each 15-minute Settlement Interval.
$RTRUTO_q$	MW	*Real-Time Reg-Up Trade Overage for the QSE* — The quantity of submitted Reg-Up trades in excess of DAM self-arrangement quantities for the QSE *q* for the Operating Hour.
RTMCPCRU	$/MW	*Real-Time Market Clearing Price for Capacity for Reg-Up* - The Real-Time MCPC for Reg-Up for the 15-minute Settlement Interval.
q	none	A QSE.

[NPRR1010: Insert Section 6.7.5.3 below upon system implementation of the Real-Time Co-Optimization (RTC) project:]

6.7.5.3 Regulation Down Service Payments and Charges

(1) Reg-Down Imbalance Payment or Charge:

$$\mathbf{RTRDIMBAMT}_{q} = \mathbf{(-1) * [} \sum_{r} \mathbf{[RTRDREV}_{q,r} \mathbf{- (1/4) * (PCRDR}_{r,q,DAM} \mathbf{* RTMCPCRD)] - (1/4) * (DASARDQ}_{q} \mathbf{* RTMCPCRD) + (1/4) * (RDTP}_{q} \mathbf{- RDTS}_{q}\mathbf{) * RTMCPCRD]}$$

Where:

$$\mathbf{RTRDREV}_{q,r} = \mathbf{(1/4) * RTRDAWD}_{q,r} \mathbf{* RTMCPCRDR}_{q,r}$$

$$\mathbf{RTMCPCRDR}_{q,r} = \sum_{y} \mathbf{(RDRWF}_{q,r,p,y} \mathbf{* (RTMCPCRDS}_{y} \mathbf{+ RTRDPARDS}_{y}\mathbf{))}$$

$$\mathbf{RTRDAWD}_{q,r} = \sum_{y} \mathbf{(RNWF}_{y} \mathbf{* RTRDAWDS}_{q,r,p,y}\mathbf{)}$$

Where:

$$\text{RDRWF}_{q,r,p,y} = [\max(0.001, \text{RTRDAWDS}_{q,r,p,y}) * \text{TLMP}_{y}] / [\sum_{y} \max(0.001, \text{RTRDAWDS}_{q,r,p,y}) * \text{TLMP}_{y}]$$

And:

$$\text{RNWF}_{y} = \text{TLMP}_{y} / \sum_{y} \text{TLMP}_{y}$$

The above variables are defined as follows:

Variable	Unit	Description
RTRDIMBAMT_{q}	$	*Real-Time Reg-Down Imbalance Amount for the QSE*— The total payment or charge to QSE *q* for the Real-Time Reg-Down imbalance for each 15-minute Settlement Interval.
$\text{RTRDAWD}_{q,r}$	MW	*Real-Time Reg-Down Award per Resource per QSE* - The Reg-Down amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$\text{RTRDREV}_{q,r}$	$	*Real-Time Reg-Down Revenue*— The Real-Time Reg-Down revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.

$RTRDAWDS_{q, r, p, y}$	MW	*Real-Time Reg-Down Award per Resource per QSE per SCED interval* - The Reg-Down Amount awarded to QSE *q* for Resource *r* in Real-Time for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$RTMCPCRDR_{q, r}$	$/MW	*Real-Time Market Clearing Price for Capacity for Reg-Down per Resource per QSE*— The Real-Time MCPC for Reg-Down for Resource *r*, represented by QSE *q* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTMCPCRDS_{y}$	$/MW	*Real-Time Market Clearing Price for Capacity for Reg-Down per SCED interval* - The Real-Time MCPC for Reg-Down for the SCED interval *y*.
$PCRDR_{r, q, DAM}$	MW	*Procured Capacity for Reg-Down per Resource per QSE in DAM*—The Reg-Down capacity awarded to QSE *q* in the DAM for Resource *r* for the Operating Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTMCPCRD	$/MW	*Real-Time Market Clearing Price for Capacity for Reg-Down* - The Real-Time MCPC for Reg-Down for the 15-minute Settlement Interval.
$RTRDPARDS_{y}$	$/MW	*Real-Time Reliability Deployment Price Adder for Ancillary Service for Reg-Down per SCED interval* - The Real-Time price adder for Reg-Down that captures the impact of reliability deployments on Reg-Down prices for the SCED interval *y*.
$DASARDQ_{q}$	MW	*Day-Ahead Self-Arranged Reg-Down Quantity per QSE* —The self-arranged Reg-Down quantity submitted by QSE *q* before 1000 in the DAM for the Operating Hour.
$RDTP_{q}$	MW	*Trade Purchases for Reg-Down for the QSE*— The trade purchases for QSE *q* for Reg-Down for the Operating Hour.
$RDTS_{q}$	MW	*Trade Sales for Reg-Down for the QSE*— The trade sales for QSE *q* for Reg-Down for the Operating Hour.
$TLMP_{y}$	second	*Duration of SCED interval per interval* - The duration of the SCED interval *y*.
$RNWF_{y}$	none	*Resource Node Weighting Factor per interval* - The weight used in the Ancillary Service award calculation for the portion of the SCED interval y within the Settlement Interval.
$RDRWF_{q, r, p, y}$	none	*Regulation Down Resource Node Weighting Factor per interval* - The Reg-Down Resource weight, based on Reg-Down awards, used in the Real-Time MCPC calculation for the portion of the SCED interval y within the Settlement Interval. Where for a Combined Cycle Train, the Resource r is a Combined Cycle Generation Resource within the Combined Cycle Train.
r	none	A Resource.
q	none	A QSE.
y	none	A SCED interval in the 15-minute Settlement Interval.
p	none	A Resource Node Settlement Point.

(2) Reg-Down Only Charge:

RTRDOAMT $_q$ = (1/4) * DARDOAWD $_q$ * RTMCPCRD

The above variables are defined as follows:

Variable	Unit	Description
RTRDOAMT $_q$	$	*Real-Time Reg-Down Only Amount for the QSE*— The total charge to QSE *q* in Real-Time for Reg-Down only awards for each 15-minute Settlement Interval.
DARDOAWD $_q$	MW	*Day-Ahead Reg-Down Only Award for the QSE*— The Reg-Down only capacity awarded in the DAM to the QSE *q* for the Operating Hour.
RTMCPCRD	$/MW	*Real-Time Market Clearing Price for Capacity for Reg-Down* - The Real-Time MCPC for Reg-Down for the 15-minute Settlement Interval.
q	none	A QSE.

