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| NPRR Number | [1086](http://www.ercot.com/mktrules/issues/NPRR1086) | NPRR Title | Recovery, Charges, and Settlement for Operating Losses During an LCAP Effective Period |
| Date of Decision | July 28, 2021 |
| Action | Recommended Approval |
| Timeline  | Urgent – Urgent status is necessary to align the Protocols with the Public Utility Commission of Texas (PUCT) order amending 16 Tex. Admin. Code (TAC) § 25.505 in Project No. 51871, Review of the Scarcity Pricing Mechanism, as approved at the June 24, 2021, Open Meeting, which became effective on July 14, 2021.  |
| Proposed Effective Date | Upon PUCT approval – August 20, 2021 |
| Priority and Rank Assigned | Not applicable |
| Nodal Protocol Sections Requiring Revision  | 2.1, Definitions4.4.11, System-Wide Offer Caps6.8, Settlement for Operating Losses During an LCAP Effective Period (new)6.8.1, Determination of Operating Losses During an LCAP Effective Period (new)6.8.2, Recovery of Operating Losses During an LCAP Effective Period (new)6.8.3, Charges for Operating Losses During an LCAP Effective Period (new) 6.8.3.1, Charges for Capacity Shortfalls During an LCAP Effective Period (new)6.8.3.1.1, Capacity Shortfall Ratio Share for an LCAP Effective Period (new)6.8.3.2, Uplift Charges for an LCAP Effective Period (new)6.8.4, Miscellaneous Invoices of Payments and Charges for an LCAP Effective Period (new) |
| Related Documents Requiring Revision/Related Revision Requests | None |
| Revision Description | This Nodal Protocol Revision Request (NPRR) aligns the Protocols with the order amending 16 TAC § 25.505 in Project No. 51871 (51871 Order), which modifies the value of the Low System-Wide Offer Cap (LCAP) by eliminating a provision that ties the value of LCAP to the natural gas price index, and adding a provision that ensures that a Resource Entity (through its Qualified Scheduling Entity (QSE)) can recover its actual marginal costs when a scarcity pricing situation occurs while the LCAP is in effect (LCAP Effective Period).An LCAP Effective Period occurs when the Peaker Net Margin (PNM) during a calendar year exceeds a threshold of three times the cost of new entry for new generation plants. During an LCAP Effective Period, the System-Wide Offer Cap (SWCAP) will be set to the LCAP for the remainder of the calendar year. For example, if the LCAP goes into effect on August 1, 2021, the SWCAP will be set to the LCAP through December 31, 2021.In order for a Resource Entity (through its QSE) to recover actual marginal costs for an LCAP Effective Period, the following process will apply:* The QSE for an eligible Resource Entity will submit a Settlement and billing dispute in accordance with Section 9.14, Settlement and Billing Dispute Process.
* Within 60 days of a Real-Time Market (RTM) Initial Settlement Statement, the QSE will also submit:
	+ For a Generation Resource – Information to support the Generation Resource’s weighted average fuel price (WAFP);
	+ For an Energy Storage Resource (ESR) – The actual variable Operations and Maintenance (O&M) rate and the average electricity cost incurred to charge the ESR for the amount of discharge during the LCAP Effective Period; and
	+ An attestation that the information provided is accurate and that fixed costs were not included in any of the costs submitted.
* For a Generation Resource, ERCOT will calculate the Resource’s marginal fuel cost by multiplying the WAFP by the average heat rate. For an ESR, ERCOT will set the ESR’s actual fuel cost equal to the average electricity cost used to charge the ESR. ERCOT will add a variable O&M component to the marginal fuel cost (for Generation Resources) and to the actual fuel cost (for ESRs) to arrive at a proxy for the actual marginal cost (AMC). Since compensation for operating losses is based on actual marginal costs in excess of LCAP revenues, ERCOT will calculate a marginal energy production value (MEP). This marginal MWh value will then be used to compute the Resource Operating Losses Payment Amount (OPLPAMT).

