***5.6.2 RUC Startup Cost Eligibility***

(1) For purposes of this Section 5.6.2, all contiguous RUC-Committed Hours are considered as one RUC instruction. For each Resource, only one Startup Cost is eligible per block of contiguous RUC-Committed Hours.

(2) For a Resource’s Startup Costs in the Operating Day, per RUC instruction, to be included in the calculation of the RUC guarantee for that Operating Day, all the criteria below must be met:

(a) According to the Current Operating Plan (COP) and Trades Snapshot for the RUC process that committed the Resource, the Resource must not be QSE-committed in the Settlement Interval immediately before the designated start hour or after the last hour of the RUC instruction;

(b) A later RUC instruction or QSE commitment must not connect the designated start hour or last hour of the RUC instruction to a block of QSE-committed Intervals that was QSE-committed before the RUC instruction was given, according to the COP and Trades Snapshot for the RUC process that committed the Resource;

(c) The generation breakers must have been open, as indicated by a telemetered Resource status of Off-Line, for at least five minutes during the six hours preceding the first RUC-Committed Hour; and

(d) The generation breakers must have been closed, as indicated by a telemetered Resource status of On-Line, for at least one minute during the RUC commitment period or after the determined five-minute open breaker, as indicated by a telemetered Resource status of Off-Line, in the six hours preceding the first RUC-Committed Hour.

5.7 Settlement for RUC Process

***5.7.1 RUC Make-Whole Payment***

(1) To make up the difference when the revenues that a Reliability Unit Commitment (RUC)-committed Resource receives are less than its costs as described in paragraph (2) below, ERCOT shall calculate a RUC Make-Whole Payment for that Operating Day for that Resource (whether committed by Day-Ahead RUC (DRUC) or Hourly RUC (HRUC)).

(2) ERCOT shall pay to the Qualified Scheduling Entity (QSE) for the Resource a Make-Whole Payment if the RUC Guarantee calculated in Section 5.7.1.1, RUC Guarantee, is greater than the sum of:

(a) RUC Minimum-Energy Revenue calculated in Section 5.7.1.2, RUC Minimum-Energy Revenue;

(b) Revenue less cost above Low Sustained Limited (LSL) during RUC-Committed Hours calculated in Section 5.7.1.3, Revenue Less Cost Above LSL During RUC-Committed Hours; and

(c) Revenue less cost during QSE Clawback Intervals calculated in Section 5.7.1.4, Revenue Less Cost During QSE Clawback Intervals.

(3) The RUC Make-Whole Payment to the QSE for each RUC-committed Resource, including Reliability Must-Run (RMR) Units, for each RUC-Committed Hour in an Operating Day is calculated as follows:

RUCMWAMT*q,r,h* = (-1) \* Max (0, RUCG*q,r,d* – RUCMEREV*q,r,d* – RUCEXRR*q,r,d* – RUCEXRQC*q,r,d*) / RUCHR*q,r,d*

The above variables are defined as follows:

| Variable | Unit | Definition |
| --- | --- | --- |
| RUCMWAMT*q,r,h* | $ | *RUC Make-Whole Payment*—The RUC Make-Whole Payment to the QSE for Resource *r*, for each RUC-Committed Hour of the Operating Day. When one or more Combined Cycle Generation Resources are committed by RUC, payment is made to the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| RUCG*q,r,d* | $ | *RUC Guarantee*—The sum of eligible Startup Costs and minimum-energy costs for Resource *r* during all RUC-Committed Hours, for the Operating Day. See Section 5.7.1.1. When one or more Combined Cycle Generation Resources are committed by RUC, guaranteed costs are calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| RUCMEREV*q,r,d* | $ | *RUC Minimum-Energy Revenue*—The sum of the energy revenues for Resource *r*’s generation up to LSL during all RUC-Committed Hours, for the Operating Day. See Section 5.7.1.2. When one or more Combined Cycle Generation Resources are committed by RUC, minimum-energy revenue is calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| RUCEXRR*q,r,d* | $ | *Revenue Less Cost Above LSL During RUC-Committed Hours*—The sum of the total revenue for Resource *r* operating above its LSL less the cost during all RUC-Committed Hours, for the Operating Day. See Section 5.7.1.3. When one or more Combined Cycle Generation Resources are committed by RUC, revenue less cost above LSL is calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| RUCEXRQC*q,r,d* | $ | *Revenue Less Cost During QSE Clawback Intervals*—The sum of the total revenue for Resource *r* less the cost during all QSE Clawback Intervals, for the Operating Day. See Section 5.7.1.4. When one or more Combined Cycle Generation Resources are committed by RUC, revenue less cost during QSE Clawback Intervals is calculated for the Combined Cycle Train for all Combined Cycle Generation Resources earning revenue in QSE Clawback Intervals. |
| RUCHR*q,r,d* | None | RUC Hour—The total number of RUC-Committed Hours, for Resource *r* for the Operating Day. When one or more Combined Cycle Generation Resources are committed by RUC, the total number of RUC-Committed Hours is calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| *q* | None | A QSE. |
| *r* | None | A RUC-committed Generation Resource. |
| *d* | None | An Operating Day containing the RUC-commitment. |
| *h* | None | An hour in the RUC-commitment period. |

5.7.1.1 RUC Guarantee

(1) The allowable Startup Costs and minimum-energy costs of a Resource committed by RUC is the RUC Guarantee. The RUC Guarantee minimum-energy costs are prorated according to the actual generation when the Resource’s average output during a 15-minute Settlement Interval is below the corresponding LSL.