(3) Reg-Down Trade Overage Charge:

RTRDTOAMT $_q$ = (1/4) * RTRDTO $_q$ * RTMCPCRD

The above variables are defined as follows:

Variable	Unit	Description
RTRDTOAMT $_q$	$	*Real-Time Reg-Down Trade Overage Amount for the QSE*— The total charge to QSE *q* in Real-Time for Reg-Down trade overages for each 15-minute Settlement Interval.
RTRDTO $_q$	MW	*Real-Time Reg-Down Trade Overage for the QSE* — The quantity of submitted Reg-Down trades in excess of their DAM self-arrangement quantity for the QSE *q* for the Operating Hour.
RTMCPCRD	$/MW	*Real-Time Market Clearing Price for Capacity for Reg-Down* - The Real-Time MCPC for Reg-Down for the 15-minute Settlement Interval.
q	none	A QSE.

[NPRR1010: Insert Section 6.7.5.4 below upon system implementation of the Real-Time Co-Optimization (RTC) project:]

6.7.5.4 Responsive Reserve Payments and Charges

(1) RRS Imbalance Payment or Charge:

$$\mathbf{RTRRIMBAMT}_q = \mathbf{(-1)} * \left[\sum_r \mathbf{[RTRRREV}_{q,r} - \mathbf{(1/4)} * \mathbf{(PCRRR}_{r,q,DAM} * \mathbf{RTMCPCRR)]} - \mathbf{(1/4)} * \mathbf{(DASARRQ}_q * \mathbf{RTMCPCRR)} + \mathbf{(1/4)} * \mathbf{(RRTP}_q - \mathbf{RRTS}_q) * \mathbf{RTMCPCRR]}$$

Where:

$$\mathbf{RTRRREV}_{q,r} = \mathbf{(1/4) * RTRRAWD}_{q,r} \mathbf{* RTMCPCRRR}_{q,r}$$

$$\mathbf{RTMCPCRRR}_{q,r} = \sum_{y} \mathbf{(RRRWF}_{q,r,p,y} \mathbf{* (RTMCPCRRS}_{y} \mathbf{+ RTRDPARRS}_{y}\mathbf{))}$$

$$\mathbf{RTRRAWD}_{q,r} = \sum_{y} \mathbf{(RNWF}_{y} \mathbf{* RTRRAWDS}_{q,r,p,y}\mathbf{)}$$

Where:

$$RRRWF_{q,r,p,y} = [\max(0.001, RTRRAWDS_{q,r,p,y}) * TLMP_{y}] / [\sum_{y} \max(0.001, RTRRAWDS_{q,r,p,y}) * TLMP_{y}]$$

And:

$$RNWF_{y} = TLMP_{y} / \sum_{y} TLMP_{y}$$

The above variables are defined as follows:

Variable	Unit	Description
$RTRRIMBAMT_{q}$	$	*Real-Time Responsive Reserve Imbalance Amount for the QSE*— The total payment or charge to QSE *q* for the Real-Time RRS imbalance for each 15-minute Settlement Interval.
$RTRRAWD_{q,r}$	MW	*Real-Time Responsive Reserve Award per Resource per QSE*— The RRS amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTRRREV_{q,r}$	$	*Real-Time Responsive Reserve Revenue*— The Real-Time RRS revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTRDPARRS_{y}$	$/MW	*Real-Time Reliability Deployment Price Adder for Ancillary Service for Responsive Reserve per SCED interval* – The Real-Time price adder for RRS that captures the impact of reliability deployments on RRS prices for the SCED interval y.
$RTRRAWDS_{q,r,p,y}$	MW	*Real-Time Responsive Reserve Award per Resource per QSE per SCED interval* - The RRS amount awarded to QSE *q* for Resource *r* in Real-Time for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$RTMCPCRRR_{q,r}$	$/MW	*Real-Time Market Clearing Price for Capacity for Responsive Reserve per Resource per QSE*— The Real-Time MCPC for RRS for Resource *r*, represented by QSE *q* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTMCPCRRS_{y}$	$/MW	*Real-Time Market Clearing Price for Capacity for Responsive Reserve per SCED interval* - The Real-Time MCPC for RRS for the SCED interval *y*.

$PCRRR_{r, q, DAM}$	MW	*Procured Capacity for Responsive Reserve per Resource per QSE in DAM*—The RRS capacity awarded to QSE *q* in the DAM for Resource *r* for the Operating Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTMCPCRR	$/MW	*Real-Time Market Clearing Price for Capacity for Responsive Reserve* - The Real-Time MCPC for RRS for the 15-minute Settlement Interval.
$DASARRQ_q$	MW	*Day-Ahead Self-Arranged Responsive Reserve Quantity per QSE*—The self-arranged RRS quantity submitted by QSE *q* before 1000 in the DAM for the Operating Hour.
$RRTP_q$	MW	*Trade Purchases for Responsive Reserve for the QSE*— The trade purchases for QSE *q* for RRS for the Operating Hour.
$RRTS_q$	MW	*Trade Sales for Responsive Reserve for the QSE* — The trade sales for QSE *q* for RRS for the Operating Hour.
$TLMP_y$	second	*Duration of SCED interval per interval* - The duration of the SCED interval *y*.
$RNWF_y$	none	*Resource Node Weighting Factor per interval* - The weight used in the Ancillary Service award calculation for the portion of the SCED interval y within the Settlement Interval.
$RRRWF_{q, r, p, y}$	none	*Responsive Reserve Resource Node Weighting Factor per interval* - The RRS Resource weight, based on RRS awards, used in the Real-Time MCPC calculation for the portion of the SCED interval *y* within the Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
r	none	A Resource.
q	none	A QSE.
y	none	A SCED interval in the 15-minute Settlement Interval.
p	none	A Resource Node Settlement Point.

(2) RRS Only Charge:

$$\mathbf{RTRROAMT_q = (1/4) * DARROAWD_q * RTMCPCRR}$$

The above variables are defined as follows:

Variable	Unit	Description
$RTRROAMT_q$	$	*Real-Time Responsive Reserve Only Amount for the QSE*— The total charge to QSE *q* in Real-Time for RRS only awards for each 15-minute Settlement Interval.
$DARROAWD_q$	MW	*Day-Ahead Responsive Reserve Only Award for the QSE*— The RRS only capacity awarded in the DAM to the QSE *q* for the Operating Hour.
RTMCPCRR	$/MW	*Real-Time Market Clearing Price for Capacity for Responsive Reserve* - The Real-Time MCPC for RRS for the 15-minute Settlement Interval.
q	none	A QSE.