In the event of recovery of actual marginal costs above the LCAP revenues, this NPRR also includes an LCAP capacity short allocation to charge QSEs that are capacity short at the end of the Adjustment Period for the Operating Hour during the LCAP Effective Period.Additionally, this NPRR removes the fifty times Fuel Index Price (FIP) language from Section 4.4.11 to comply with the 51871 Order. |
| Reason for Revision |  Addresses current operational issues. Meets Strategic goals (tied to the [ERCOT Strategic Plan](http://www.ercot.com/content/wcm/lists/144926/ERCOT_Strategic_Plan_2019-2023.pdf) or directed by the ERCOT Board). Market efficiencies or enhancements Administrative Regulatory requirements Other: (explain)*(please select all that apply)* |
| Business Case | Alignment between the Protocols and PUCT rules is necessary and proper.  |
| Credit Work Group Review | ERCOT Credit Staff and the Credit Work Group (Credit WG) have reviewed NPRR1086 and do not believe that it requires changes to credit monitoring activity or the calculation of liability. |
| PRS Decision | On 7/15/21, PRS voted via roll call to grant NPRR1086 Urgent status and to table NPRR1086. There was one abstention from the Cooperative (Pedernales) Market Segment. All Market Segments participated in the vote.On 7/21/21, PRS voted via roll call to recommend approval of NPRR1086 as amended by the 7/20/21 Luminant comments; and to forward to TAC NPRR1086 and the Impact Analysis with a recommended effective date of upon PUCT approval. There were six opposing votes from the Consumer (3) (OPUC, Nucor, Occidental), Cooperative (Brazos), and Municipal (2) (Austin Energy, CPS Energy) Market Segments and five abstentions from the Cooperative (LCRA), Independent Generator (2) (Jupiter Power, Calpine), and Investor Owned Utility (IOU) (2) (Oncor, AEP) Market Segments. All Market Segments participated in the vote. |
| Summary of PRS Discussion | On 7/15/21, ERCOT staff provided an overview of NPRR1086 and the request for Urgent status. Participants debated the meaning of “marginal” cost as it applies to the LCAP Effective Period, potential scenarios involving fuel purchases during extreme weather events, and, given that NPRR1086 was filed one day before the meeting, requested a special PRS meeting be held on July 21, 2021 to allow participants additional time to review the new language and Settlement formulas internally without impacting the overall approval timeline of the NPRR.On 7/21/21, the 7/20/21 ERCOT, Exelon, and Luminant comments were reviewed. Participants debated the meaning of “marginal” cost as it applies to the LCAP Effective Period, and ERCOT staff reviewed scenarios involving fuel purchases during extreme weather events and the impacts of NPRR1086 language on the financial outcomes. |
| TAC Decision | On 7/28/21, TAC voted via roll call to recommend approval of NPRR1086 as recommended by PRS in the 7/21/21 PRS Report as amended by the 7/27/21 TIEC comments; and the Revised Impact Analysis. There were three opposing votes from the Cooperative (GSEC), Independent Generator (Luminant), and Independent Power Marketer (IPM) (Morgan Stanley) Market Segments and six abstentions from the Independent Generator (Calpine), IPM (2) (DC Energy, Shell), and Municipal (3) (DME, Austin Energy, CPS Energy) Market Segments. All Market Segments participated in the vote. |
| Summary of TAC Discussion | On 7/28/21, ERCOT and PUCT Staff presented the 7/22/21 Joint Commenters comments and TIEC presented the 7/27/21 TIEC comments. ERCOT staff provided an overview of the capacity shortfall calculations proposed within Section 6.8.3.1 and the Revised Impact Analysis. Participants debated the appropriateness of including certain fuel-related costs (fixed vs. variable) in verifiable costs, particularly during extreme weather events. ERCOT staff reiterated the desire to ensure a Resource recovers all variable costs via this dispute process, allowing a Resource to present their case for what charges should be considered variable under NPRR1086. Participants encouraged ongoing holistic discussions on the interactions between fuel and generation across the ERCOT Region beyond the narrow scope of NPRR1086 to ensure proper incentives are in place. ERCOT and PUCT Staff stated their neutrality on the proposed 0.1 multiplier. |
| ERCOT Opinion | ERCOT supports approval of NPRR1086. |

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| Market Segment | Not applicable |