(2) The SUPR, MEPR and LSL used to calculate the RUC Guarantee for a Combined Cycle Train are the SUPR, MEPR and LSL that correspond to the Combined Cycle Generation Resource, within the Combined Cycle Train, that is RUC-committed for the hour.

(3) For an Aggregate Generation Resource (AGR), the Startup Cost shall be scaled according to the maximum number of its generators online during a contiguous block of RUC-committed intervals, as indicated by telemetry, compared to the total number of generators registered to the AGR and used in the approved verifiable cost for the AGR.

(4) The RUC Guarantee is calculated for non-Combined Cycle Trains as follows:

RUCG*q,r,d* = (SUPR*q,r,s* \* RUCSUFLAG*q,r,s*) + (MEPR*q,r,i* \* Min ((LSL*q,r,i* \* (¼)), RTMG*q,r,i*))

(5) The RUC Guarantee is calculated for Combined Cycle Trains as follows:

RUCG*q,r,*d = ******(SUPR*q,r,*s \* RUCSUFLAG*q,r,*s) +

  ******(MAX (0, SUPR - SUPR)) +

 (MEPR*q r,i* \* Min ((LSL*q,r,i* \* (¼)), RTMG*q,r i*))

(a) If a Combined Cycle Train transitions to a RUC-committed configuration from a QSE-committed or other RUC-committed configuration, the transition is calculated as follows:

 MAX (0, SUPR*afterCCGR* – SUPR*beforeCCGR*)

(b) If a Combined Cycle Train transitions to a QSE-committed configuration from a RUC-committed configuration, the transition is calculated as follows:

 MAX (0, SUPR*beforeCCGR* – SUPR*afterCCGR*)

(6) If a validated Three-Part Supply Offer has been submitted for a Resource for the RUC, then the RUC Guarantee for that Resource is based on the Startup Offer and Minimum-Energy Offer in that validated Three-Part Supply Offer. If a validated Three-Part Supply Offer has not been submitted for a Resource for the RUC and ERCOT has not yet approved verifiable unit-specific costs for the Resource, then the RUC Guarantee for a Resource is based on the Resource Category Startup Generic Cap and the Resource Category Minimum-Energy Generic Cap. If a validated Three-Part Supply Offer has not been submitted for a Resource for the RUC and ERCOT has approved verifiable unit-specific costs for the Resource, then the RUC Guarantee for a Resource is based on the most recent ERCOT-approved verifiable unit-specific costs for that Resource.

**For a Resource which is not an AGR,**

If the QSE submitted a validated Three-Part Supply Offer,

 Then, SUPR*q,r,*s = SUO*q,r,s*

 MEPR*q,r,i* = MEO*q,r,i*

 Otherwise, SUPR*q,r,s* = SUCAP*q,r,s*

 MEPR*q,r,i* = MECAP*q,r,i*

If ERCOT has approved verifiable Startup Costs and minimum-energy costs for the Resource,

 Then, SUCAP *q, r, s* = verifiable Startup Costs *q, r, s*

 MECAP*q,r,i* = verifiable minimum-energy costs *q, r, i*

 Otherwise, SUCAP *q, r, s* = RCGSC *s*

 MECAP *q, r, i* = RCGMEC *i*

**For AGRs,**

If the QSE submitted a validated Three-Part Supply Offer,

Then, SUPR *q,r,*s = Min(SUO *q,r,s*, SUCAP *q,r,s*)

 MEPR *q,r,i* = MEO *q,r,i*

 Otherwise, SUPR *q,r,s* = SUCAP *q,r,s*

 MEPR *q,r,i* = MECAP *q,r,i*

If ERCOT has approved verifiable Startup Costs and minimum-energy costs for the Resource,

 Then, SUCAP *q, r, s* = Max c (AGRRATIO *q, p, r* ) \* verifiable Startup Costs *q, r, s*