(3) RRS Trade Overage Charge:

$$\mathbf{RTRRTOAMT}_q = \mathbf{(1/4) * RTRRTO}_q \mathbf{* RTMCPCRR}$$

The above variables are defined as follows:

Variable	Unit	Description
$RTRRTOAMT_q$	$	*Real-Time Responsive Reserve Trade Overage Amount for the QSE*— The total charge to QSE *q* in Real-Time for RRS trade overages for each 15-minute Settlement Interval.
$RTRRTO_q$	MW	*Real-Time Responsive Reserve Trade Overage for the QSE* — The quantity of submitted RRS trades in excess of their DAM self-arrangement quantity for the QSE *q* for the Operating Hour.
RTMCPCRR	$/MW	*Real-Time Market Clearing Price for Capacity for Responsive Reserve* - The Real-Time MCPC for RRS for the 15-minute Settlement Interval.
q	none	A QSE.

[NPRR1010: Insert Section 6.7.5.5 below upon system implementation of the Real-Time Co-Optimization (RTC) project:]

6.7.5.5 Non-Spinning Reserve Service Payments and Charges

(1) Non-Spin Imbalance Payment or Charge:

$$\mathbf{RTNSIMBAMT}_q = \mathbf{(-1) * [} \sum_r \mathbf{[RTNSREV}_{q,r} \mathbf{- (1/4) * (PCNSR}_{r,q,DAM} \mathbf{* RTMCPCNS)] - (1/4) * (DASANSQ}_q \mathbf{* RTMCPCNS) + (1/4) * (NSTP}_q \mathbf{- NSTS}_q \mathbf{) * RTMCPCNS]}$$

Where:

$$\mathbf{RTNSREV}_{q,r} = \mathbf{(1/4) * RTNSAWD}_{q,r} \mathbf{* RTMCPCNSR}_{q,r}$$

$$\mathbf{RTMCPCNSR}_{q,r} = \sum_y \mathbf{(NSRWF}_{q,r,p,y} \mathbf{* (RTMCPCNSS}_y \mathbf{+ RTRDPANSS}_y \mathbf{))}$$

$$\mathbf{RTNSAWD}_{q,r} = \sum_y \mathbf{(RNWF}_y \mathbf{* RTNSAWDS}_{q,r,p,y}\mathbf{)}$$

Where:

$$NSRWF_{q,r,p,y} = [\max(0.001, RTNSAWDS_{q,r,p,y}) * TLMP_y] / [\sum_y \max(0.001, RTNSAWDS_{q,r,p,y}) * TLMP_y]$$

And:

$$RNWF_y = TLMP_y / \sum_y TLMP_y$$

The above variables are defined as follows:

Variable	Unit	Description
$RTNSIMBAMT_q$	$	*Real-Time Non-Spin Imbalance Amount for the QSE*— The total payment or charge to QSE *q* for the Real-Time Non-Spin imbalance for each 15-minute Settlement Interval.
$RTNSAWD_{q,r}$	MW	*Real Time Non-Spin Award per Resource per QSE* - The Non-Spin amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTNSREV_{q,r}$	$	*Real-Time Non-Spin Revenue*— The Real-Time Non-Spin revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTNSAWDS_{q,r,p,y}$	MW	*Real Time Non-Spin Award per Resource per QSE per SCED interval* - The Non-Spin Amount awarded to QSE *q* for Resource *r* in Real-Time for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$RTMCPCNSR_{q,r}$	$/MW	*Real-Time Market Clearing Price for Capacity for Non-Spin per Resource per QSE*— The Real-Time MCPC for Non-Spin for Resource *r*, represented by QSE *q* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTMCPCNSS_y$	$/MW	*Real-Time Market Clearing Price for Capacity for Non-Spin per SCED Interval* - The Real-Time MCPC for Non-Spin for the SCED interval *y*.
$PCNSR_{r,q,DAM}$	MW	*Procured Capacity for Non-Spin per Resource per QSE in DAM*— The Non-Spin capacity awarded to QSE *q* in the DAM for Resource *r* for the Operating Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTMCPCNS	$/MW	*Real-Time Market Clearing Price for Capacity for Non-Spin* - The Real-Time MCPC for Non-Spin for the 15-minute Settlement Interval.
$RTRDPANSS_y$	$/MW	*Real-Time Reliability Deployment Price Adder for Ancillary Service for Non-Spin per SCED interval* - The Real-Time price adder for Non-Spin that captures the impact of reliability deployments on Non-Spin prices for the SCED interval *y*.
$DASANSQ_q$	MW	*Day-Ahead Self-Arranged Non-Spin Quantity per QSE*—The self-arranged Non-Spin quantity submitted by QSE *q* before 1000 in the DAM for the Operating Hour.
$NSTP_q$	MW	*Trade Purchases for Non-Spin for the QSE*— The trade purchases for QSE *q* for Non-Spin for the Operating Hour.
$NSTS_q$	MW	*Trade Sales for Non-Spin for the QSE*— The trade sales for QSE *q* for Non-Spin for the Operating Hour.

$TLMP_y$	second	*Duration of SCED interval per interval* - The duration of the SCED interval *y*.
$RNWF_y$	none	*Resource Node Weighting Factor per interval* - The weight used in the Ancillary Service award calculation for the portion of the SCED interval y within the Settlement Interval.
$NSRWF_{q,r,p,y}$	none	*Non-Spin Resource Node Weighting Factor per interval* - The Non-Spin Resource weight, based on Non-Spin awards, used in the Real-Time MCPC calculation for the portion of the SCED interval *y* within the Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
r	none	A Resource.
q	none	A QSE.
y	none	A SCED interval in the 15-minute Settlement Interval.
p	none	A Resource Node Settlement Point.

(2) Non-Spin Only Charge:

$RTNSOAMT_q$ = (1/4) * $DANSOAWD_q$ * RTMCPCNS

The above variables are defined as follows:

Variable	Unit	Description
$RTNSOAMT_q$	$	*Real-Time Non-Spin Only Amount for the QSE*— The total charge to QSE *q* in Real-Time for Non-Spin only award for each 15-minute Settlement Interval.
$DANSOAWD_q$	MW	*Day-Ahead Non-Spin Only Award for the QSE*— The Non-Spin only capacity awarded in the DAM to the QSE *q* for the Operating Hour.
RTMCPCNS	$/MW	*Real-Time Market Clearing Price for Capacity for Non-Spin* - The Real-Time MCPC for Non-Spin for the 15-minute Settlement Interval.
q	none	A QSE.

(3) Non-Spin Trade Overage Charge:

$RTNSTOAMT_q$ = (1/4) * $RTNSTO_q$ * RTMCPCRNS

The above variables are defined as follows:

Variable	Unit	Description
$RTNSTOAMT_q$	$	*Real-Time Non-Spin Trade Overage Amount for the QSE*— The total charge to QSE *q* in Real-Time for Non-Spin trade overages for each 15-minute Settlement Interval.
$RTNSTO_q$	MW	*Real-Time Non-Spin Trade Overage for the QSE* — The quantity of submitted Non-Spin trades in excess of their DAM self-arrangement quantity for the QSE *q* for the Operating Hour.
RTMCPCNS	$/MW	*Real-Time Market Clearing Price for Capacity for Non-Spin* - The Real-Time MCPC for Non-Spin for the 15-minute Settlement Interval.

q	none	A QSE.