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| **Comments Received** |
| Comment Author | **Comment Summary** |
| Luminant 071421 | Removed language related to the exclusion of fixed costs in the weighted average fuel price for LCAP cost recovery |
| ERCOT 071521 | Opposed the 7/14/21 Luminant comments |
| PUCT Staff 071521 | Endorsed NPRR1086 as submitted |
| ERCOT 072021 | Provided additional language to clarify 1) fuel prices may include all variable costs associated with the purchase, transportation, and storage of fuel; and 2) the payment for operating losses applies only when the Real-Time Settlement Point Price for the Resource is equal to or exceeds the LCAP |
| Exelon 072021 | Proposed additional language to capture circumstances where a generator may be offered at the LCAP and still be dispatched up, and inserted a 10% coefficient to the calculation of the charge to a QSE due to capacity shortfall for an LCAP Effective Period |
| Luminant 072021 | Proposed additional edits to the 7/20/21 Exelon comments to remove ERCOT’s language related to the exclusion of fixed costs in the weighted average fuel price for LCAP cost recovery, remove uncertainty on fuel purchase timelines, and utilize Senate Bill 3’s “reasonable, verifiable” language |
| Joint Commenters 072221 | Reverted changes to the exclusion of fixed costs and the “reasonable, verifiable” language from the 7/20/21 Luminant comments to the previous language |
| TIEC 072721 | Removed the proposed 0.1 multiplier from the capacity shortfall calculation within Section 6.8.3.1 |

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| **Market Rules Notes** |

None

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| Proposed Protocol Language Revision |

## 2.1 DEFINITIONS

High Ancillary Service Limit (HASL)

A dynamically calculated MW upper limit on a Resource to reserve the part of the Resource’s capacity committed for Ancillary Service, calculated as described in Section 6.5.7.2, Resource Limit Calculator.HASL is also included in Section 5.7.4.1.1, Capacity Shortfall Ratio Share, Section 6.8.3.1.1, Capacity Shortfall Ratio Share for an LCAP Effective Period, and in the Reliability Unit Commitment (RUC) optimization but is not adjusted for Non-Frequency Responsive Capacity (NFRC) as in Section 6.5.7.2.

**Low System-Wide Offer Cap (LCAP) Effective Period**

The period in which the System-Wide Offer Cap (SWCAP) is set to the LCAP.

4.4.11 System-Wide Offer Caps

(1) The SWCAP shall be determined in accordance with the Public Utility Commission of Texas (PUCT) Substantive Rules. The methodology for determining the SWCAP is as follows:

(a) The Low System-Wide Offer Cap (LCAP) is set at $2,000 per MWh for energy and $2,000 per MW per hour for Ancillary Services.

(b) At the beginning of each year, the SWCAP shall be set equal to the High System-Wide Offer Cap (HCAP) and maintained at this level as long as the Peaker Net Margin (PNM) during a year is less than or equal to the PNM threshold per MW-year. If the PNM exceeds the PNM threshold per MW-year during a year, on the next Operating Day, the SWCAP shall be reset to the LCAP for the remainder of that year.

(c) ERCOT shall set the PNM threshold at three times the cost of new entry of new generation plants.

The above parameters are defined as follows.

| Parameter | Unit | Current Value\* |
| --- | --- | --- |
| HCAP | $/MWh | 9,000 |
| PNM threshold | $/MW-year | 315,000 |
| \* The current value for the parameters referenced in this table above will be recommended by TAC and approved by the ERCOT Board. ERCOT shall update parameter values on the first day of the month following ERCOT Board approval unless otherwise directed by the ERCOT Board. ERCOT shall provide a Market Notice prior to implementation of a revised parameter value. |

(2) Any offers that exceed the current SWCAP shall be rejected by ERCOT.

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| ***[NPRR1008: Replace Section 4.4.11 above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]***4.4.11 Day-Ahead and Real-Time System-Wide Offer Caps(1) The DASWCAP and RTSWCAP shall be determined in accordance with the Public Utility Commission of Texas (PUCT) Substantive Rules. The methodology for determining the DASWCAP and RTSWCAP is as follows: (a) The Low System-Wide Offer Cap (LCAP) is set at $2,000 per MWh for energy and $2,000 per MW per hour for Ancillary Services.(b) At the beginning of each year, the DASWCAP and RTSWCAP shall be set equal to the respective High System-Wide Offer Cap (HCAP) and maintained at this level as long as the Peaker Net Margin (PNM) during a year is less than or equal to the PNM threshold per MW-year. Additionally, the Value of Lost Load (VOLL) used to determine the ASDCs for DAM and RTM shall be set to the HCAP for DAM. If the PNM exceeds the PNM threshold per MW-year the DASWCAP and the VOLL used to determine the ASDCs for DAM and RTM shall be reset per the schedule in Section 4.4.11.1, Scarcity Pricing Mechanism.(c) ERCOT shall set the PNM threshold at three times the cost of new entry of new generation plants.The above parameters are defined as follows:

| Parameter | Unit | Current Value\* |
| --- | --- | --- |
| HCAP – DAM (DASWCAP) | $/MWh | 9,000 |
| HCAP – RTM (RTSWCAP) | $/MWh | 2,000 |
| PNM threshold | $/MW-year | 315,000 |
| \* The current value for the parameters referenced in this table above will be recommended by TAC and approved by the ERCOT Board. ERCOT shall update parameter values on the first day of the month following ERCOT Board approval unless otherwise directed by the ERCOT Board. ERCOT shall provide a Market Notice prior to implementation of a revised parameter value. |