 MECAP *q,r,i* = verifiable minimum-energy costs *q, r, i*

 Where, AGRRATIO *q,p,r* = AGRMAXON *q, p, r* / AGRTOT *q, p, r*

 Otherwise, SUCAP *q, r, s* = Max c (AGRRATIO *q, p, r*) \* RCGSC *s*

 MECAP *q, r, i* = RCGMEC *i*

The above variables are defined as follows:

| Variable | Unit | Definition |
| --- | --- | --- |
| RUCG*q,r,d* | $ | *RUC Guarantee*—The sum of eligible Startup Costs and minimum-energy costs for Resource *r* during all RUC-Committed Hours, for the Operating Day. When one or more Combined Cycle Generation Resources are committed by RUC, guaranteed costs are calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| SUPR*q,r,s* | $/Start | *Startup Price per start*—The Settlement price for Resource *r* for the start *s*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| SUO*q,r,s* | $/Start | *Startup Offer per start*—Represents an offer for all costs incurred by Generation Resource *r* in starting up and reaching the Resource’s LSL, minus the average energy produced during the time period between breaker close and LSL multiplied by the heat rate proxy multiplied by the appropriate Fuel Index Price (FIP) or Fuel Oil Price (FOP), as described in the Verifiable Cost Manual. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| SUCAP*q,r,s* | $/Start | *Startup Cap*—The amount used for Resource *r* as Startup Costs if the QSE did not submit a validated Three-Part Supply Offer. The cap is the RCGSC unless ERCOT has approved verifiable unit-specific Startup Costs for that Resource, in which case the startup cap is the verifiable unit-specific Startup Cost. See Section 5.6.1, Verifiable Costs, for more information on verifiable costs. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| AGRRATIO *q, p, r* | none | *Aggregate Generation Resource Ratio per QSE per Settlement Point per Aggregate Generation Resource*—A value which represents the ratio of the maximum number of generators online during an hour, as indicated by telemetry, compared to the total number of generators registered to the AGR and used in the approved verifiable cost for the AGR. The value is only applicable if the Resource is an AGR. |
| AGRMAXON *q, p, r* | none | *Aggregate Generation Resource Maximum Online per QSE per Settlement Point per Aggregate Generation Resource*—The maximum number of generators online during an hour, as indicated by telemetry. The value is only applicable if the Resource is an AGR. |
| AGRTOT *q, p, r* | none | *Aggregate Generation Resource Total per QSE per Settlement Point per Aggregate Generation Resource*—The total number of generators registered to the AGR and used in the approved verifiable cost for the AGR. The value is only applicable if the Resource is an AGR. |
| RCGSC*s* | $/Start | *Resource Category Generic Startup Cost*—The Resource Category Generic Startup Cost cap for the category of the Resource, according to Section 4.4.9.2.3, Startup Offer and Minimum-Energy Offer Generic Caps, for the Operating Day. |
| RUCSUFLAG*q,r,s* | none | *RUC Startup Flag*—The flag that indicates whether or not the start *s* for Resource *r* is eligible for RUC Make-Whole Payment. Its value is one if eligible; otherwise, zero. See Section 5.6.2, RUC Startup Cost Eligibility, and Section 5.6.3, Forced Outage of RUC-Committed Resource, for more information on startup eligibility. For a Combined Cycle Train, the Resource *r* must be one of the registered Combined Cycle Generation Resources within the Combined Cycle Train. When one or more Combined Cycle Generation Resources are committed by RUC, the RUC Startup Flag is calculated for the Combined Cycle Train for all RUC-committed Combined Cycle Generation Resources. |
| MEPR*q,r,i* | $/MWh | *Minimum-Energy Price*—The Settlement price for Resource *r* for minimum energy for the Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| MEO*q,r,i* | $/MWh | *Minimum-Energy Offer*—Represents an offer for the costs incurred by Resource *r* in producing energy at the Resource’s LSL for the Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| MECAP*q,r,i* | $/MWh | *Minimum-Energy Cap*—The amount used for Resource *r* for minimum-energy costs if the QSE did not submit a validated Three-Part Supply Offer. The cap is the RCGMEC unless ERCOT has approved verifiable unit-specific minimum energy costs for that Resource, in which case the Minimum-Energy Cap is the verifiable unit-specific minimum energy cost. See Section 5.6.1 for more information on verifiable costs. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. |
| RCGMEC*i* | $/MWh | *Resource Category Generic Minimum-Energy Cost*—The Resource Category Generic Minimum Energy Cost cap for the category of the Resource, according to Section 4.4.9.2.3, for the Operating Day. |
| RTMG*q,r,i* | MWh | *Real-Time Metered Generation*—The Resource *r*’s metered generation for the Settlement Interval *i*. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train. |
| LSL*q,r,i* | MW | *Low Sustained Limit*—The LSL of Generation Resource *r* represented by QSE *q* for the hour that includes the Settlement Interval *i*, as submitted in the Current Operating Plan (COP). 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 RUC-committed Generation Resource. |
| *d* | none | An Operating Day containing the RUC-commitment. |
| *i* | none | A 15-minute Settlement Interval within the hour that includes a RUC-commitment. |
| *s* | none | A start that is eligible to have its costs included in the RUC Guarantee. |
| *t* | none | A transition that is eligible to have its costs included in the RUC Guarantee. |
| *c* | none | A contiguous block of RUC–Committed Hours. |
| *afterCCGR* | none | The Combined Cycle Generation Resource to which a Combined Cycle Train transitions. |
| *beforeCCGR* | none | The Combined Cycle Generation Resource from which a Combined Cycle Train transitions. |