[NPRR1010: Insert Section 6.7.5.6 below upon system implementation of the Real-Time Co-Optimization (RTC) project:]

6.7.5.6 ERCOT Contingency Reserve Service Payments and Charges

(1) ECRS Imbalance Payment or Charge:

$$\mathbf{RTECRIMBAMT}_{q} = (-1) * [\sum_{r} [\mathbf{RTECRREV}_{q,r} - (1/4) * (\mathbf{PCECRR}_{r,q,DAM} * \mathbf{RTMCPCECR})] - (1/4) * (\mathbf{DASAECRQ}_{q} * \mathbf{RTMCPCECR}) + (1/4) * (\mathbf{ECRTP}_{q} - \mathbf{ECRTS}_{q}) * \mathbf{RTMCPCECR}]$$

Where:

$$\mathbf{RTECRREV}_{q,r} = (1/4) * \mathbf{RTECRAWD}_{q,r} * \mathbf{RTMCPCECRR}_{q,r}$$

$$\mathbf{RTMCPCECRR}_{q,r} = \sum_{y} (\mathbf{ECRRWF}_{q,r,p,y} * (\mathbf{RTMCPCECRS}_{y} + \mathbf{RTRDPAECRS}_{y}))$$

$$\mathbf{RTECRAWD}_{q,r} = \sum_{y} (\mathbf{RNWF}_{y} * \mathbf{RTECRAWDS}_{q,r,p,y})$$

Where:

$$\mathbf{ECRRWF}_{q,r,p,y} = [\max(0.001, \mathbf{RTECRAWDS}_{q,r,p,y}) * \mathbf{TLMP}_{y}] / [\sum_{y} \max(0.001, \mathbf{RTECRAWDS}_{q,r,p,y}) * \mathbf{TLMP}_{y}]$$

And:

$$\mathbf{RNWF}_{y} = \mathbf{TLMP}_{y} / \sum_{y} \mathbf{TLMP}_{y}$$

The above variables are defined as follows:

Variable	Unit	Description
$\mathbf{RTECRIMBAMT}_{q}$	$	*Real-Time ERCOT Contingency Reserve Service Imbalance Amount for the QSE*— The total payment or charge to QSE *q* for the Real-Time ECRS imbalance for each 15-minute Settlement Interval.
$\mathbf{RTECRAWD}_{q,r}$	MW	*Real-Time ERCOT Contingency Reserve Service Award per Resource per QSE*— The ECRS amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.

RTECRREV $_{q, r}$	$	*Real-Time ERCOT Contingency Reserve Service Revenue*— The Real-Time ECRS revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTECRAWDS $_{q, r, p, y}$	MW	*Real-Time ERCOT Contingency Reserve Service Award per Resource per QSE per SCED interval* - The ECRS amount awarded to QSE *q* for Resource *r* in Real-Time for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTMCPCECRR $_{q, r}$	$/MW	*Real-Time Market Clearing Price for Capacity for ERCOT Contingency Reserve Service per Resource per QSE* — The Real-Time MCPC for ECRS for Resource *r*, represented by QSE *q* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTMCPCECRS $_{y}$	$/MW	*Real-Time Market Clearing Price for Capacity for ERCOT Contingency Reserve Service per SCED Interval* — The Real-Time MCPC for ECRS for the SCED interval *y*.
PCECRR $_{r, q, DAM}$	MW	*Procured Capacity for ERCOT Contingency Reserve Service per Resource per QSE in DAM*—The ECRS capacity awarded to QSE *q* in the DAM for Resource *r* for the Operating Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTMCPCECR	$/MW	*Real-Time Market Clearing Price for Capacity for ERCOT Contingency Reserve Service* — The Real-Time MCPC for ECRS for the 15-minute Settlement Interval.
RTRDPAECRS $_{y}$	$/MW	*Real-Time Reliability Deployment Price Adder for Ancillary Service for ERCOT Contingency Reserve Service per SCED interval* - The Real-Time price adder for ECRS that captures the impact of reliability deployments on ECRS prices for the SCED interval *y*.
DASAECRQ $_{q}$	MW	*Day-Ahead Self-Arranged ERCOT Contingency Reserve Service Quantity per QSE*—The self-arranged ECRS quantity submitted by QSE *q* before 1000 in the DAM for the Operating Hour.
ECRTP $_{q}$	MW	*Trade Purchases for ERCOT Contingency Reserve Service for the QSE*— The trade purchases for QSE *q* for ECRS for the Operating Hour.
ECRTS $_{q}$	MW	*Trade Sales for ERCOT Contingency Reserve Service for the QSE*— The trade sales for QSE *q* for ECRS for the Operating Hour.
TLMP $_{y}$	second	*Duration of SCED interval per interval* - The duration of the SCED interval *y*.
RNWF $_{y}$	none	*Resource Node Weighting Factor per interval* - The weight used in the Ancillary Service award calculation for the portion of the SCED interval *y* within the Settlement Interval.
ECRRWF $_{q, r, p, y}$	none	*ERCOT Contingency Reserve Service Resource Node Weighting Factor per interval* - The ECRS Resource weight, based on ECRS awards, used in the Real-Time MCPC calculation for the portion of the SCED interval *y* within the Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
r	none	A Resource.

q	none	A QSE.
y	none	A SCED interval in the 15-minute Settlement Interval.
p	none	A Resource Node Settlement Point.

(2) ECRS Only Charge:

RTECROAMT $_q$ = (1/4) * DAECROAWD $_q$ * RTMCPCECR

The above variables are defined as follows:

Variable	Unit	Description
RTECROAMT $_q$	$	*Real-Time ERCOT Contingency Reserve Service Only Amount for the QSE*— The total charge to QSE *q* in Real-Time for ECRS only awards for each 15-minute Settlement Interval.
DAECROAWD $_q$	MW	*Day-Ahead ERCOT Contingency Service Only Award for the QSE*— The ECRS only capacity awarded in the DAM to the QSE *q* for the Operating Hour.
RTMCPCECR	$/MW	*Real-Time Market Clearing Price for Capacity for ERCOT Contingency Reserve Service* — The Real-Time MCPC for ECRS for the 15-minute Settlement Interval.
q	none	A QSE.