(2) Any offers that exceed the current respective SWCAP shall be rejected by ERCOT. |

6.8 Settlement for Operating Losses During an LCAP Effective Period

6.8.1 Determination of Operating Losses During an LCAP Effective Period

(1) In order for a Qualified Scheduling Entity (QSE) that represents a Generation Resource or Energy Storage Resource (ESR) to recover actual marginal costs for operating losses during a Low System-Wide Offer Cap (LCAP) Effective Period, and incurred as calculated in Section 6.8.2, Recovery of Operating Losses During an LCAP Effective Period, the QSE shall timely submit a Settlement and billing dispute for each affected Operating Day, consistent with the dispute process described in Section 9.14, Settlement and Billing Dispute Process. The QSE shall also submit, through the Settlement and billing dispute process, and within 60 days of the issuance of a Real-Time Market (RTM) Initial Statement for an Operating Day, the following information:

(a) For a Generation Resource:

(i) All fuel purchases used to determine the weighted average fuel price included in the calculation of the actual marginal operating fuel cost component, for the Generation Resource, for the 15-minute Settlement Interval within the Operating Day.

(b) For an ESR:

(i) The actual variable O&M rate incurred during the LCAP Effective Period in lieu of the Standard Operations and Maintenance Cost (STOM) defined in Section 6.8.2, Recovery of Operating Losses During an LCAP Effective Period; and

(ii) The average electricity cost incurred to charge the ESR for the amount of discharge during the LCAP Effective Period.

(c) An attestation signed by an officer or executive with authority to bind the QSE stating that the information contained in the Settlement and billing dispute is accurate and that fixed costs (fees, penalties, and similar non-gas costs) were not included in the calculation of the weighted average fuel price.

(2) The calculation of operating losses under Section 6.8.2 applies only when the Real-Time Settlement Point Price for the Resource is equal to or exceeds the LCAP or when the Resource’s Energy Offer Curve is at the LCAP and the Resource receives a Dispatch Instruction or a Base Point above its Low Sustained Limit (LSL).

(3) Fuel prices may include all variable costs associated with the purchase, transportation, and storage of fuel.

(4) ERCOT will consider the documentation provided by the QSE in order to determine the weighted average fuel price for a Generation Resource or the average fuel cost for an ESR during an LCAP Effective Period.

(5) For purposes of determining operating losses during an LCAP Effective Period, ERCOT may request additional information, documentation, or clarification from the QSE. A QSE shall respond to any such request within ten Business Days.

6.8.2 Recovery of Operating Losses During an LCAP Effective Period

(1) ERCOT shall calculate the recovery of operating losses during an LCAP Effective Period with the actual marginal costs that exceed LCAP revenues in accordance with this Section.

(2) The actual marginal cost (AMC) and marginal energy production (MEP) used to calculate operating losses (OPL) for a Combined Cycle Train are the AMC and MEP that correspond to the Combined Cycle Generation Resource, within a Combined Cycle Train, that operates in Real-Time for the 15-minute Settlement Interval.

(3) Payment for operating losses during an LCAP Effective Period is calculated as follows:

OPLPAMT *q, r, i* = (-1) \* (OPL *q, r, i* + ADJOPL *q, r, i*)

Where,

For the Generation Resource:

OPL *q, r,i*  = Max(0, (AMC *q, r, i* - Max(LCAP, RTSPP *p, i*)) \* Min(RTMG *q, r, i*, MEP *q, r, i*))

If ERCOT approved verifiable costs for the Generation Resource:

 AMC *q, r, i* = AHR *q, r, i* \* WAFP *q, r, i* + ROM *q, r*

 MEP *q, r, i* = AMF *q, r, i* / AHR *q, r, i*

Otherwise,

AMC *q, r, i*  = PAHR *q, r, i* \* WAFP *q, r, i* + STOM *rc*

MEP *q, r, i* = AMF *q, r, i* / PAHR *q, r, i*

For ESRs:

OPL *q, r, i*  = Max(0, (AMC *q, r, i* - Max(LCAP, RTSPP *p, i*)) \* RTMG *q, r, i*)

Where,

AMC *q, r, i*  = AFC *q, r, i* + STOM *rc*

The above variables are defined as follows:

| **Variable** | **Unit** | **Definition** |
| --- | --- | --- |
| OPLPAMT *q, r, i* | $ | *Operating Losses Payment Amount –* The operating losses payment to the QSE *q,* for Resource *r*, for the 15-minute Settlement Interval *i* within the Operating Day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| OPL *q, r, i*  | $ | *Operating Losses* – The operating losses for Resource *r*, represented by QSE *q,* for the 15-minute Settlement Interval *i* within the Operating Day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| ADJOPL *q, r, i* | $ | *Operating Losses* *Adjustment* – The adjustment to the operating losses for Resource *r*, represented by QSE *q,* for the 15-minute Settlement Interval *i* within the Operating Day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| WAFP *q, r, i* | $/MMBtu | *Weighted Average Fuel Price*—The volume-weighted average price of fuel submitted to ERCOT for the LCAP Effective Period for a specific Resource *r,* represented by QSE *q,* and specific 15-minute Settlement Interval *i* within the Operating Day. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| AMC *q, r, i*  | $/MWh | *Actual Marginal Cost –* The actual marginal costs for Resource *r* represented by QSE *q* for the 15-minute Settlement Interval *i* within the Operating Day. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| LCAP | $/MWh | *Low System Wide Offer Cap –* The value set per paragraph (1) of Section 4.4.11, System-Wide Offer Caps. |
| ROM *q, r* | $/MWh | *Raw Verifiable Operations and Maintenance Cost Above LSL –* The raw verifiable O&M cost for the Resource *r* represented by QSE *q* for operations above Low Sustained Limit (LSL). Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| AMF *q, r, i* | MMBtu | *Actual Marginal Fuel per QSE per Resource -* The actual marginal purchased and delivered fuel for the Resource *r* represented by QSE *q* for the 15-minute Settlement Interval *i* within the Operating Day. The AMF represents only the fuel used to calculate the weighted average fuel price, WAFP. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. For Resources that are granted a dispute under Section 9.14.7, Disputes for RUC Make-Whole Payment for Fuel Costs, the actual marginal purchased and delivered fuel shall include only fuel for operations above LSL. |
| STOM *rc* | $/MWh | *Standard Operations and Maintenance Cost –* The standard O&M cost for the Resource category *rc* for operations above LSL, as described in paragraph (6)(c) of Section 5.6.1, Verifiable Costs. For an ESR, STOM shall be set at $0.3/MWh.

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| ***[NPRR1086: Replace the definition above with the following upon system implementation of NPRR1029:]****Standard Operations and Maintenance Cost –* The standard O&M cost for the Resource category *rc* for operations above LSL, shall be set to the minimum energy variable O&M costs, as described in paragraph (6)(c) of Section 5.6.1, Verifiable Costs. For an ESR, STOM shall be set at $0.3/MWh and for a DC-Coupled Resource, the value shall be set at $4.40/MWh. |

 |
| RTSPP *p, i* | $/MWh | *Real-Time Settlement Point Price -* The Real-Time Settlement Point Price at the Settlement Point *p,* for the 15-minute Settlement Interval *i*. |
| AFC *q, r, i* | $/MWh | *Average Fuel Cost per Resource —*The average electricity cost used to charge the ESR *r* represented by QSE *q* applicable to the energy discharge for the 15-minute Settlement Interval *i* within the Operating Day. |
| AHR *q, r, i* | MMBtu / MWh | *Average Heat Rate per Resource –* The verifiable average heat rate for the Resource *r* represented by QSE *q*, for operating levels between LSL and High Sustained Limit (HSL), for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| PAHR *q, r, i* | MMBtu / MWh | *Proxy Average Heat Rate –* The proxy average heat rate for the Resource *r,* represented by QSE *q*, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| RTMG *q, r, i* | MWh | *Real-Time Metered Generation per QSE per Resource by Settlement Interval by hour—*The Real-Time energy from Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource r is the Combined Cycle Train. For Resources that are granted a dispute under Section 9.14.7, Disputes for RUC Make-Whole Payment for Fuel Costs, the Real-Time energy represents the energy produced for operations above LSL. |
| MEP *q, r, i* | MWh | *Marginal Energy Production per QSE per Resource by Settlement Interval* — The calculated marginal generation of Resource *r* represented by QSE *q* in Real-Time for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| *q* | None | A QSE. |
| *r* | None | A Generation Resource or ESR. |
| *i* | None | A 15-minute Settlement Interval within the Operating Day during an LCAP Effective Period. |
| *rc* | None | A Resource category |

(2) The total compensation to each QSE for operating losses during an LCAP Effective Period for the 15-minute Settlement Interval is calculated as follows:

OPLPAMTQSETOT *q*  =  OPLPAMT *q, r, i*

The above variables are defined as follows:

| **Variable** | **Unit** | **Definition** |
| --- | --- | --- |
| OPLPAMTQSETOT*q*  | $ | *Total Operating Losses Payment Amount per QSE –* The total operating losses payment to the QSE *q*, for all Resources, for the 15-minute Settlement Interval within the Operating Day.  |
| OPLPAMT *q, r, i*  | $ | *Operating Losses Payment Amount* – The operating losses payment to the QSE *q*, for Resource *r*, for the 15-minute Settlement Interval *i* within the Operating Day. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| *q* | none | A QSE. |
| *r* | none | A Generation Resource or ESR. |
| *i* | none | A 15-minute Settlement Interval within the Operating Day during an LCAP Effective Period. |

6.8.3 Charges for Operating Losses During an LCAP Effective Period

(1) All QSEs that were capacity-short in a Settlement Interval for which actual marginal costs above the LCAP are recovered will be charged for that shortage, as described in Section 6.8.3.1, Charges for Capacity Shortfalls During an LCAP Effective Period. If revenues from the charges under Section 6.8.3.1 are not enough to cover all actual marginal costs above the LCAP for a Settlement Interval, then the difference will be uplifted to all QSEs on a Load Ratio Share (LRS) basis, as described in 6.8.3.2, Uplift Charges for an LCAP Effective Period.

6.8.3.1 Charges for Capacity Shortfalls During an LCAP Effective Period

(1) The dollar amount charged to each QSE due to capacity shortfalls for any Settlement Intervals in an LCAP Effective Period is calculated as follows:

LCAPCSAMT *i, q* = (-1) \* Max [(LCAPSFRS *i, q* \* OPLPAMTTOT *i*),
(((1/4) \* LCAPSF *i, q*) \* OPLPAMTTOT *i* / OPLCAPTOT *i*)]

Where:

OPLPAMTTOT *i*  = OPLPAMTQSETOT *i, q*

OPLCAPTOT *i* = RTMG *q, r, i*

The above variables are defined as follows:

| Variable | Unit | Definition |
| --- | --- | --- |
| LCAPCSAMT  *i, q* | $ | *LCAP Capacity-Short Amount*—The charge to a QSE *q*, due to capacity shortfall for an LCAPEffectivePeriod, for the 15-minute Settlement Interval *i*. |
| OPLPAMTQSETOT*i, q*  | $ | *Total Operating Losses Payment Amount per QSE –* The total operating losses payment to the QSE *q*, for all Resources, for the 15-minute settlement interval *i* within the Operating Day.  |
| OPLPAMTTOT *i* | $ | *Total Operating Losses Payment Amount –* The sum of Operating Losses Payments to all QSEs, for the 15-minute Settlement Interval *i*. |
| LCAPSFRS *i, q* | none | *LCAP Effective Period Shortfall Ratio Share*—The ratio of the QSE *q*’s capacity shortfall to the sum of all QSEs’ capacity shortfalls for an LCAP Effective Period for the 15-minute Settlement Interval *i*. See Section 6.8.3.1.1, Capacity Shortfall Ratio Share for an LCAP Effective Period. |
| LCAPSF  *i, q* | MW | *LCAP Shortfall*—The QSE *q*’s capacity shortfall for an LCAPEffective Period for the 15-minute Settlement Interval *i*. See formula in 6.8.3.1.1, Capacity Shortfall Ratio Share for an LCAP Effective Period. |
| OPLCAPTOT *i* | MWh | *Operating Loss Capacity Total*—The sum of the Real-Time Metered Generation (RTMG) of all Resources compensated for an LCAP Effective Period for the 15-minute Settlement Interval *i*.  |
| RTMG *q, r, i* | MWh | *Real-Time Metered Generation per QSE per Resource by Settlement Interval by hour—*The Real-Time energy from Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval *i*. Where for a Combined Cycle Train, the Resource r is the Combined Cycle Train. For Resources that are granted a dispute under Section 9.14.7, Disputes for RUC Make-Whole Payment for Fuel Costs, the Real-Time energy represents the energy produced for operations above LSL. |
| *i* | none | A 15-minute Settlement Interval. |
| *q* | none | A QSE. |
| *r* | none | A Generation Resource or ESR that is compensated during an LCAP Effective Period for the hour that includes the Settlement Interval *i* . |