(3) ECRS Trade Overage Charge:

RTECRTOAMT $_q$ = (1/4) * RTECRTO $_q$ * RTMCPCRECR

The above variables are defined as follows:

Variable	Unit	Description
RTECRTOAMT $_q$	$	*Real-Time ERCOT Contingency Reserve Service Trade Overage Amount for the QSE*— The total charge to QSE *q* in Real-Time for ECRS trade overages for each 15-minute Settlement Interval.
RTECRTO $_q$	MW	*Real-Time ERCOT Contingency Reserve Service Trade Overage for the QSE* — The quantity of submitted ECRS trades in excess of their DAM self-arrangement quantity for the QSE *q* for the Operating Hour.
RTMCPCECR	$/MW	*Real-Time Market Clearing Price for Capacity for ERCOT Contingency Reserve Service* — The Real-Time MCPC for ECRS for the 15-minute Settlement Interval.
q	none	A QSE.

[NPRR1010: Insert Section 6.7.5.7 below upon system implementation of the Real-Time Co-Optimization (RTC) project:]

6.7.5.7 Real-Time Derated Ancillary Service Capability Payment

(1) If ERCOT manually reduces the amount of an Ancillary Service that may be awarded to a Resource in Real-Time under paragraph (6) of Section 6.4.9.1.1, Ancillary Service Awards, and the reduction reduces the payment the QSE would have received under Section 6.7.5.1, Real-Time Ancillary Service Imbalance Payment or Charge, the QSE may be eligible for a Real-Time derated Ancillary Service capability payment under this Section.

(2) In order to be eligible for a Real-Time derated Ancillary Service capability payment, the QSE must:

(a) File a timely Settlement and billing dispute, identifying the following items, by Settlement Interval:

(i) Dollar amount and calculation of the estimated Real-Time derated Ancillary Service capability payment;

(ii) The quantity of Ancillary Service awards, by Ancillary Service product, that were not awarded due to ERCOT's manual reduction of the Resource's Ancillary Service capability;

(iii) Any additional revenues earned by the QSE under Section 6.6.3.1, Real-Time Energy Imbalance Payment or Charge at a Resource Node; and

(iv) Any additional revenues earned by the QSE under Section 6.7.5.1, Real-Time Ancillary Service Imbalance Payment or Charge.

(b) Have submitted an Ancillary Service Offer for the disputed Settlement Interval(s). The Ancillary Service Offer used to calculate the Real-Time derated Ancillary Service capability payment shall be the most recent offer received by ERCOT effective for the disputed Settlement Interval(s) before ERCOT manually reduced the amount of Ancillary Service to be awarded.

(3) ERCOT shall attempt to validate the calculations provided by the QSE, and may request additional supporting documentation or explanation with respect to the submitted materials within 15 Business Days of receipt. Additional information requested by ERCOT must be provided by the QSE within 15 Business Days of ERCOT's request. Upon determination by ERCOT that no additional supporting documentation or explanation is needed from the disputing QSE, ERCOT shall notify the QSE of its acceptance or rejection of the claim for the Real-Time derated Ancillary Service capability payment within 15 Business Days.

(4) The price used to determine the derated MWs that were not awarded due to the manual reduction shall be the Real-Time MCPC for the Ancillary Service that was reduced.

(5) The amount recoverable under this section shall be capped by the Real-Time MCPC for the Ancillary Service that was reduced, multiplied by the reduced quantity.

(6) The amount recoverable under this Section shall be reduced by any additional revenue received by the QSE, as determined in paragraphs (2)(a)(iii) and (2)(a)(iv) above.

(7) The Real-Time derated Ancillary Service capability payment for a given 15-minute Settlement Interval is calculated as follows:

$$\mathbf{RTDASAMT}_q = \mathbf{(-1)} * \mathbf{Min}[(\mathbf{RTRUILD}_q + \mathbf{RTRDILD}_q + \mathbf{RTRRILD}_q + \mathbf{RTNSILD}_q + \mathbf{RTECRILD}_q - \mathbf{RTEIRD}_q - \mathbf{RTASIRD}_q), \sum_r \mathbf{RTDASCAP}_{q,r}]$$

Where:

$$\text{RTDASCAP}_{q,r} = (1/4) * (\text{RTMCPCRU} * \text{RTRUDQ}_{q,r} + \text{RTMCPCRD} * \text{RTRDDQ}_{q,r} + \text{RTMCPCRR} * \text{RTRRDQ}_{q,r} + \text{RTMCPCNS} * \text{RTNSDQ}_{q,r} + \text{RTMCPCECR} * \text{RTECRDQ}_{q,r})$$

The above variables are defined as follows:

Variable	Unit	Description
RTDASAMT_q	$	*Real-Time Derated Ancillary Service Amount*—The payment to QSE *q* for amounts recoverable resulting from a manual reduction of Ancillary Services by ERCOT for the 15-minute Settlement Interval.
RTRUILD_q	$	*Real-Time Derated Regulation Up Imbalance Losses for Deration*—The payments not made to QSE *q* under paragraph (1) of Section 6.7.5.2, Regulation Up Service Payments and Charges, for the 15-minute Settlement Interval.
RTRDILD_q	$	*Real-Time Derated Regulation Down Imbalance Losses for Deration*—The payments not made to QSE *q* under paragraph (1) of Section 6.7.5.3, Regulation Down Service Payments and Charges, for the 15-minute Settlement Interval.
RTRRILD_q	$	*Real-Time Derated Responsive Reserve Imbalance Losses for Deration*—The payments not made to QSE *q* under paragraph (1) of Section 6.7.5.4, Responsive Reserve Payments and Charges, for the 15-minute Settlement Interval.
RTNSILD_q	$	*Real-Time Derated Non-Spin Imbalance Losses for Deration*—The payments not made to QSE *q* under paragraph (1) of Section 6.7.5.5, Non-Spinning Reserve Service Payments and Charges, for the 15-minute Settlement Interval.
RTECRILD_q	$	*Real-Time Derated ERCOT Contingency Reserve Service Imbalance Losses for Deration*—The payments not made to QSE *q* under paragraph (1) of Section 6.7.5.6, ERCOT Contingency Reserve Service Payments and Charges, for the 15-minute Settlement Interval.