6.8.3.1.1 Capacity Shortfall Ratio Share for an LCAP Effective Period

(1) For Combined Cycle Generation Resources, if more than one Combined Cycle Generation Resource is shown On-Line in its COP for the same Settlement hour, then the provisions of paragraph (6)(a) of Section 3.9.1, Current Operating Plan (COP) Criteria, apply in the determination of the On-Line Combined Cycle Generation Resource for that Settlement hour.

(2) The capacity shortfall ratio share of a specific QSE for an LCAP Effective Period is calculated, for a 15-minute Settlement Interval, as follows:

LCAPSFRS *i, q* = LCAPSF *i, q* / LCAPSFTOT *i*

Where:

LCAPSFTOT *i* =  LCAPSF  *i, q*

(3) The LCAP Shortfall in MW for a QSE for the 15-minute Settlement Interval is:

LCAPSF *i, q* = Max (0, ((RTAML *q, p, i*) \*4) – LCAPCAP*q, i*)

(4) The amount of capacity that a QSE had in Real-Time for a 15-minute Settlement Interval, excluding capacity from IRRs, is:

LCAPCAP *i, q* =  LCAPHASLADJ *q, r, h* + (RUCCPADJ *q, h* – RUCCSADJ *q, h*) + (DAEP *q, p, h* – DAES *q, p, h*) + (RTQQEPADJ *q, p, i* – RTQQESADJ *q, p, i*) +  DCIMPADJ *q, p, i*

The above variables are defined as follows:

| Variable | Unit | Definition |
| --- | --- | --- |
| LCAPSFRS *i, q* | none | *LCAP Effective Period Shortfall Ratio Share*—The ratio of the QSE *q*’s capacity shortfall to the sum of all QSEs’ capacity shortfalls for an LCAP Effective Period for the 15-minute Settlement Interval *i*. |
| LCAPSF  *i, q* | MW | *LCAP Shortfall*—The QSE *q*’s capacity shortfall for an LCAPEffective Period for the 15-minute Settlement Interval *i*. |
| LCAPSFTOT  *i* | MW | *LCAP Shortfall Total*—The sum of all QSEs’ capacity shortfalls, for an LCAP Effective Period for a 15-minute Settlement Interval *i*. |
| LCAPCAP  *q, i* | MW | *LCAP Capacity at Adjustment Period*—The QSE *q*’s Adjustment Period calculated capacity for the 15-minute Settlement Interval *i*. |
| RTAML *q, p, i* | MWh | *Real-Time Adjusted Metered Load*—The QSE *q*’s Adjusted Metered Load (AML) at the Settlement Point *p* for the 15-minute Settlement Interval *i*. |
| DCIMPADJ *q, p, i* | MW | *DC Tie Import per QSE per Settlement Point*—The approved aggregated DC Tie Schedule submitted by QSE *q* as an importer into the ERCOT System through DC Tie *p* according to the Adjustment Period snapshot, for the 15-minute Settlement Interval *i*. |
| LCAPHASLADJ *q, r, h* | MW | *LCAP Effective Period High Ancillary Services Limit at Adjustment Period*—The HASL of Resource *r,* represented by the QSE *q*, according to the Adjustment Period COP and Trades snapshot, for the hour *h* that includes 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.  |
| RUCCPADJ *q, h* | MW | *RUC Capacity Purchase at Adjustment Period*—The QSE *q*’s capacity purchase, according to the Adjustment Period Snapshot for the hour *h* that includes the 15-minute Settlement Interval. |
| RUCCSADJ *q, h* | MW | *RUC Capacity Sale at Adjustment Period*—The QSE *q*’s capacity sale, according to the Adjustment Period Snapshot for the hour *h* that includes the 15-minute Settlement Interval. |
| DAEP *q, p, h* | MW | *Day-Ahead Energy Purchase*—The QSE *q*’s energy purchased in the DAM at the Settlement Point *p* for the hour *h* that includes the 15-minute Settlement Interval. |
| DAES *q, p, h* | MW | *Day-Ahead Energy Sale*—The QSE *q*’s energy sold in the DAM at the Settlement Point *p* for the hour *h* that includes the 15-minute Settlement Interval. |
| RTQQEPADJ *q, p, i* | MW | *QSE-to-QSE Energy Purchase by QSE by point*—The QSE *q*’s Energy Trades in which the QSE is the buyer at the delivery Settlement Point *p* for the 15-minute Settlement Interval *i*, according to the Adjustment Period snapshot. |
| RTQQESADJ *q, p, i* | MW | *QSE-to-QSE Energy Sale by QSE by point*—The QSE *q*’s Energy Trades in which the QSE is the seller at the delivery Settlement Point *p* for the 15-minute Settlement Interval *i*, according to the Adjustment Period snapshot. |
| *q* | none | A QSE. |
| *p* | none | A Settlement Point. |
| *r* | none | A Generation Resource that is QSE-committed or planning to operate as a Quick Start Generation Resource (QSGR) for the Settlement Interval as shown by the Resource Status of OFFQS in the Adjustment Period snapshot; 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 EEA condition. If the Settlement Interval is a RUCAC-Interval, *r* represents the Combined Cycle Generation Resource that was QSE-committed at the time the RUCAC was issued. |
| *i* | none | A 15-minute Settlement Interval. |
| *h* | none | The hour that includes the Settlement Interval *i*.  |

6.8.3.2 Uplift Charges for an LCAP Effective Period

(1) If the revenues from the charges under Section 6.8.3.1, Charges for Capacity Shortfalls During an LCAP Effective Period, are not enough to cover all LCAP Effective Period payments, for a 15-minute Settlement Interval, then the difference will be uplifted to all QSEs on a Load Ratio Share basis as an LCAP Effective Period Uplift Charge, calculated as follows:

LALCAPAMT *q, i* = (-1) \* [OPLPAMTTOT *i* + LCAPCSAMTTOT *i*] \* LRS *q, i*

Where:

 OPLPAMTTOT *i*  = OPLPAMTQSETOT *i, q*

 LCAPCSAMTTOT *i* = LCAPCSAMT *i, q*

The above variables are defined as follows:

|  |  |  |
| --- | --- | --- |
| Variable | Unit | Definition |
| LALCAPAMT *q, i* | $ | *Load Allocated LCAP Effective Period Uplift Charge*—The amount owed from the QSE *q,* based on Load Ratio Share, for the 15-minute Settlement Interval *i*. |
| OPLPAMTQSETOT*i, q*  | $ | *Total Operating Losses Payment Amount per QSE –* The total operating losses payment to the QSE *q*, for all Resources, for the 15-minute Settlement Interval *i* within the Operating Day.  |
| OPLPAMTTOT *i* | $ | *Total Operating Losses Payment Amount –*The sum of Operating Losses Payments to all QSEs, for the 15-minute Settlement Interval *i*. |
| LCAPCSAMTTOT *i* | $ | *LCAP Capacity-Short Amount Total*—The total of all charges to all QSEs *q*, due to capacity shortfall for an LCAPEffective Period, for the 15-minute Settlement Interval *i*. |
| LCAPCSAMT  *i, q* | $ | *LCAP Capacity-Short Amount*—The charge to QSE *q*, due to capacity shortfall for an LCAPEffective Period, for the 15-minute Settlement Interval *i*. |
| LRS *q, i* | none | *Load Ratio Share*—The ratio of Adjusted Metered Load to the total ERCOT Adjusted Metered Load for the 15-minute Settlement Interval. See Section 6.6.2, Load Ratio Share, item (2). |
| *i* | none | A 15-minute Settlement Interval. |
| *q* | none | A QSE. |

***6.8.4 Miscellaneous Invoice for Payments and Charges for an LCAP Effective Period***

(1) ERCOT shall issue one-time miscellaneous Invoices using the most recent available Settlement data at the time the Invoices were issued.

(2) ERCOT shall issue miscellaneous Invoices to QSEs for payment of operating losses during an LCAP Effective Period, as described in Section 6.8.2, Recovery of Operating Losses During an LCAP Effective Period.

(3) ERCOT shall issue miscellaneous Invoices and allocate costs to the impacted QSEs as described in Section 6.8.3, Charges for Operating Losses During an LCAP Effective Period.

(4) ERCOT shall issue a Market Notice in conjunction with the issuance of miscellaneous Invoices for payments or charges for an LCAP Effective Period.