$RTEIRD_q$	$	*Real-Time Energy Imbalance Revenues for Deration*—The additional payments to QSE *q* under Section 6.6.3.1.
$RTASIRD_q$	$	*Real-Time Ancillary Service Imbalance Revenues for Deration*—The additional Ancillary Service imbalance payments to QSE *q* for all Ancillary Service products for the 15-minute Settlement Interval.
$RTDASCAP_{q,r}$	$	*Real-Time Derated Ancillary Service Payment Cap*—The amount recoverable for Resource *r* represented by QSE *q*, capped by the Real-Time MCPC for the Ancillary Service product that was derated, multiplied by the quantity by which the Resource's capability to provide the Ancillary Service was reduced for the 15-minute Settlement Interval.
RTMCPCRU	$/MW	*Real-Time Market Clearing Price for Capacity for Regulation Up* - The Real-Time MCPC for Reg-Up for the 15-minute Settlement Interval.
RTMCPCRD	$/MW	*Real-Time Market Clearing Price for Capacity for Regulation Down* - The Real-Time MCPC for Reg-Down for the 15-minute Settlement Interval.
RTMCPCRR	$/MW	*Real-Time Market Clearing Price for Capacity for Responsive Reserve* - The Real-Time MCPC for RRS for the 15-minute Settlement Interval.
RTMCPCNS	$/MW	*Real-Time Market Clearing Price for Capacity for Non-Spin* - The Real-Time MCPC for Non-Spin for the 15-minute Settlement Interval.
RTMCPCECR	$/MW	*Real-Time Market Clearing Price for Capacity for ERCOT Contingency Reserve Service* — The Real-Time MCPC for ECRS for the 15-minute Settlement Interval.
$RTRUDQ_{q,r}$	MW	*Real-Time Regulation Up Derated Quantity* - The Reg-Up quantity manually reduced by ERCOT for the Resource *r* represented by QSE *q* for the 15-minute Settlement Interval.
$RTRDDQ_{q,r}$	MW	*Real-Time Regulation Down Derated Quantity* - The Reg-Down quantity manually reduced by ERCOT for the Resource *r* represented by QSE *q* for the 15-minute Settlement Interval.
$RTRRDQ_{q,r}$	MW	*Real-Time Responsive Reserve Derated Quantity* - The RRS quantity manually reduced by ERCOT for the Resource *r* represented by QSE *q* for the 15-minute Settlement Interval.
$RTECRDQ_{q,r}$	MW	*Real-Time ERCOT Contingency Reserve Service Derated Quantity* - The ECRS quantity manually reduced by ERCOT for the Resource *r* represented by QSE *q* for the 15-minute Settlement Interval.
$RTNSDQ_{q,r}$	MW	*Real-Time Non-Spin Derated Quantity* - The Non-Spin quantity manually reduced by ERCOT for the Resource *r* represented by QSE *q* for the 15-minute Settlement Interval.
q	none	A QSE.
r	none	A Resource.

[NPRR1010: Insert Section 6.7.5.8 below upon system implementation of the Real-Time Co-Optimization (RTC) project:]

6.7.5.8 Real-Time Derated Ancillary Service Capability Charge

(1) The total cost for Real-Time derated Ancillary Service payments and charges is allocated to QSEs representing Load based on Load Ratio Share (LRS). The Real-

Time derated Ancillary Service Payment allocations to each QSE for a given 15-minute Settlement Interval are calculated as follows:

$$LARTDASAMT_q = (-1) * RTDASAMTTOT * LRS_q$$

Where:

$$RTDASAMTTOT = \sum_q RTDASAMT_q$$

The above variables are defined as follows:

Variable	Unit	Description
$LARTDASAMT_q$	$	*Load Allocated Real-Time Derated Ancillary Service Amount per QSE* – The charge to QSE *q* due to a manual reduction of Ancillary Services to be awarded for the 15-minute Settlement Interval.
RTDASAMTTOT	$	*Real-Time Derated Ancillary Service Amount Total* —The total of all payments to all QSEs for amounts recoverable due to an ERCOT issued manual reduction of Ancillary Services to be awarded for the 15-minute Settlement Interval.
$RTDASAMT_q$	$	*Real-Time Derated Ancillary Service Amount*—The payment to QSE *q* for amounts recoverable due to an ERCOT issued manual reduction of Ancillary Services to be awarded for the 15-minute Settlement Interval.
LRS_q	none	*Load Ratio Share per QSE*—The LRS as defined in Section 6.6.2.2, QSE Load Ratio Share for a 15-Minute Settlement Interval, for QSE *q* for the 15-minute Settlement Interval.
q	none	A QSE.

6.7.6 Real-Time Ancillary Service Imbalance Revenue Neutrality Allocation

(1) The total cost for Ancillary Service Imbalance payments and charges associated with ORDC and reliability deployments is allocated to the QSEs representing Load based on Load Ratio Share (LRS). The Real-Time Ancillary Service imbalance revenue neutrality allocations to each QSE for a given 15-minute Settlement Interval are calculated as follows:

$$\mathbf{LAASIRNAMT_q = (-1) * [(RTASIAMTTOT + RTRUCRSVAMTTOT) * LRS_q]}$$

$$\mathbf{LARDASIRNAMT_q = (-1) * [(RTRDASIAMTTOT + RTRDRUCRSVAMTTOT) * LRS_q]}$$

Where:

$$RTASIAMTTOT = \sum_q RTASIAMT_q$$

$$RTRUCRSVAMTTOT = \sum_q RTRUCRSVAMT_q$$

$$RTRDASIAMTTOT = \sum_{q} RTRDASIAMT_{q}$$

$$RTRDRUCRSVAMTTOT = \sum_{q} RTRDRUCRSVAMT_{q}$$

The above variables are defined as follows:

Variable	Unit	Definition
$LAASIRNAMT_{q}$	$	*Load-Allocated Ancillary Service Imbalance Revenue Neutrality Amount per QSE*—The QSE *q*'s share of the total Real-Time Ancillary Service imbalance revenue neutrality amount associated with ORDC for the 15-minute Settlement Interval.
$LARDASIRNAMT_{q}$	$	*Load-Allocated Reliability Deployment Ancillary Service Imbalance Revenue Neutrality Amount per QSE*—The QSE *q*'s share of the total Real-Time Ancillary Service imbalance revenue neutrality amount associated with Reliability Deployments for the 15-minute Settlement Interval.
RTASIAMTTOT	$	*Real-Time Ancillary Service Imbalance Market Total Amount*—The total payment or charge to all QSEs for the Real-Time Ancillary Service imbalance associated with ORDC for each 15-minute Settlement Interval.
$RTASIAMT_{q}$	$	*Real-Time Ancillary Service Imbalance Amount*—The total payment or charge to QSE *q* for the Real-Time Ancillary Service imbalance associated with ORDC for each 15-minute Settlement Interval.
RTRDASIAMTTOT	$	*Real-Time Reliability Deployment Ancillary Service Imbalance Market Total Amount*—The total payment or charge to all QSEs for the Real-Time Ancillary Service imbalance associated with Reliability Deployments for each 15-minute Settlement Interval.
$RTRDASIAMT_{q}$	$	*Real-Time Reliability Deployment Ancillary Service Imbalance Amount*—The total payment or charge to QSE *q* for the Real-Time Ancillary Service imbalance associated with Reliability Deployments for each 15-minute Settlement Interval.
RTRUCRSVAMTTOT	$	*Real-Time RUC Ancillary Service Reserve Market Total Amount*—The total payment to all QSEs for the Real-Time RUC Ancillary Service reserve payments associated with ORDC for each 15-minute Settlement Interval.
$RTRUCRSVAMT_{q}$	$	*Real-Time RUC Ancillary Service Reserve Amount*—The total payment to QSE *q* for the Real-Time RUC Ancillary Service reserve payment associated with ORDC for each 15-minute Settlement Interval.
RTRDRUCRSVAMTTOT	$	*Real-Time Reliability Deployment RUC Ancillary Service Reserve Market Total Amount*—The total payment |to all QSEs for the Real-Time RUC Ancillary Service Reserve payment as a result of Reliability Deployments for each 15-minute Settlement Interval.
$RTRDRUCRSVAMT_{q}$	$	*Real-Time Reliability Deployment RUC Ancillary Service Reserve Amount*—The total payment |to QSE *q* for the Real-Time RUC Ancillary Service Reserve payment as a result of Reliability Deployments for each 15-minute Settlement Interval.
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.

[NPRR1010: Replace Section 6.7.6 above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]

6.7.6 Real-Time Ancillary Service Revenue Neutrality Allocation

(1) The total cost for Real-Time Ancillary Service payments and charges is allocated to the QSEs representing Load based on Load Ratio Share (LRS). The Real-Time Ancillary Service allocations to each QSE for a given 15-minute Settlement Interval are calculated as follows:

(a) For Reg-Up:

$$LARTRUAMT_q = (-1) * (RTRUIMBAMTTOT + RTRUOAMTTOT + RTRUTOAMTTOT) * LRS_q$$

Where:

$$RTRUIMBAMTTOT = \sum_q (RTRUIMBAMT_q)$$

$$RTRUOAMTTOT = \sum_q (RTRUOAMT_q)$$

$$RTRUTOAMTTOT = \sum_q (RTRUTOAMT_q)$$

The above variables are defined as follows:

Variable	**Unit**	**Description**
$LARTRUAMT_q$	$	*Load-Allocated Real-Time Reg-Up Amount for the QSE*— The QSE *q*'s share of the total Real-Time Reg-Up amount for the 15-minute Settlement Interval.
$RTRUIMBAMT_q$	$	*Real-Time Reg-Up Imbalance Amount for the QSE* - The total payment or charge to QSE *q* for the Real-Time Reg-Up imbalance for each 15-minute Settlement Interval.
$RTRUOAMT_q$	$	*Real-Time Reg-Up Only Amount for the QSE*— The total charge to QSE *q* in Real-Time for Reg-Up only awards for each 15-minute Settlement Interval.
RTRUIMBAMTTOT	$	*Real-Time Reg-Up Imbalance Market Total Amount* - The total payment or charge to all QSEs for the Real-Time Reg-Up imbalance for each 15-minute Settlement Interval.
RTRUOAMTTOT	$	*Real-Time Reg-Up Only Market Total Amount* - The total charge to all QSEs in Real-Time for Reg-Up only awards for each 15-minute Settlement Interval.
$RTRUTOAMT_q$	$	*Real-Time Reg-Up Trade Overage Amount for the QSE*— The total charge to QSE *q* in Real-Time for Reg-Up trade overages for each 15-minute Settlement Interval.

RTRUTOAMTTOT	$	*Real-Time Reg-Up Trade Overage Total Amount* — The total charge to all QSEs for Real-Time Reg-Up trade overages for each 15-minute Settlement Interval.
LRS_q	none	*Load Ratio Share per QSE*—The LRS as defined in Section 6.6.2.2, QSE Load Ratio Share for a 15-Minute Settlement Interval, for QSE *q* for the 15-minute Settlement Interval.
q	none	A QSE.

(b) For Reg-Down:

$$LARTRDAMT_q = (-1) * (RTRDIMBAMTTOT + RTRDOAMTTOT + RTRDTOAMTTOT) * LRS_q$$

Where:

$$RTRDIMBAMTTOT = \sum_q (RTRDIMBAMT_q)$$

$$RTRDOAMTTOT = \sum_q (RTRDOAMT_q)$$

$$RTRDTOAMTTOT = \sum_q (RTRDTOAMT_q)$$

The above variables are defined as follows:

Variable	**Unit**	**Description**
$LARTRDAMT_q$	$	*Load-Allocated Real-Time Reg-Down Amount for the QSE* — The QSE *q*'s share of the total Real-Time Reg-Down amount for the 15-minute Settlement Interval.
$RTRDIMBAMT_q$	$	*Real-Time Reg-Down Imbalance Amount for the QSE* - The total payment or charge to QSE *q* for the Real-Time Reg-Down imbalance for each 15-minute Settlement Interval.
$RTRDOAMT_q$	$	*Real-Time Reg-Down Only Amount for the QSE*— The total charge to QSE *q* in Real-Time for Reg-Down only awards for each 15-minute Settlement Interval.
RTRDIMBAMTTOT	$	*Real-Time Reg-Down Imbalance Market Total Amount* - The total payment or charge to all QSEs for the Real-Time Reg-Down imbalance for each 15-minute Settlement Interval.
RTRDOAMTTOT	$	*Real-Time Reg-Down Only Market Total Amount* - The total charge to all QSEs in Real-Time for Reg-Down only awards for each 15-minute Settlement Interval.
$RTRDTOAMT_q$	$	*Real-Time Reg-Down Trade Overage Amount for the QSE*— The total charge to QSE *q* in Real-Time for Reg-Down trade overages for each 15-minute Settlement Interval.
RTRDOAMTTOT	$	*Real-Time Reg-Down Trade Overage Total Amount* — The total charge to all QSEs for Real-Time Reg-Down trade overages for each 15-minute Settlement Interval.
LRS_q	none	*Load Ratio Share per QSE*—The LRS as defined in Section 6.6.2.2 for QSE *q* for the 15-minute Settlement Interval.

q	none	A QSE.

(c) For Responsive Reserve (RRS):

$$LARTRRAMT_q = (-1) * (RTRRIMBAMTTOT + RTRROAMTTOT + RTRRTOAMTTOT) * LRS_q$$

Where:

$$RTRRIMBAMTTOT = \sum_q (RTRRIMBAMT_q)$$

$$RTRROAMTTOT = \sum_q (RTRROAMT_q)$$

$$RTRRTOAMTTOT = \sum_q (RTRRTOAMT_q)$$

The above variables are defined as follows:

Variable	**Unit**	**Description**
$LARTRRAMT_q$	$	*Load-Allocated Real-Time Responsive Reserve Amount for the QSE* — The QSE's share of the total Real-Time RRS amount for the 15-minute Settlement Interval.
$RTRRIMBAMT_q$	$	*Real-Time Responsive Reserve Imbalance Amount for the QSE* - The total payment or charge to QSE q for the Real-Time RRS imbalance for each 15-minute Settlement Interval.
$RTRROAMT_q$	$	*Real-Time Responsive Reserve Only Amount for the QSE*— The total charge to QSE q in Real-Time for RRS only awards for each 15-minute Settlement Interval.
RTRRIMBAMTTOT	$	*Real-Time Responsive Reserve Imbalance Market Total Amount* - The total payment or charge to all QSEs for the Real-Time RRS imbalance for each 15-minute Settlement Interval.
RTRROAMTTOT	$	*Real-Time Responsive Reserve Only Market Total Amount* - The total charge to all QSEs in Real-Time for RRS only awards for each 15-minute Settlement Interval.
$RTRRTOAMT_q$	$	*Real-Time Responsive Reserve Trade Overage Amount for the QSE*— The total charge to QSE q in Real-Time for RRS trade overages for each 15-minute Settlement Interval.
RTRROAMTTOT	$	*Real-Time Responsive Reserve Trade Overage Total Amount* — The total charge to all QSEs for Real-Time RRS trade overages for each 15-minute Settlement Interval.
LRS_q	none	*Load Ratio Share per QSE*—The LRS as defined in Section 6.6.2.2 for QSE q for the 15-minute Settlement Interval.
q	none	A QSE.

(d) For Non-Spin:

$$LARTNSAMT_q = (-1) * (RTNSIMBAMTTOT + RTNSOAMTTOT + RTNSTOAMTTOT) * LRS_q$$

Where:

$$RTNSIMBAMTTOT = \sum_{q} (RTNSIMBAMT_{q})$$

$$RTNSOAMTTOT = \sum_{q} (RTNSOAMT_{q})$$

$$RTNSTOAMTTOT = \sum_{q} (RTNSTOAMT_{q})$$

The above variables are defined as follows:

Variable	**Unit**	**Description**
$LARTNSAMT_{q}$	$	*Load-Allocated Real-Time Non-Spin Amount for the QSE* — The QSE's share of the total Real-Time Non-Spin amount for the 15-minute Settlement Interval.
$RTNSIMBAMT_{q}$	$	*Real-Time Non-Spin Imbalance Amount for the QSE* - The total payment or charge to QSE *q* for the Real-Time Non-Spin imbalance for each 15-minute Settlement Interval.
$RTNSOAMT_{q}$	$	*Real-Time Non-Spin Only Amount for the QSE*— The total charge to QSE *q* in Real-Time for Non-Spin only awards for each 15-minute Settlement Interval.
RTNSIMBAMTTOT	$	*Real-Time Non-Spin Imbalance Market Total Amount* - The total payment or charge to all QSEs for the Real-Time Non-Spin imbalance for each 15-minute Settlement Interval.
RTNSOAMTTOT	$	*Real-Time Non-Spin Only Market Total Amount* - The total charge to all QSEs in Real-Time for Non-Spin only awards for each 15-minute Settlement Interval.
$RTNSTOAMT_{q}$	$	*Real-Time Non-Spin Trade Overage Amount for the QSE*— The total charge to QSE *q* in Real-Time for Non-Spin trade overages for each 15-minute Settlement Interval.
RTNSOAMTTOT	$	*Real-Time Non-Spin Trade Overage Total Amount* — The total charge to all QSEs for Real-Time Non-Spin trade overages for each 15-minute Settlement Interval.
LRS_{q}	none	*Load Ratio Share per QSE*—The LRS as defined in Section 6.6.2.2 for QSE *q* for the 15-minute Settlement Interval.
q	none	A QSE.

(e) For ERCOT Contingency Reserve Service (ECRS):

$$LARTECRAMT_{q} = (-1) * (RTECRIMBAMTTOT + RTECROAMTTOT + RTECRTOAMTTOT) * LRS_{q}$$

Where:

$$RTECRIMBAMTTOT = \sum_{q} (RTECRIMBAMT_{q})$$

$$RTECROAMTTOT = \sum_{q} (RTECROAMT_{q})$$

$$RTECRTOAMTTOT = \sum_{q} (RTECRTOAMT_{q})$$

The above variables are defined as follows:

Variable	Unit	Description
$LARTECRAMT_{q}$	$	*Load-Allocated Real-Time ERCOT Contingency Reserve Service Amount for the QSE* - The QSE *q*'s share of the total Real-Time ECRS amount for the 15-minute Settlement Interval.
$RTECRIMBAMT_{q}$	$	*Real-Time ERCOT Contingency Reserve Service Imbalance Amount for the QSE* - The total payment or charge to QSE *q* for the Real-Time ECRS imbalance for each 15-minute Settlement Interval.
$RTECROAMT_{q}$	$	*Real-Time ERCOT Contingency Reserve Service Only Amount for the QSE*— The total charge to QSE *q* in Real-Time for ECRS only awards for each 15-minute Settlement Interval.
RTECRIMBAMTTOT	$	*Real-Time ERCOT Contingency Reserve Service Imbalance Market Total Amount* - The total payment or charge to all QSEs for the Real-Time ECRS imbalance for each 15-minute Settlement Interval.
RTECROAMTTOT	$	*Real-Time ERCOT Contingency Reserve Service Only Market Total Amount* - The total charge to all QSEs in Real-Time for ECRS only awards for each 15-minute Settlement Interval.
$RTECRTOAMT_{q}$	$	*Real-Time ERCOT Contingency Reserve Service Trade Overage Amount for the QSE*— The total charge to QSE *q* in Real-Time for ECRS trade overages for each 15-minute Settlement Interval.
RTECROAMTTOT	$	*Real-Time ERCOT Contingency Reserve Service Trade Overage Total Amount* — The total charge to all QSEs for Real-Time ECRS trade overages for each 15-minute Settlement Interval.
LRS_{q}	none	*Load Ratio Share per QSE*—The LRS as defined in Section 6.6.2.2 for QSE *q* for the 15-minute Settlement Interval.
q	none	A QSE.

6.7.7 Adjustments to Net Cost Allocations for Real-Time Ancillary Services

If ERCOT assigns Ancillary Service during a Watch, the incremental cost for assigned Ancillary Service is calculated in this section.

(1) For Reg-Up, if applicable:

(a) The total costs for Reg-Up for a given Operating Hour during a Watch is calculated as follows:

ARUCOSTTOT = (-1) * RTAURUAMTTOT + RUCOSTTOT

Where: