| | | |
|---|---|---|
| DAFGRHVPR $_f$ | \$/MWh | *Day-Ahead FGR Hedge Value Price per flowgate*—The Day-Ahead hedge price of the flowgate *f*, for the hour. |
| MINRESPR | \$/MWh | *Minimum Resource Price*—The lowest Minimum Resource Price for the types of Resources located at the source of MCFRI. |
| DAWALBEP | \$/MWh | *Day-Ahead Weighted Average Load Bus Energy Price*—The weighted average DAM energy price of all load buses for the hour. |
| o | none | A CRR Owner. |
| f | none | A flowgate; in this application f = MCFRI. |
| e | none | A directional network element, including principal element. |
| c | none | A constraint. |
| $e \in$ MCFRI | none | The directional network element *e* belongs to MCFRI. |
| $e \notin$ MCFRI | none | The directional network element *e* doesn't belong to MCFRI. |
| $c \in$ Base Case | none | The constraint *c* is under the Base Case. |

(4) The total of the payments to each CRR Owner for the Operating Hour of all its FGRs settled in the DAM is calculated as follows:

$$\textbf{DAFGRAMTOTOT}_{\boldsymbol{o}} = \sum_{f} \textbf{DAFGRAMT}_{\boldsymbol{o,f}}$$

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| DAFGRAMTOTOT $_o$ | \$ | *Day-Ahead FGR Amount Owner Total per CRR Owner*—The total payment to CRR Owner *o* of all its FGRs settled in the DAM, for the hour. |
| DAFGRAMT $_{o,f}$ | \$ | *Day-Ahead FGR Amount per CRR Owner per flowgate*—The payment to CRR Owner *o* of the FGRs associated with flowgate *f* settled in DAM, for the hour. |
| o | none | A CRR Owner. |
| f | none | A flowgate.. |

#### 7.9.1.5 Payments and Charges for PTP Obligations with Refund Settled in DAM

(1) Except as specified otherwise in paragraph (2) below, ERCOT shall pay the owner of a PTP Obligation with Refund the difference in the Day-Ahead Settlement Point Prices between the sink Settlement Point and the source Settlement Point, subject to a charge for refund, when the price difference is positive, as described in the item (1) (c) (i) of Section 7.4.2, PCRR Allocation Terms and Conditions.

(2) The payment of PTP Obligations with Refund may be further reduced due to transmission elements that are oversold in previous CRR auctions.

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

If the PTP Obligation with Refund has a non-positive value, i.e., (DAOBLRPR $_{(j,k)} \le 0$), then

$$\mathbf{DAOBLRAMT}_{o,(j,k)} = (-1) * \mathbf{DAOBLRTP}_{o,(j,k)}$$

If the PTP Obligation with Refund has a positive value, i.e., ($DAOBLRPR_{(j,k)} > 0$), then

$$\mathbf{DAOBLRAMT}_{o,(j,k)} = (-1) * \mathbf{Max}\ (\mathbf{DAOBLRTP}_{o,(j,k)} - \mathbf{DAOBLRDA}, \mathbf{Min}\ (\mathbf{DAOBLRTP}, \mathbf{DAOBLRHV}))$$

Where:

The target payment:

$$DAOBLRTP_{o,(j,k)} = DAOBLRPR_{(j,k)} * \text{Min}\ (DAOBLR_{o,(j,k)}, OBLRACT_{o,(j,k)})$$

$$DAOBLRPR_{(j,k)} = DASPP_k - DASPP_j$$

$$OBLRACT_{o,(j,k)} = \sum_y (\sum_r (OBLROF_{o,r,(j,k)} * RESACT_{r,(j,k),y}) * TLMP_y) / (\sum_y TLMP_y) * OBLRF_{o,(j,k)}$$

If ($OS_{r,y}$ exists)

$RESACT_{r,(j,k),y} = OS_{r,y}$

Otherwise

If ($EBP_{r,y}$ exists)

$RESACT_{r,(j,k),y} = EBP_{r,y}$

Otherwise

$RESACT_{r,(j,k),y} = BP_{r,y}$

The derated amount:

$$DAOBLRDA_{o,(j,k)} = OBLDRPR_{(j,k)} * \text{Min}\ (DAOBLR_{o,(j,k)}, OBLRACT_{o,(j,k)})$$

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

The hedge value:

$$DAOBLRHV_{o,(j,k)} = DAOBLHVPR_{(j,k)} * \text{Min}\ (DAOBLR_{o,(j,k)}, OBLRACT_{o,(j,k)})$$

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

$DAOBLHVPR_{(j,k)} = \text{Max}\ (0, MAXRESPR_k - DASPP_j)$

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

$DAOBLHVPR_{(j,k)} = \text{Max}\ (0, DASPP_k - MINRESPR_j)$

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| $DAOBLRAMT_{o, (j, k)}$ | $ | *Day-Ahead Obligation with Refund Amount per CRR Owner per pair of source and sink*—The payment to CRR Owner *o* for the PTP Obligation with Refund with the source *j* and the sink *k*, settled in the DAM, for the hour. |
| $DAOBLRTP_{o, (j, k)}$ | $ | *Day-Ahead Obligation with Refund Target Payment per CRR Owner per source and sink pair*—The target payment for CRR Owner *o*'s PTP Obligations with Refund, with the source *j* and the sink *k*, settled in the DAM, for the hour. |
| $DAOBLRHV_{o, (j, k)}$ | $ | *Day-Ahead Obligation with Refund Hedge Value per CRR Owner per source and sink pair*—The hedge value of CRR Owner *o*'s PTP Obligations with Refund, with the source *j* and the sink *k*, settled in the DAM, for the hour. |
| $DAOBLRDA_{o, (j, k)}$ | $ | *Day-Ahead Obligation with Refund Derated Amount per CRR Owner per source and sink pair*—The derated amount of CRR Owner *o*'s PTP Obligations with Refund, with the source *j* and the sink *k*, settled in the DAM, for the hour. |
| $DAOBLRPR_{(j, k)}$ | $/MW per hour | *Day-Ahead Obligation with Refund Price*—The DAM price of a PTP Obligation with Refund for the hour. |
| $DASPP_{j}$ | $/MWh | *Day-Ahead Settlement Point Price at source*—The DAM Settlement Point Price at the source Settlement Point *j* for the hour. |
| $DASPP_{k}$ | $/MWh | *Day-Ahead Settlement Point Price at sink*—The DAM Settlement Point Price at the sink Settlement Point *k* for the hour. |
| $OBLDRPR_{(j, k)}$ | $/MW per hour | *Obligation Deration Price per source and sink pair*—The deration price of a PTP Obligation with the source *j* and the sink *k*, for the hour. |
| $DASP_{c}$ | $/MW per hour | *Day-Ahead Shadow Price per constraint*—The DAM Shadow Price of the constraint *c* for the hour. |
| $DRF_{c}$ | none | *Deration Factor per constraint*— The deration factor of the constraint *c* for the hour, equal to the MW amount by which the constraint is oversold divided by the total MW amount of the positive impacts on the constraint of all CRRs existing prior to DAM execution. |
| $DAWASF_{j, c}$ | none | *Day-Ahead Weighted Average Shift Factor at source per constraint*—The Day-Ahead Shift Factor for the source Settlement Point and the directional network element for constraint *c*, in the hour. |
| $DAWASF_{k, c}$ | none | *Day-Ahead Weighted Average Shift Factor at sink per constraint*—The Day-Ahead Shift Factor for the sink Settlement Point and the directional network element for constraint *c*, in the hour. |
| $DAOBLHVPR_{(j, k)}$ | $/MWh | *Day-Ahead Obligation Hedge Value Price per source and sink pair*—The Day-Ahead hedge price of a PTP Obligation with the source *j* and the sink *k*, for the hour. |
| $MINRESPR_{j}$ | $/MWh | *Minimum Resource Price for source*—The lowest Minimum Resource Price for the types of Resources located at the source Settlement Point *j*. |
| $MAXRESPR_{k}$ | $/MWh | *Max Resource Price for sink*—The highest Maximum Resource Price for the types of Resources located at the sink Settlement Point *k*. |
| $DAOBLR_{o, (j, k)}$ | MW | *Day-Ahead Obligation with Refund per CRR Owner per pair of source and sink*— The number of CRR Owner *o*'s PTP Obligations with Refund with the source *j* and the sink *k* settled in DAM for the hour. |
| $OBLRACT_{o, (j, k)}$ | MW | *Obligation with Refund Actual usage per CRR Owner per pair of source and sink*—CRR Owner *o*'s actual usage for the PTP Obligations with Refund with the source *j* and the sink *k*, for the hour. |
| $RESACT_{r, (j, k), y}$ | MW | *Resource Actual per resource associated with pair of source and sink per interval*—The output of Resource *r* associated with the PTP Obligations with Refund with the source *j* and the sink *k*, for the SCED interval y. |

| | | |
|---|---|---|
| OBLROF $_{o, r, (j, k)}$ | none | *Obligation with Refund Ownership Factor per CRR Owner per resource associated with pair of source and sink*—The factor showing the percentage usage of Resource *r* for CRR Owner *o*'s PTP Obligations with Refund with the source *j* and the sink *k*. Its value is 1, if only one CRR Owner has acquired PCRRs under the refund provision using this Resource *r*. |
| OS $_{r, y}$ | MW | *Output Schedule per resource per SCED interval*—The Output Schedule for Resource *r* for the SCED interval y. |
| EBP $_{r, y}$ | MW | *Emergency Base Point per resource per SCED interval*—The Emergency Base Point of Resource *r* for the SCED interval y. |
| BP $_{r, y}$ | MW | *Base Point per resource per SCED interval*—The Base Point of Resource *r* for the SCED interval y. |
| OBLRF $_{o, (j, k)}$ | none | *Obligation with Refund Factor associated with pair of source and sink per CRR Owner*—The ratio of CRR Owner *o*'s capacity allocated to the PTP Obligations with Refund with the source *j* and sink *k* to the same CRR Owner's total capacity nominated for all the PCRRs under the refund provision with the same source *j*. |
| TLMP $_{y}$ | second | *Duration of SCED interval per interval*—The duration of the portion of the SCED interval *y* within the hour. |
| o | none | A CRR Owner. |
| y | none | A SCED interval in the hour. |
| r | none | A Resource. |
| j | none | A source Settlement Point. |
| k | none | A sink Settlement Point. |
| c | none | A constraint associated with a directional network element for the hour. |

(4) The net total payment or charge to each CRR Owner for the Operating Hour of all its PTP Obligations with Refund settled in the DAM is calculated as follows:

$$\mathbf{DAOBLRAMTOTOT}_{o} = \mathbf{DAOBLRCROTOT}_{o} + \mathbf{DAOBLRCHOTOT}_{o}$$

Where:

$$\text{DAOBLRCROTOT}_{o} = \sum_{j}\sum_{k} \text{Min}\,(0, \text{DAOBLRAMT}_{o, (j, k)})$$

$$\text{DAOBLRCHOTOT}_{o} = \sum_{j}\sum_{k} \text{Max}\,(0, \text{DAOBLRAMT}_{o, (j, k)})$$

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| DAOBLRAMTOTOT $_{o}$ | $ | *Day-Ahead Obligation with Refund Amount Owner Total per CRR Owner*—The net total payment or charge to CRR Owner *o* for all its PTP Obligations with Refund settled in the DAM, for the hour. |
| DAOBLRCROTOT $_{o}$ | $ | *Day-Ahead Obligation with Refund Credit Owner Total per CRR Owner*—The total payment to CRR Owner *o* for its PTP Obligations with Refund settled in the DAM, for the hour. |
| DAOBLRCHOTOT $_{o}$ | $ | *Day-Ahead Obligation with Refund Charge Owner Total per CRR Owner*—The total charge to CRR Owner *o* for its PTP Obligations with Refund settled in the DAM, for the hour. |
| DAOBLRAMT $_{o, (j, k)}$ | $ | *Day-Ahead Obligation with Refund Amount per CRR Owner per pair of source* |

| | | |
|---|---|---|
| | | *and sink*—The payment or charge to CRR Owner *o* for the PTP Obligations with Refund with the source *j* and the sink *k* settled in the DAM, for the hour. |
| o | none | A CRR Owner. |
| j | none | A source Settlement Point. |
| k | none | A sink Settlement Point. |

### 7.9.1.6 Payments for PTP Options with Refund Settled in DAM

(1) Except as specified otherwise in paragraph (2) below, ERCOT shall pay the owner of a PTP Option with Refund the difference in the DAM Settlement Point Prices between the sink Settlement Point and the source Settlement Point, if positive, subject to a charge for refund, as described in the item (1) (c) (i) of Section 7.4.2, PCRR Allocation Terms and Conditions.

(2) The payment of PTP Options with Refund may be further reduced due to transmission elements that are oversold in previous CRR auctions.

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

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

Where:

The target payment:

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

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

$$\text{OPTRACT}_{o, (j, k)} = \sum_{y} (\sum_{r} (\text{OPTROF}_{o, r, (j, k)} * \text{RESACT}_{r, (j, k), y}) * \text{TLMP}_{y}) / (\sum_{y} \text{TLMP}_{y}) * \text{OPTRF}_{o, (j, k)}$$

If ($\text{OS}_{r, y}$ exists)

$\text{RESACT}_{r, (j, k), y} = \text{OS}_{r, y}$

Otherwise

If ($\text{EBP}_{r, y}$ exists)

$\text{RESACT}_{r, (j, k), y} = \text{EBP}_{r, y}$

Otherwise

$\text{RESACT}_{r, (j, k), y} = \text{BP}_{r, y}$

The derated amount:

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

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

The hedge value:

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

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

The above variables are defined as follows:

| **Variable** | **Unit** | **Definition** |
|---|---|---|
| $\text{DAOPTRAMT}_{o, (j, k)}$ | \$ | *Day-Ahead Option with Refund Amount per CRR Owner per pair of source and sink*—The payment to CRR Owner *o* for its PTP Options with Refund with the source *j* and the sink *k*, settled in the DAM, for the hour. |
| $\text{DAOPTRTP}_{o, (j, k)}$ | \$ | *Day-Ahead Option with Refund Target Payment per CRR Owner per source and sink pair*—The target payment for CRR Owner *o*'s PTP Options with Refund, with the source *j* and the sink *k*, settled in the DAM, for the hour. |
| $\text{DAOPTRHV}_{o, (j, k)}$ | \$ | *Day-Ahead Option with Refund Hedge Value per CRR Owner per source and sink pair*—The hedge value of CRR Owner *o*'s PTP Options with Refund, with the source *j* and the sink *k*, settled in the DAM, for the hour. |
| $\text{DAOPTRDA}_{o, (j, k)}$ | \$ | *Day-Ahead Option with Refund Derated Amount per CRR Owner per source and sink pair*—The derated amount of CRR Owner *o*'s PTP Options with Refund, with the source *j* and the sink *k*, settled in the DAM, for the hour. |
| $\text{DAOPTRPR}_{(j, k)}$ | \$/MW per hour | *Day-Ahead Option Price with Refund per pair of source and sink*—The DAM price of the PTP Option with Refund with the source *j* and the sink *k*, for the hour. |
| $\text{DASPP}_{j}$ | \$/MWh | *Day-Ahead Settlement Point Price at source*—The DAM Settlement Point Price at the source Settlement Point *j*, for the hour. |
| $\text{DASPP}_{k}$ | \$/MWh | *Day-Ahead Settlement Pont Price at sink*—The DAM Settlement Point Price at the sink Settlement Point *k*, for the hour. |
| $\text{DAOPTR}_{o, (j, k)}$ | MW | *Day-Ahead Option with Refund per CRR Owner per pair of source and sink*—The number of CRR Owner *o*'s PTP Options with Refund with the source *j* and the sink *k*, settled in DAM, for the hour. |
| $\text{RTOPTR}_{o, (j, k)}$ | MW | *Real-Time Option with Refund per CRR Owner per pair of source and sink*—The number of CRR Owner *o*'s PTP Options with Refund with the source *j* and the sink *k* settled in Real-Time, for the hour. |
| $\text{OPTRACT}_{o, (j, k)}$ | MW | *Option with Refund Actual usage per CRR Owner per pair of source and sink*—CRR Owner *o*'s actual usage for the PTP Options with Refund with the source *j* and the sink *k*, for the hour. |

| | | |
|---|---|---|
| RESACT $_{r, (j, k), y}$ | MW | *Resource Actual per resource associated with pair of source and sink per interval*—The output of Resource *r* associated with the PTP Options with Refund with the source *j* and the sink *k*, for the SCED interval *y*. |
| OPTROF $_{o, r, (j, k)}$ | none | *Option with Refund Ownership Factor per CRR Owner per resource associated with pair of source and sink*—The factor showing the percentage usage of Resource *r* for CRR Owner *o*'s PTP Options with Refund with the source *j* and the sink *k*. Its value is 1, if only one CRR Owner has acquired PCRRs under the refund provision using this Resource *r*. |
| OS $_{r, y}$ | MW | *Output Schedule per resource per SCED interval*—The Output Schedule for Resource *r* for the SCED interval *y*. |
| EBP $_{r, y}$ | MW | *Emergency Base Point per resource per SCED interval*—The Emergency Base Point of Resource *r* for the SCED interval *y*. |
| BP $_{r, y}$ | MW | *Base Point per resource per SCED interval*—The Base Point of Resource *r* for the SCED interval y. |
| OPTRF $_{o, (j, k)}$ | none | *Option with Refund Factor associated with pair of source and sink per CRR Owner*—The ratio of CRR Owner *o*'s capacity allocated to the PTP Options with Refund with the source *j* and sink *k* to the same CRR Owner's total capacity nominated PCRRs under the refund provision with the same source *j*. |
| TLMP $_{y}$ | second | *Duration of SCED interval per interval*—The duration of the portion of the SCED interval *y* within the hour. |
| OPTDRPR $_{(j, k)}$ | \$/MW per hour | *Option Deration Price per source and sink pair*—The deration price of a PTP Option with the source *j* and the sink *k*, for the hour. |
| DASP $_{c}$ | \$/MW per hour | *Day-Ahead Shadow Price per constraint*—The DAM Shadow Price of the constraint *c* for the hour. |
| DRF $_{c}$ | none | *Deration Factor per constraint*— The deration factor of the constraint *c* for the hour, equal to the MW amount by which the constraint is oversold divided by the total MW amount of the positive impacts on the constraint of all CRRs existing prior to DAM execution. |
| DAWASF $_{j, c}$ | none | *Day-Ahead Weighted Average Shift Factor at source per constraint*—The Day-Ahead Shift Factor for the source Settlement Point and the directional network element for constraint *c*, in the hour. |
| DAWASF $_{k, c}$ | none | *Day-Ahead Weighted Average Shift Factor at sink per constraint*—The Day-Ahead Shift Factor for the sink Settlement Point and the directional network element for constraint *c*, in the hour. |
| DAOPTHVPR $_{(j, k)}$ | \$/MWh | *Day-Ahead Option Hedge Value Price per pair of source and sink*—The Day-Ahead hedge price of a PTP Option with the source *j* and the sink *k*, for the hour. |
| MINRESPR $_{j}$ | \$/MWh | *Minimum Resource Price for source*—The lowest Minimum Resource Price for the types of Resources located at the source Settlement Point *j*. |
| o | none | A CRR Owner. |
| y | none | A SCED interval in the hour. |
| r | none | A Resource. |
| j | none | A source Settlement Point. |
| k | none | A sink Settlement Point. |
| c | none | A constraint associated with a directional network element for the hour. |

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

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

The above variables are defined as follows:

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

### *7.9.2 Real-Time CRR Payments and Charges*

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

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

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

Where:

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

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| RTOBLAMT $_{q, (j, k)}$ | $ | *Real-Time Obligation Amount per QSE per pair of source and sink*—The payment or charge to QSE *q* for its PTP Obligations with the source *j* and the sink *k* settled in Real-Time, for the hour. |
| RTOBLPR $_{(j, k)}$ | $/MW per hour | *Real-Time Obligation Price*—The Real-Time price of the PTP Obligation, for the hour. |
| RTSPP $_{j, i}$ | $/MWh | *Real-Time Settlement Point Price at source per interval*—The Real-Time Settlement Point Price at the source *j* for the 15-minute Settlement Interval *i*. |
| RTSPP $_{k, i}$ | $/MWh | *Real-Time Settlement Point Price at sink per interval*—The Real-Time Settlement Point Price at the sink *k* for the 15-minute Settlement Interval *i*. |
| RTOBL $_{q, (j, k)}$ | MW | *Real-Time Obligation per QSE per pair of source and sink*—The number of QSE *q*'s PTP Obligations for the source *j* and the sink *k* settled in Real-Time for the hour. |

| | | |
|---|---|---|
| q | none | A QSE. |
| i | none | A 15-minute Settlement Interval in the Operating Hour. |
| j | none | A source Settlement Point. |
| k | none | A sink Settlement Point. |

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

$$\mathbf{RTOBLAMTQSETOT}_{q} = \sum_{j}\sum_{k} \mathbf{RTOBLAMT}_{q, (j, k)}$$

The above variables are defined as follows:

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

### 7.9.2.2 Payments for PTP Options Settled in Real-Time

(1) Except as specified in paragraph (2) below, ERCOT shall pay the NOIE that owns a PTP Option that was declared before DAM execution by the NOIE to be settled in Real-Time and not cleared in the DAM, the positive difference in Real-Time Settlement Point Prices between the sink and the source.

(2) For PTP Options that source or sink at a Resource Node, the PTP Option payment may be reduced due to transmission elements that are oversold in previous CRR auctions.

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

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

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

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

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

Where:

The target payment:

$$\text{RTOPTTP}_{o,(j,k)} = \text{RTOPTPR}_{(j,k)} * \text{RTOPT}_{o,(j,k)}$$

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

The derated amount:

$$\text{RTOPTDA}_{o,(j,k)} = \text{OPTDRPR}_{(j,k)} * \text{RTOPT}_{o,(j,k)}$$

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

The hedge value:

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

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

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

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

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

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

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

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| $\text{RTOPTAMT}_{o,(j,k)}$ | $ | *Real-Time Option Amount per CRR Owner per source and sink pair* —The payment to NOIE CRR Owner *o* of PTP Options with the source *j* and the sink *k* settled in Real-Time, for the hour. |
| $\text{RTOPTTP}_{o,(j,k)}$ | $ | *Real-Time Option Target Payment per CRR Owner per source and sink pair*—The target payment for CRR Owner *o*'s PTP Options with the source *j* and the sink *k* settled in Real-Time, for the hour. |
| $\text{RTOPTHV}_{o,(j,k)}$ | $ | *Real-Time Option Hedge Value per CRR Owner per source and sink pair*—The hedge value of CRR Owner *o*'s PTP Options with the source *j* and the sink *k* settled in Real-Time, for the hour. |
| $\text{RTOPTDA}_{o,(j,k)}$ | $ | *Real-Time Option Derated Amount per CRR Owner per source and sink pair*—The derated amount of CRR Owner *o*'s PTP Options with the source *j* and the sink *k* settled in Real-Time, for the hour. |
| $\text{RTOPTPR}_{(j,k)}$ | $/MW per hour | *Real-Time Option Price per source and sink pair* —The Real-Time price of a PTP Option with the source *j* and the sink *k* for the hour. |
| $\text{RTSPP}_{j,i}$ | $/MWh | *Real-Time Settlement Point Price at source per interval*—The Real-Time Settlement Point Price at the source Settlement Point *j*, for the 15-minute Settlement Interval *i*. |

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

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

$$\mathbf{RTOPTAMTOTOT}_{\boldsymbol{o}} = \sum_{j} \sum_{k} \mathbf{RTOPTAMT}_{\boldsymbol{o, (j, k)}}$$

The above variables are defined as follows:

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

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

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

The above variables are defined as follows:

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

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

(1) Except as specified in paragraph (2) below, ERCOT shall pay the NOIE that owns a PTP Option with Refund that was allocated to that NOIE as a PCRR and that was, declared before DAM execution by the NOIE to be settled in Real-Time but not cleared in the DAM, for the MW quantity up to the pro-rata actual usage based on the positive difference in Real-Time Settlement Point Price between the sink and the source.

(2) The payment of PTP Options with Refund may be further reduced due to transmission elements that are oversold in previous CRR auctions.

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

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

Where:

The target payment:

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

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

$$\text{OPTRACT}_{o,(j,k)} = \sum_{y} (\sum_{r} (\text{OPTROF}_{o,r,(j,k)} * \text{RESACT}_{r,(j,k),y}) * \text{TLMP}_{y}) / (\sum_{y} \text{TLMP}_{y}) * \text{OPTRF}_{o,(j,k)}$$

If ($OS_{r,y}$ exists)

$\text{RESACT}_{r,(j,k),y} = OS_{r,y}$

Otherwise

If ($EBP_{r,y}$ exists)

$\text{RESACT}_{r,(j,k),y} = EBP_{r,y}$

Otherwise

$\text{RESACT}_{r,(j,k),y} = BP_{r,y}$

The derated amount:

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

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

The hedge value:

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

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

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| $\text{RTOPTRAMT}_{o,(j,k)}$ | $ | *Real-Time Option with Refund Amount per CRR Owner per pair of source and sink*—The payment to CRR Owner *o* of the PTP Options with Refund with the source *j* and the sink *k*, settled in Real-Time, for the hour. |
| $\text{RTOPTRTP}_{o,(j,k)}$ | $ | *Real-Time Option with Refund Target Payment per CRR Owner per source and sink pair*—The target payment for CRR Owner *o*'s PTP Options with Refund, with the source *j* and the sink *k*, settled in Real-Time, for the hour. |
| $\text{RTOPTRHV}_{o,(j,k)}$ | $ | *Real-Time Option with Refund Hedge Value per CRR Owner per source and sink pair*—The hedge value of CRR Owner *o*'s PTP Options with Refund, with the source *j* and the sink *k*, settled in Real-Time, for the hour. |

| | | |
|---|---|---|
| RTOPTRDA $_{o, (j, k)}$ | $ | *Real-Time Option with Refund Derated Amount per CRR Owner per source and sink pair*—The derated amount of CRR Owner *o*'s PTP Options with Refund, with the source *j* and the sink *k*, settled in Real-Time, for the hour. |
| RTOPTRPR $_{(j, k)}$ | $/MW per hour | *Real-Time Option with Refund Price per pair of source and sink*—The Real-Time price of the PTP Options with Refund with the source *j* and the sink *k*, for the hour. |
| RTSPP $_{j, i}$ | $/MWh | *Real-Time Settlement Point Price at source per interval*—The Real-Time Settlement Point Price at the source *j* for the 15-minute Settlement Interval *i*. |
| RTSPP $_{k, i}$ | $/MWh | *Real-Time Settlement Point Price at sink per interval*—The Real-Time Settlement Point Price at the sink *k* for the 15-minute Settlement Interval *i*. |
| OPTRACT $_{o, (j, k)}$ | MW | *Option with Refund Actual usage per CRR Owwner per pair of source and sink*—CRR Owner *o*'s actual usage for the PTP Options with Refund with the source *j* and the sink *k*, for the hour. |
| RESACT $_{r, (j, k), y}$ | MW | *Resource Actual per resource associated with pair of source and sink per interval*—The output of Resource *r* recognized for the CRR Owner's PTP Options with Refund with the source *j* and the sink *k*, for the SCED interval y. |
| OPTROF $_{o, r, (j, k)}$ | none | *Option with Refund Ownership Factor per CRR Owner per resource associated with pair of source and sink*—The factor showing the percentage usage of Resource *r* for CRR Owner *o*'s PTP Options with Refund with the source *j* and the sink *k*. Its value is 1, if only one CRR Owner uses this Resource for PCRRs under the refund provision. |
| OS $_{r, y}$ | MW | *Output Schedule per resource per SCED interval*—The Output Schedule for Resource *r* for the SCED interval *y*. |
| EBP $_{r, y}$ | MW | *Emergency Base Point per resource per SCED interval*—The Emergency Base Point of Resource *r* for the SCED interval y. |
| BP $_{r, y}$ | MW | *Base Point per resource per SCED interval*—The Base Point of Resource *r* for the SCED interval y. |
| OPTRF $_{o, (j, k)}$ | none | *Option with Refund Factor associated with pair of source and sink per CRR Owner*—The ratio of CRR Owner *o*'s capacity allocated to the PTP Options with Refund with the source *j* and sink *k* to the same CRR Owner's total capacity nominated for all the PCRRs under the refund provision with the same source *j*. |
| TLMP $_{y}$ | second | *Duration of SCED interval per interval*—The duration of the portion of the SCED interval *y* within the hour. |
| RTOPTR $_{(j, k)}$ | MW | *Real-Time Option with Refund per pair of source and sink*—The number of the CRR Owner's PTP Options with Refund with the source *j* and the sink *k*, settled in Real-Time, for the hour. |
| DAOPTR $_{o, (j, k)}$ | MW | *Day-Ahead Option with Refund per CRR Owner per pair of source and sink*—The number of CRR Owner *o*'s PTP Options with Refund settled in the DAM and sourced and sunk at the same Settlement Points as the PTP Option with Refund settled in Real-Time, for the hour. |
| OPTDRPR $_{(j, k)}$ | $/MW per hour | *Option Deration Price per source and sink pair*—The deration price of a PTP Option with the source *j* and the sink *k*, for the hour. |
| DASP $_{c}$ | $/MW per hour | *Day-Ahead Shadow Price per constraint*—The DAM Shadow Price of the constraint *c* for the hour. |
| DRF $_{c}$ | none | *Deration Factor per constraint*— The deration factor of the constraint *c* for the hour, equal to the MW amount by which the constraint is oversold divided by the total MW amount of the positive impacts on the constraint of all CRRs existing prior to DAM execution. |
| DAWASF $_{j, c}$ | none | *Day-Ahead Weighted Average Shift Factor at source per constraint*—The Day-Ahead Shift Factor for the source Settlement Point and the directional network |

| | | |
|---|---|---|
| | | element for constraint *c*, in the hour. |
| DAWASF $_{k, c}$ | none | *Day-Ahead Weighted Average Shift Factor at sink per constraint*—The Day-Ahead Shift Factor for the sink Settlement Point and the directional network element for constraint *c*, in the hour. |
| ~~DAOPTHVPR~~ RTOPTHVPR $_{(j, k)}$ | \$/MWh | *~~Day-Ahead~~Real-Time Option Hedge Value Price per ~~pair of~~ source and sink pair*—The ~~Day-Ahead~~Real-Time hedge price of a PTP Option with the source *j* and the sink *k*, for the hour. |
| MINRESPR $_j$ | \$/MWh | *Minimum Resource Price for source*—The lowest Minimum Resource Price for the types of Resources located at the source Settlement Point *j*. |
| o | none | A CRR Owner. |
| r | none | A Resource. |
| y | none | A SCED interval in the hour. |
| j | none | A source Settlement Point. |
| k | none | A sink Settlement Point. |
| c | none | A constraint associated with a directional network element for the hour. |

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

$$\textbf{RTOPTRAMTOTOT}_{\,o} = \sum_{j}\sum_{k} \textbf{RTOPTRAMT}_{\,o,\,(j,\,k)}$$

The above variables are defined as follows:

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

### *7.9.3 CRR Balancing Account*

#### 7.9.3.1 DAM Congestion Rent

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

(a) The total of payments to all QSEs for cleared DAM energy offers (this does not include any revenue calculated for an RMR Unit, even though its Three-Part Supply Offer was cleared in the DAM), whether through Three-Part Supply Offers or through DAM Energy-Only Offer Curves, calculated under Section 4.6.2.1., Day-Ahead Energy Payment;

(b) The total of revenue for all RMR Units as calculated below;

(c) The total of charges to all QSEs for cleared DAM Energy Bids, calculated under Section 4.6.2.2, Day-Ahead Energy Charge; and

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

(2) The DAM Congestion Rent for a given Operating Hour is calculated as follows:

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

Where:

$$\text{DAESAMTTOT} = \sum_{q} \text{DAESAMTQSETOT}_{q}$$

$$\text{DAEPAMTTOT} = \sum_{q} \text{DAEPAMTQSETOT}_{q}$$

$$\text{DARTOBLAMTTOT} = \sum_{q} \text{DARTOBLAMTQSETOT}_{q}$$

$$\text{RMRDAEREVTOT} = \sum_{q} \sum_{p} \sum_{r} \text{DAEREV}_{q,p,r}$$

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

The above variables are defined as follows:

| **Variable** | **Unit** | **Definition** |
|---|---|---|
| DACONGRENT | $ | *Day-Ahead Congestion Rent*—The Congestion Rent collected in the DAM for the hour. |
| DAESAMTTOT | $ | *Day-Ahead Energy Sale Amount Total*—The total payment to all QSEs for cleared DAM energy offers, whether through Three-Part Supply Offers or through DAM Energy-Only Offer Curves for the hour. |
| RMRDAEREVTOT | $ | *RMR Day-Ahead Energy Revenue Total*(The total of the RMR Day-Ahead Energy Revenue for all RMR Units for the hour. See Section 6.6.6, Reliability Must-Run Settlement. |
| DAEPAMTTOT | $ | *Day-Ahead Energy Purchase Amount Total*—The total charge to all QSEs for cleared DAM Energy Bids for the hour. |
| DARTOBLAMTTOT | $ | *Day-Ahead Real-Time Obligation Amount Total*—The net total charge or payment to all QSEs for cleared PTP Obligation Bids in the DAM for the hour. |
| DAESAMTQSETOT $_{q}$ | $ | *Day-Ahead Energy Sale Amount QSE Total per QSE*—The total payment to QSE *q* for cleared DAM energy offers, whether through Three-Part Supply Offers or through DAM Energy-Only Offer Curves, for the hour. See Section 4.6.2.1, Day-Ahead Energy Payment, item (2). |
| DAEREV $_{q,p,r}$ | $ | *Day-Ahead Energy Revenue per QSE by Settlement Point per unit*(The |

| | | |
|---|---|---|
| | | revenue received in the DAM for RMR Unit *r* at Resource Node *p* represented by QSE *q*, based on the DAM Settlement Point Price, for the hour. |
| $DASPP_{p}$ | \$/MWh | *Day-Ahead Settlement Point Price by Settlement Point*(The DAM Settlement Point Price at Resource Node *p* for the hour. |
| $DAESR_{q, p, r}$ | MW | *Day-Ahead Energy Sale from Resource per QSE by Settlement Point per unit*(The amount of energy cleared through Three-Part Supply Offers in the DAM and/or DAM Energy-Only Offer Curves for RMR Unit *r* at Resource Node *p* represented by QSE *q* for the hour. |
| $DAEPAMTQSETOT_{q}$ | \$ | *Day-Ahead Energy Purchase Amount QSE Total per QSE*—The total charge to QSE *q* for cleared DAM Energy Bids for the hour. See Section 4.6.2.2, Day-Ahead Energy Charge, item (2). |
| $DARTOBLAMTQSETOT_{q}$ | \$ | *Day-Ahead Real-Time Obligation Amount QSE Total per QSE* —The total charge or payment to QSE *q* for PTP Obligation Bids cleared in the DAM for the hour. See Section 4.6.3, Settlement for PTP Obligations Bought in DAM, item (2). |
| q | none | A QSE. |
| p | none | A Resource Node Settlement Point. |
| r | none | An RMR Unit. |

### 7.9.3.2 Credit to CRR Balancing Account

If the Day-Ahead Congestion Rent is greater than the total payment to all CRR Owners for the CRRs settled in the DAM for any Operating Hour, a credit is put into the CRR Balancing Account for that Operating Hour. The credit to the CRR Balancing Account for a given Operating Hour is calculated as follows:

$$\mathbf{CRRBACR} = \mathbf{Max\ (0, (DACONGRENT + DACRRCRTOT + DACRRCHTOT))}$$

Where:

$$DACRRCRTOT = DAOBLCRTOT + DAOBLRCRTOT + DAOPTAMTTOT + DAOPTRAMTTOT + DAFGRAMTTOT$$

$$DACRRCHTOT = DAOBLCHTOT + DAOBLRCHTOT$$

$$DAOBLCRTOT = \sum_{o} DAOBLCROTOT_{o}$$

$$DAOBLCHTOT = \sum_{o} DAOBLCHOTOT_{o}$$

$$DAOBLRCRTOT = \sum_{o} DAOBLRCROTOT_{o}$$

$$DAOBLRCHTOT = \sum_{o} DAOBLRCHOTOT_{o}$$

$$DAOPTAMTTOT = \sum_{o} DAOPTAMTOTOT_{o}$$

$$DAOPTRAMTTOT = \sum_{o} DAOPTRAMTOTOT_{o}$$

$$DAFGRAMTTOT = \sum_{o} DAFGRAMTOTOT_{o}$$

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| CRRBACR | $ | *CRR Balancing Account Credit*—The credit to the CRR Balancing Account for the hour. |
| DACONGRENT | $ | *Day-Ahead Congestion Rent*—The Congestion Rent collected in the DAM for the hour. See 7.9.3.1. |
| DACRRCRTOT | $ | *Day-Ahead CRR Credit Total*—The total payment to all CRR Owners of all CRRs settled in the DAM for the hour. |
| DACRRCHTOT | $ | *Day-Ahead CRR Charge Total*—The total charge to all CRR Owners of all CRRs settled in the DAM for the hour. |
| DAOBLCRTOT | $ | *Day-Ahead Obligation Credit Total*—The total payment of all PTP Obligations settled in the DAM, for the hour. |
| DAOBLCHTOT | $ | *Day-Ahead Obligation Charge Total*—The total charge of all PTP Obligations settled in the DAM, for the hour. |
| DAOBLRCRTOT | $ | *Day-Ahead Obligation with Refund Credit Total*—The total payment of all PTP Obligations with Refund settled in the DAM, for the hour. |
| DAOBLRCHTOT | $ | *Day-Ahead Obligation with Refund Charge Total*—The total charge of all PTP Obligations with Refund settled in the DAM, for the hour. |
| DAOPTAMTTOT | $ | *Day-Ahead Option Amount Total*—The total payment of all PTP Options settled in the DAM, for the hour. |
| DAOPTRAMTTOT | $ | *Day-Ahead Option with Refund Amount Total*—The total payment of all PTP Options with Refund settled in the DAM, for the hour. |
| DAFGRAMTTOT | $ | *Day-Ahead FGR Amount Total*—The total payment of all FGRs settled in the DAM, for the hour. |
| $DAOBLCROTOT_{o}$ | $ | *Day-Ahead Obligation Credit Owner Total per owner*—The total payment to CRR Owner *o* of PTP Obligations settled in the DAM, for the hour. See Section 7.9.1.1, Payments and Charges for PTP Obligations Settled in DAM. |
| $DAOBLCHOTOT_{o}$ | $ | *Day-Ahead Obligation Charge Owner Total per owner*—The total charge to CRR Owner *o* of PTP Obligations settled in the DAM, for the hour. See Section 7.9.1.1 Payments and Charges for PTP Obligations Settled in DAM. |
| $DAOBLRCROTOT_{o}$ | $ | *Day-Ahead Obligation with Refund Credit Owner Total per owner*—The total payment to the CRR Owner *o* of PTP Obligations with Refund settled in the DAM, for the hour. See Section 7.9.1.5, Payments and Charges for PTP Obligations with Refund Settled in DAM. |
| $DAOBLRCHOTOT_{o}$ | $ | *Day-Ahead Obligation with Refund Charge Owner Total per owner*—The total charge to CRR Owner *o* of PTP Obligations with Refund settled in the DAM, for the hour. See Section 7.9.1.5, Payments and Charges for PTP Obligations with Refund Settled in DAM. |
| $DAOPTAMTOTOT_{o}$ | $ | *Day-Ahead Option Amount Owner Total per owner*—The total payment to the CRR Owner *o* of PTP Options settled in the DAM, for the hour. See Section 7.9.1.2, Payments for PTP Options Settled in DAM. |

| | | |
|---|---|---|
| DAOPTRAMTOTOT $_o$ | $ | *Day-Ahead Option with Refund Amount Owner Total per owner*—The total payment to the CRR Owner *o* of PTP Options with Refund settled in the DAM, for the hour. See Section 7.9.1.6, Payments for PTP Options with Refund Settled in DAM. |
| DAFGRAMTOTOT $_o$ | $ | *Day-Ahead FGR Amount Owner Total per owner*—The total payment to the CRR Owner *o* of FGRs settled in the DAM, for the hour. See Section 7.9.1.4, Payments for FGRs Settled in DAM. |
| o | none | A CRR Owner. |

#### 7.9.3.3 Shortfall Charges to CRR Owners

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

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

$$\mathbf{DACRRSAMT}_{o} = \mathbf{(-1) * Min (0, DACONGRENT + DACRRCRTOT + DACRRCHTOT) * CRRCRRSDA}_{o}$$

Where:

$$\text{CRRCRRSDA}_{o} = (\text{DAOBLCROTOT}_{o} + \text{DAOBLRCROTOT}_{o} + \text{DAOPTAMTOTOT}_{o} + \text{DAOPTRAMTOTOT}_{o} + \text{DAFGRAMTOTOT}_{o}) / (\text{DACRRCRTOT} + \text{RTOPTAMTTOT} + \text{RTOPTRAMTTOT})$$

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

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

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| DACRRSAMT $_o$ | $ | *Day-Ahead CRR Shortfall Amount per owner*—The shortfall charge to CRR Owner *o* for its CRRs settled in the DAM, due to deration, for the hour. |
| DACONGRENT | $ | *Day-Ahead Congestion Rent*—The Congestion Rent collected in the DAM for the hour. See 7.9.3.1. |
| DACRRCRTOT | $ | *Day-Ahead CRR Credit Total*—The total payment to all CRR Owners of all the CRRs settled in the DAM, for the hour. See 7.9.3.3. |
| DACRRCHTOT | $ | *Day-Ahead CRR Charge Total*—The total charge to all CRR Owners of all the CRRs settled in the DAM, for the hour. See 7.9.3.3. |
| CRRCRRSDA $_o$ | none | *CRR Credit Ratio Share Day-Ahead per owner*—The ratio of the total payments to CRR Owner *o* of its CRRs settled in the DAM to the total payments to all CRR Owners of all CRRS, for the hour. |

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

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

$$\textbf{RTCRRSAMT}_{o} = (-1) * \textbf{Min}(0, \textbf{DACONGRENT} + \textbf{DACRRCRTOT} + \textbf{DACRRCHTOT}) * \textbf{CRRCRRSRT}_{o}$$

Where:

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

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

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

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|

| | | |
|---|---|---|
| RTCRRSAMT $_o$ | $ | *Real-Time CRR Shortfall Amount per owner*—The shortfall charge to CRR Owner *o* for its CRRs settled in Real-Time, due to deration, for the hour. |
| DACONGRENT | $ | *Day-Ahead Congestion Rent*—The Congestion Rent collected in the DAM for the hour. See 7.9.3.1. |
| DACRRCRTOT | $ | *Day-Ahead CRR Credit Total*—The total payment to all CRR Owners of all the CRRs settled in the DAM, for the hour. See 7.9.3.3. |
| DACRRCHTOT | $ | *Day-Ahead CRR Charge Total*—The total charge to all CRR Owners of all the CRRs settled in the DAM, for the hour. See 7.9.3.3. |
| CRRCRRSRT $_o$ | none | *CRR Credit Ratio Share Real-Time per owner*—The ratio of the total payments to CRR Owner *o* of its CRRs settled in Real-Time to the total payments to all CRR Owners of all CRRS, for the hour. |
| RTOPTAMTTOT | $ | *Real-Time Option Amount Total*—The total of payments to all CRR Owners of all PTP Options settled in Real-Time for the hour. |
| RTOPTRAMTTOT | $ | *Real-Time Option with Refund Amount Total*—The total of payments to all CRR Owners of all PTP Options with Refund settled in Real-Time for the hour. |
| RTOPTAMTOTOT $_o$ | $ | *Real-Time Option Amount Owner Total per owner*—The total payment to CRR Owner *o* of all its PTP Options settled in Real-Time for the hour. See Section 7.9.2.2, Payments for PTP Options Settled in Real-Time. |
| RTOPTRAMTOTOT $_o$ | $ | *Real-Time Option with Refund Amount Owner Total per owner*—The total payment to CRR Owner *o* of all its PTP Options with Refund settled in Real-Time for the hour. See Section 7.9.2.3, Payments for NOIE PTP Options with Refund Settled in Real-Time. |
| o | none | A CRR Owner. |

#### 7.9.3.4 Monthly Refunds to Short-Paid CRR Owners

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

$$\mathbf{CRRRAMT}_{\boldsymbol{o}} = \mathbf{(-1) * Min\ (CRRBACRTOT,\ CRRSAMTTOT) * CRRSAMTRS}_{\boldsymbol{o}}$$

Where:

~~CRRBCCRTOT~~CRRBACRTOT = $\sum_{h}$ CRRBACR $_h$

If (CRRSAMTTOT = 0)

CRRSAMTRS $_o$ = 0

Otherwise

CRRSAMTRS $_o$ = CRRSAMTOTOT $_o$ / CRRSAMTTOT

$$\text{CRRSAMTTOT} = \sum_{o} \text{CRRSAMTOTOT}_{o}$$

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

The above variables are defined as follows:

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

### 7.9.3.5 CRR Balancing Account Closure

(1) At the end of each month, the surplus in the CRR Balancing Account, if any, is paid to the QSEs representing LSEs based on a monthly Load Ratio Share. The monthly Load Ratio Share is the 15-minute Load Ratio Share calculated for the peak-load Settlement Interval during the month.

(2) The credit to each QSE representing LSEs for a given month is calculated as follows:

$$\mathbf{LACRRAMT}_{\boldsymbol{q}} = \mathbf{(-1) * (CRRBACRTOT + CRRRAMTTOT) * MLRS}_{\boldsymbol{q}}$$

Where:

$$\text{CRRRAMTTOT} = \sum_{o} \text{CRRRAMT}_{o}$$

The above variables are defined as follows:

| Variable | Unit | Definition |
|---|---|---|
| LACRRAMT $_q$ | $ | *Load-Allocated CRR Amount per QSE*—The allocated surplus in the CRR Balancing Account at the end of the month to QSE *q*, based on Load Ratio Share for the month. |
| CRRBACRTOT | $ | *CRR Balancing Account Credit Total*—The total credit accumulated in the CRR Balancing Account during the month. See its calculation in Section 7.9.3.4, Monthly Refunds to Short-Paid CRR Owners. |
| CRRRAMTTOT | $ | *CRR Refund Amount Total*—The total refund to all the previously short-paid CRR Owners at the end of the month. |

| | | |
|---|---|---|
| CRRRAMT $_o$ | $ | *CRR Refund Amount per owner*—The refund credited to the CRR Owner *o* at the end of the month. |
| MLRS $_q$ | none | *Monthly Load Ratio Share per QSE*—The Load Ratio Share calculated for QSE *q* for the 15-minute monthly peak-load Settlement Interval. See Section 6.6.2.2, QSE Load Ratio Share for a 15-Minute Settlement Interval, for the calculation of LRS for a 15-minute Settlement Interval. |
| q | none | A QSE. |
| o | none | A CRR Owner. |

# ERCOT Nodal Protocols
# Section 4: Day-Ahead Operations

**~~May 5, 2006~~August 1, 2006**

**(Effective Upon Texas Nodal Market Implementation)**

# 4 DAY-AHEAD OPERATIONS

## 4.1 Introduction

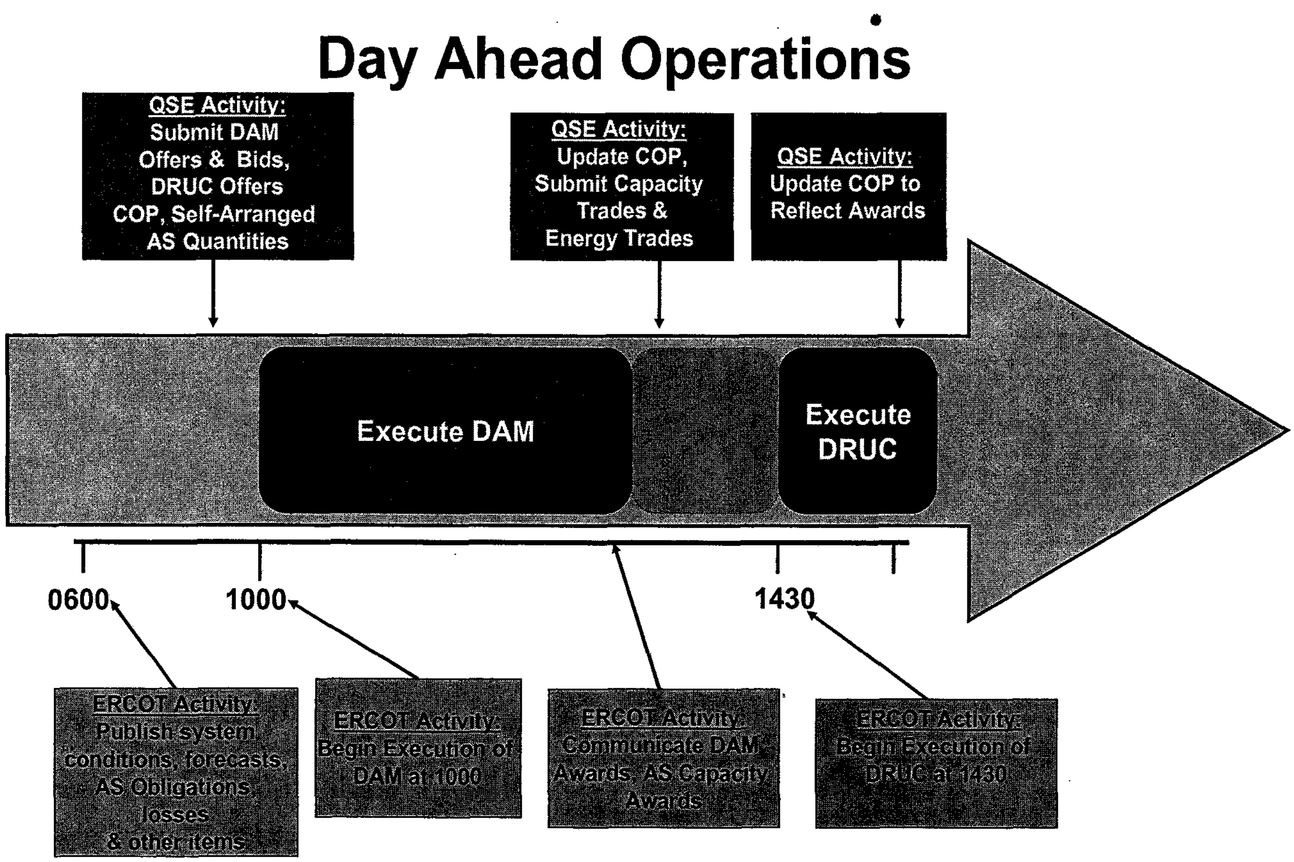
(1) The Day-Ahead Market (DAM) is a daily, co-optimized market in the Day-Ahead for Ancillary Service capacity, certain Congestion Revenue Rights, and forward financial energy transactions.

(2) Participation in the DAM is voluntary, except for Reliability Must Run (RMR) Units, the participation of which is governed by their respective RMR Agreements and Section 4.4.7, RMR Offers.

(3) DAM energy settlements use DAM Settlement Point Prices that are calculated for Resource Nodes, Load Zones, and Hubs for a one-hour Settlement Interval using the LMPs from DAM. In contrast, the Real-Time energy settlements use Real-Time Settlement Point Prices that are calculated for Resource Nodes, Load Zones, and Hubs for a 15-minute Settlement Interval.

### *4.1.1 Day-Ahead Timeline Summary*

The figure below shows the major activities that occur in the Day-Ahead:



### *4.1.2 Day-Ahead Process and Timing Deviations*

(1) ERCOT may temporarily deviate from the timing of its obligations in this Section but only to the extent necessary to ensure the secure operation of the ERCOT System. In that event, ERCOT shall immediately issue an Alert and notify all QSEs of the following:

(a) Details of the affected timing and procedures;

(b) Details of any interim requirements;

(c) An estimate of the period for which the interim requirements apply; and

(d) Reasons for the temporary variation.

(2) If, despite the varying timing or omitting any procedure, ERCOT is unable to execute the Day-Ahead process, ERCOT may abort all or part of the Day-Ahead process and require all schedules and trades to be submitted in the Adjustment Period. In that event, ERCOT shall declare an Emergency Condition and notify all QSEs of the following:

(a) Details of the affected timing and procedures;

(b) Details of any interim requirements;

(c) An estimate of the period for which the interim requirements apply; and

(d) Reasons for the temporary variation.

(3) If, despite varying timing or omitting steps, ERCOT is unable to operate the Adjustment Period process, then ERCOT may abort the Adjustment Period process and operate under its Operating Period procedures.

## 4.2 ERCOT Activities in the Day-Ahead

### *4.2.1 Ancillary Service Plan and Ancillary Service Obligation*

#### 4.2.1.1 Ancillary Service Plan

(1) ERCOT shall analyze the expected Load conditions for the Operating Day and develop an Ancillary Service Plan that identifies the Ancillary Service MW necessary for each hour of the Operating Day. The MW of each Ancillary Service required may vary from hour to hour depending on ERCOT System conditions. ERCOT must post the Ancillary Service Plan to the MIS Public Area by 0600 of the Day-Ahead.

(2) If ERCOT determines that an Emergency Condition may exist that would adversely affect ERCOT System reliability, it may change the percentage of Load Resources that are allowed to provide Responsive Reserve Service (RRS) from

the monthly amounts determined previously, as described in Section 3.16, Standards for Determining Ancillary Service Quantities, and must post any change in the percentage to the MIS Public Area by 0600 of the Day-Ahead.

(3) ERCOT shall determine the total required amount of each Ancillary Service under Section 3.16, Standards for Determining Ancillary Service Quantities, or use its operational judgment and experience to change the daily quantity of each required Ancillary Service.

(4) ERCOT shall include in the Ancillary Service Plan enough capacity to automatically control frequency with the intent to meet NERC standards.

(5) ERCOT shall notify the QSE representing an RMR Unit for any unit that is being committed in the DAM or the DRUC at the same time that the DAM and DRUC participants are notified of the results of that respective process.

(6) Once specified by ERCOT for an hour and published on the MIS Public Area, Ancillary Service quantity requirements for an Operating Day may not be decreased.

### 4.2.1.2 Ancillary Service Obligation Assignment and Notice

(1) ERCOT shall assign part of the Ancillary Service Plan quantity, by service, by hour, to each LSE based on Load Ratio Share and shall then aggregate those quantities, by service, by hour to the QSE level. The resulting Ancillary Service quantity for each QSE, by service, by hour, is called its Ancillary Service Obligation. ERCOT shall base the LSE Ancillary Service allocation on the hourly Load Ratio Share from the real time market data used for Initial Settlement ~~data, as defined in Section 9.2, Settlement Statements for the Day-Ahead Market,~~ for the same hour and day of the week, for the most recent day for which Initial Settlement Statements are available, multiplied by the quantity of that service required in the Day-Ahead Ancillary Service Plan. The Ancillary Service Obligation defined shall be adjusted based on the most current real time settlement and resettlement data for the Operating Day for which the Ancillary Service was procured.

(2) By 0600 of the Day-Ahead, ERCOT shall notify each QSE of its Ancillary Service Obligation for each service and for each hour of the Operating Day.

(3) By 0600 of the Day-Ahead, ERCOT shall post on the MIS Certified Area each QSE's Load Ratio Share used for the Ancillary Service Obligation calculation.

### *4.2.2 Wind-Powered Generation Resource Production Potential*

(1) ERCOT shall produce and update hourly a Short-Term Wind Power Forecast (STWPF) that provides a rolling 48-hour hourly forecast of wind production potential for each Wind-Powered Generation Resource (WGR). Each Generation Entity that owns a WGR shall install and telemeter to ERCOT the site-specific

meteorological information that ERCOT determines is necessary to produce the STWPF forecasts. ERCOT shall establish procedures specifying the accuracy requirements of WGR meteorological information telemetry.

(2) The WGR Production Potential (WGRPP) is an hourly 80% confidence level forecast of energy production for each WGR. From the STWPF, ERCOT shall produce and update WGRPP forecasts each hour for each WGR to be used as input into each RUC process as per Section 5, Transmission Security Analysis and Reliability Unit Commitment.

(3) ERCOT shall produce the WGRPP forecasts using the STWPF information provided by WGR owners including WGR availability, meteorological information, and SCADA.

(4) Each hour, ERCOT shall provide, through the Messaging System, the WGRPP forecasts for each WGR to the QSE that represents that WGR and shall post each WGRPP forecast on the MIS Certified Area.

(5) Each hour, ERCOT shall post the aggregated WGRPP forecast of all WGRs on the MIS Secure Area.

(6) Each QSE representing a WGR shall use the latest WGRPP forecast for each WGR published by ERCOT as the HSL for the WGR in the QSE's COP.

(7) To determine a QSE's capacity shortage for RUC settlement purposes under Section 5.7, Settlement for RUC Process, for each WGR, ERCOT shall use the COP and Trades Snapshot prior to the Day-Ahead RUC regardless of Real-Time capacity or actual generation.

### *4.2.3 Posting Forecasted ERCOT System Conditions*

No later than 0600 in the Day-Ahead, ERCOT shall post on the MIS Secure Area, and make available for download, the following information for the Operating Day:

(a) The Network Operations Model topology that includes known transmission line and other Transmission Facilities Outages in the Common Information Model format for the minimum Load hour and the peak Load hour;

(b) Weather assumptions used by ERCOT to forecast ERCOT System conditions and used in the Dynamic Rating Processor;

(c) Any weather-related changes to the transmission contingency list;

(d) ERCOT System, Weather Zone, and Load Zone Load forecasts for the next seven days, by hour, and a message on update indicating any changes to the forecasts by means of the Messaging System;

(e) Load forecast distribution factors from which Market Participants can calculate Load at the Electrical Bus level by hour for the next seven days;

(f) Load Profiles for non-IDR metered Customers;

(g) Distribution Loss Factors and forecasted ERCOT-wide Transmission Loss Factors, as described in Section 13.3, Distribution Losses and in Section 13.2, Transmission Losses, for each Settlement Interval of the Operating Day;

~~(h) Current Electrical Bus Load distribution factors;~~

(h~~i~~) A current list of all Settlement Points that may be used for market processes and transactions; and

(i~~j~~) A mapping of Settlement Points to Electrical Buses in the Network Operations Model.

### *4.2.4 ERCOT Notice of Validation Rules for the Day-Ahead*

ERCOT shall provide each QSE with the information necessary to pre-validate its data for DAM, including publishing validation rules for offers, bids and trades and posting any software documentation and code that is not Protected Information to the MIS Secure Area within five Business Days after ERCOT receives it.

## 4.3 QSE Activities and Responsibilities in the Day-Ahead

(1) During the Day-Ahead, a QSE:

(a) Must submit its COP and update its COP as required in Section 3.9, Current Operating Plan (COP);

(b) May submit Three-Part Supply Offers, DAM Energy-Only Offers, DAM Energy Bids, Energy Trades, Self-Schedules, Capacity Trades, DC Tie Schedules, Ancillary Service Offers, Ancillary Service Trades, Self-Arranged Ancillary Service Quantities, PTP Obligation Bids, and CRR Offers as specified in this Section; and

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

## 4.4 Inputs into DAM and Other Trades

### *4.4.1 Capacity Trades*

(1) A Capacity Trade is the information for a QSE-to-QSE transaction that transfers financial responsibility for capacity between a buyer and a seller.

(2) A Capacity Trade for hours in the Operating Day that is reported to ERCOT before 1430 in the Day-Ahead creates:

(i) A capacity supply in the DRUC process for the buyer; and

(ii) A capacity obligation in the DRUC process for the seller.

(3) A Capacity Trade submitted at or after 1430 in the Day-Ahead for the Operating Day creates a capacity supply or obligation in any HRUC processes executed after the Capacity Trade is reported to ERCOT. Capacity Trades submitted after the DRUC snapshot are considered in the Adjustment Period snapshot.

(4) As soon as practicable, ERCOT shall notify each QSE through the Messaging System of any of its Capacity Trades that are invalid Capacity Trades. The QSE may correct and resubmit any invalid Capacity Trade within the appropriate market timeline.

#### 4.4.1.1 Capacity Trade Criteria

(1) A Capacity Trade must be submitted by a QSE and must include the following:

(a) The buying QSE;

(b) The selling QSE;

(c) The quantity in MW; and

(d) The first hour and last hour of the trade.

(2) A Capacity Trade must be confirmed by both the buyer and seller to be considered valid.

#### 4.4.1.2 Capacity Trade Validation

(1) A validated Capacity Trade is a Capacity Trade that ERCOT has determined meets the criteria listed in Section 4.4.1.1, Capacity Trade Criteria.

(2) When a Capacity Trade is reported to ERCOT, ERCOT shall notify both the buying and selling QSEs by using the Messaging System, if available, and on the MIS Certified Area.

(3) ERCOT shall continuously validate Capacity Trades and continuously display on the MIS Secure Area information that allows any QSE named in a Capacity Trade to view confirmed and unconfirmed Capacity Trades.

(4) The QSE that reports the Capacity Trade to ERCOT is deemed to have confirmed the Capacity Trade unless it affirmatively rejects it. The QSE that reports a Capacity Trade may reject, edit, or delete a Trade that has not been confirmed by its counterparty. After both the buyer and seller have confirmed a Capacity Trade, either party may reject it at any time, but the rejection is only effective for any ERCOT settlement process for which the deadline for reporting Capacity Trades has not already passed.

### *4.4.2 Energy Trades*

(1) An Energy Trade is the information for a QSE-to-QSE transaction that transfers financial responsibility for energy at a Settlement Point between a buyer and a seller.

(2) An Energy Trade for hours in the Operating Day that is reported to ERCOT before 1430 in the Day-Ahead creates a capacity supply or obligation in the DRUC process. Energy Trades submitted after 1430 in the Day-Ahead for the Operating Day create a capacity supply or obligation in any HRUC processes executed after the Energy Trade is reported to ERCOT. Energy Trades submitted after the DRUC snapshot are considered in the Adjustment Period.

(3) An Energy Trade may be submitted for any Settlement Interval within an Operating Day before 1430 of the following day.

(4) As soon as practicable, ERCOT shall notify each QSE through the Messaging System of any of its Energy Trades that are invalid Energy Trades. The QSE may correct and resubmit any invalid Energy Trade within the appropriate market timeline.

#### 4.4.2.1 Energy Trade Criteria

(1) Each Energy Trade must be reported by a QSE and must include the following information:

(a) The buying QSE;

(b) The selling QSE;

(c) The quantity of MW for each 15-minute Settlement Interval of the trade;

(d) The first and last 15-minute Settlement Intervals of the trade; and

(e) The Settlement Point of the trade.

(2) An Energy Trade must be confirmed by both the buyer and seller to be considered valid.

#### 4.4.2.2 Energy Trade Validation

(1) A validated Energy Trade is an Energy Trade that ERCOT has determined meets the criteria listed in Section 4.4.2.1, Energy Trade Criteria.

(2) When an Energy Trade is reported to ERCOT, ERCOT shall notify both the buying and selling QSEs by using the Messaging System if available and the MIS Certified Area.

(3) ERCOT shall continuously validate Energy Trades and continuously display on the MIS Secure Area information that allows any QSE named in an Energy Trade to view confirmed and unconfirmed Energy Trades.

(4) The QSE that reports the Energy Trade to ERCOT is considered to have confirmed the Energy Trade unless it affirmatively rejects it. The QSE that reports an Energy Trade may reject, edit, or delete a Trade that has not been confirmed by its counterparty. After both the buyer and seller have confirmed an Energy Trade, either party may reject it at any time, but the rejection is only effective for any ERCOT process for which the deadline for reporting Energy Trades has not already passed.

### *4.4.3 Self-Schedules*

(1) A Self-Schedule is the information that a QSE submits for Real-Time Settlement that specifies the amount of the QSE's energy supply at a specified source Settlement Point to be used to meet the QSE's energy obligation at a specified sink Settlement Point .

(2) A Self-Schedule may be submitted for any Settlement Interval before the end of the Adjustment Period for that Settlement Interval.

(3) As soon as practicable, ERCOT shall notify the QSE through the Messaging System of any of its Self-Schedules that are invalid Self-Schedules. The QSE may correct and resubmit any invalid Self-Schedule within the appropriate market timeline.

#### 4.4.3.1 Self-Schedule Criteria

(1) Each Self-Schedule must be reported by a QSE and must include the following information:

(a) The name of the QSE;

(b) The quantity of MW for each 15-minute Settlement Interval of the schedule;

(c) The first and last 15-minute Settlement Intervals of the schedule; and

(d) The source Settlement Point of the schedule;

(e) The sink Settlement Point of the schedule.

#### 4.4.3.2 Self-Schedule Validation

(1) A validated Self-Schedule is a Self-Schedule that ERCOT has determined meets the criteria listed in Section 4.4.3.1, Self-Schedule Criteria.

(2) ERCOT shall continuously validate Self-Schedules and continuously display on the MIS Secure Area information that allows the QSE named in a Self-Schedule to view validated Self-Schedules.

### *4.4.4 DC Tie Schedules*

(1) A DC Tie Schedule is the information for a physical transaction between a buyer and a seller, one of which is in ERCOT and the other of which is in a Non-ERCOT Control Area, for energy at a Settlement Point that is a DC Tie. A DC Tie Schedule must be implemented under these Protocols, any applicable NERC scheduling protocols, any applicable NERC operating policies, and any applicable operating agreements between ERCOT and Mexico. A DC Tie Schedule must be transaction-specific, i.e., one schedule per transaction per DC Tie, rather than aggregate (net) schedules per DC Tie.

(2) Each QSE shall follow all NERC policies for tagging of Control Area interchange transactions. Only transactions across ERCOT interconnections to SPP, WSCC, Mexico, or other areas must be tagged by the QSE as prescribed in the NERC tagging guidelines.

(3) A DC Tie Schedule for hours in the Operating Day that is reported to ERCOT before 1430 in the Day-Ahead creates a capacity supply or for the equivalent Resource or an obligation for the equivalent load of the DC Tie in the DRUC process. DC Tie Schedules submitted after 1430 in the Day-Ahead for the Operating Day create a capacity supply or obligation in any applicable HRUC processes executed after the DC Tie Schedule is reported to ERCOT. DC Tie Schedules submitted after the RUC snapshot are considered in the Adjustment Period snapshot in accordance with the market timeline.

(4) As soon as practicable, ERCOT shall notify each QSE through the Messaging System of any of its DC Tie Schedules that are invalid DC Tie Schedules. The QSE may correct and resubmit any invalid DC Tie Schedules within the appropriate market timeline.

(5) A QSE that is an importer into ERCOT through a DC Tie in a Settlement Interval under a DC Tie Schedule must be treated as a Resource at that DC Tie Settlement Point for that Settlement Interval.

(6) A QSE that is an exporter from ERCOT through a DC Tie in a Settlement Interval under a DC Tie Schedule must be treated as a Load at the DC Tie Settlement Point for that Settlement Interval and is responsible for allocated Transmission Losses, UFE System Administration Fee, and any other applicable ERCOT fees. This applies to all exports across the DC Ties except those that qualify for the Oklaunion Exemption.

(7) ERCOT shall confirm each valid DC Tie Schedule with the applicable interconnected non-ERCOT Control Area and shall coordinate the approval process for the NERC tags for the ERCOT Control Area.

(8) Using the DC Tie Schedule information submitted by QSEs, ERCOT shall update and maintain a Current Operating Plan for each DC Tie for which the aggregated DC Tie Schedules for that tie show a net export out of ERCOT for the applicable interval. When the net energy schedule for a DC Tie indicates an export, ERCOT shall treat the DC Tie as an Off-Line Resource and set the HSL and LSL for that DC Tie Resource to zero. ERCOT shall monitor the associated Resource Status telemetry during the Operating Period. When the net energy schedule for a DC Tie shows a net import, the Resource HSL, HASL and LSL must be set appropriately, considering the resulting net import and any Ancillary Service Schedules for the DC Tie Resource.

(9) A QSE submitting a DC Tie Schedule shall:

(a) Secure and maintain a NERC tag service to submit NERC tags and monitor NERC tag status according to NERC requirements;

(b) Submit NERC tags for all proposed transactions; and

(c) Implement backup procedures in case of NERC tag service failure.

#### 4.4.4.1 DC Tie Schedule Criteria

(1) Each DC Tie Schedule must be submitted by a QSE and must include the following information:

(a) The QSE or non-ERCOT Control Area buying the energy;

(b) The QSE or non-ERCOT Control Area selling the energy;

(c) For each DC Tie Schedule, the DC Tie Settlement Point;

(d) The quantity in MW for each 15-minute Settlement Interval of the schedule;

(e) The first and last 15-minute Settlement Intervals of the schedule; and

(f) The NERC tag information, which must conform to the standards set forth in NERC Policy 3 and associated appendixes.

(2) A DC Tie Schedule must be intended to match what the submitting QSE reasonably expects the DC Tie Schedule to be in Real-Time.

(3) A DC Tie Schedule must be confirmed by the non-ERCOT Control Area to be considered valid.

#### 4.4.4.2 DC Tie Schedule Validation

(1) A validated DC Tie Schedule is a DC Tie Schedule that ERCOT has determined:

(a) Meets the criteria listed in Section 4.4.4.1, DC Tie Schedule Criteria;

(b) Is matched—in quantity, time period, DC Tie Settlement Point, and other NERC tag information—by a schedule submitted by a non-ERCOT Control Area; and

(c) For the NERC tag:

(i) All Control Areas and transmission service providers with approval rights approve the NERC tag (active approval); or

(ii) No Entity with approval rights over the NERC tag has denied it, and the approval time window has ended (passive approval).

(2) Any changes in the interconnected non-ERCOT Control Area schedules due to a de-rating of the DC Tie or other change within the NERC or Mexico's scheduling protocols must be communicated to ERCOT by the DC Tie Operator or designated reliability authority for the interconnected non-ERCOT Control Area. For any interconnected non-ERCOT Control Area schedules revised during the Operating Period, the DC Tie Operator shall communicate to ERCOT the integrated schedule for the Settlement Intervals. If the DC Tie Schedule flows as planned, then ERCOT shall use schedules as the deemed meter readings for Real-Time settlement. If the interconnected non-ERCOT Control Area schedule changes during the Operating Period, then ERCOT shall use the changed interconnected non-ERCOT Control Area schedule as the deemed meter reading for Real-Time settlement.

#### 4.4.4.3 Oklaunion Exemption

(1) The export schedules from the Public Service Company of Oklahoma, the Oklahoma Municipal Power Authority, and the AEP Texas North Company for their share of the Oklaunion Resource over the North DC Tie are not treated as Load connected at transmission voltage, are not subject to any of the fees described in Section 4.4.4, DC Tie Schedules, and are limited to the actual net output of the Oklaunion Resource ("Oklaunion Exemption"). ERCOT shall

record DC Tie Schedules that qualify for the Oklaunion Exemption to support the billing of applicable TSP tariffs.

(2) A QSE requesting the Oklaunion Exemption shall:

(a) Apply to ERCOT for the exemption;

(b) Set up a separate QSE (or sub-QSE) solely to schedule DC Tie exports under the exemption; and

(c) Secure the Resources for a DC Tie Schedule by a DC Tie Schedule from each QSE representing part or all the Oklaunion Resource.

(3) ERCOT shall verify for each Settlement Interval that the sum of the "exempted" exports under the Oklaunion Exemption is not more than the total output from the Oklaunion Resource.

### *4.4.5 CRR Offers*

(1) A CRR Offer is the information for an offer by a CRR Account Holder to sell CRRs that it owns in the DAM.

(2) All CRRs held by CRR Account Holders are settled based on applicable DAM settlement prices, except for PTP Options and PTP Options with Refund that have been declared by a NOIE before DAM execution to be settled in Real-Time and are still held by that NOIE in Real-Time.

(3) PTP Options and PTP Options with Refund that are declared by NOIEs for Real-Time settlement may specify an offer price (Minimum Reservation Price) in the DAM. If no Minimum Reservation Price is specified, ERCOT shall assign a default value of $2,000 per MW per hour, as an offer in the DAM. If such an offer clears in the DAM, it is settled as part of the DAM and is not carried to Real-Time.

#### 4.4.5.1 CRR Offer Criteria

(1) A CRR Offer must include the following:

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

(b) The unique identifier for each CRR being offered, which includes the single type of CRR being offered;

(c) The source Settlement Point and the sink Settlement Point for the CRR or block of CRRs being offered;

(d) The first hour and the last hour for which the CRR or block of CRRs is being offered;

(e) The quantity of CRRs in MW for which the Minimum Reservation Price is effective;

(f) A dollars per MW per hour for the Minimum Reservation Price; and

(g) For PTP Options that a NOIE has designated for Real-Time settlement, the NOIE peak Load forecast for the Operating Day.

(2) The CRR Account Holder for whom the CRR Offer is being submitted must be shown as the owner in the ERCOT CRR registration system of the CRRs being offered.

(3) If the CRR Offer is for more than one CRR (which is 1 MW for one hour), the CRR Offer must have the following characteristics:

(a) All CRRs must be of the same type;

(b) All CRRs must have the same source and sink Settlement Points, and

(c) A block CRR Offer must have the same number of CRRs offered in each hour; and

(d) A block CRR Offer must have contiguous hours for the CRRs offered.

(4) For each NOIE that designated PTP Options or PTP Options with Refund for Real-Time settlement, the designation of such CRRs to be settled in Real-Time may not exceed 110% of that NOIE's peak Load forecast.

### 4.4.5.2 CRR Offer Validation

(1) A validated CRR Offer is a CRR Offer that ERCOT has determined meets the criteria listed in Section 4.4.5.1, CRR Offer Criteria.

(2) ERCOT shall continuously display on the MIS Certified Area information that allows any QSE submitting a CRR Offer to view its valid CRR Offers.

(3) As soon as practicable, ERCOT shall notify each CRR Account Holder through the Messaging System of any of its CRR Offers that are invalid. The CRR Account Holder may correct and resubmit any invalid CRR Offer within the appropriate market timeline.

### *4.4.6 PTP Obligation Bids*

(1) A PTP Obligation Bid is a bid that specifies the source and sink, a range of hours, and a maximum price that the bidder is willing to pay ("Not-to-Exceed Price").

(2) PTP Obligations that are bought in the DAM must be settled based on the applicable Real-Time Settlement Point Prices.

#### 4.4.6.1 PTP Obligation Bid Criteria

(1) A PTP Obligation Bid must be submitted by a QSE and must include the following:

(a) The name of the QSE submitting the PTP Obligation Bid;

(b) The source Settlement Point and the sink Settlement Point for the PTP Obligation or block of PTP Obligations being bid;

(c) The first hour and the last hour for which the PTP Obligation or block of PTP Obligations is being bid;

(d) The quantity of PTP Obligations in MW for which the Not-to-Exceed Price is effective; and

(e) A dollars per MW per hour for the Not-to-Exceed Price.

(2) If the PTP Obligation Bid is for more than one PTP Obligation (which is 1 MW for one hour), the block bid must:

(a) Include the same number of PTP Obligations in each hour of the block;

(b) Be for PTP Obligations that have the same source and sink Settlement Points; and

(c) Be for contiguous hours.

#### 4.4.6.2 PTP Obligation Bid Validation

(1) A validated PTP Obligation Bid is a bid that ERCOT has determined meets the criteria listed in Section 4.4.6.1, PTP Obligation Bid Criteria.

(2) ERCOT shall continuously display on the MIS Certified Area information that allows any QSE submitting a PTP Obligation Bid to view its valid PTP Obligation Bid.

(3) As soon as practicable, ERCOT shall notify each QSE through the Messaging System of any of its PTP Obligation Bids that are invalid. The QSE may correct and resubmit any invalid PTP Obligation Bid within the appropriate market timeline.

### *4.4.7 Ancillary Service Supplied and Traded*

#### 4.4.7.1 Self-Arranged Ancillary Service Quantities

(1) A QSE may self-arrange all or a portion thereof, but not to exceed, the Ancillary Service Obligation allocated to it by ERCOT. If a QSE elects to self-arrange Ancillary Service capacity, then ERCOT ~~may~~ shall not pay the QSE for the Self-

Arranged Ancillary Service Quantities for the portion that meets its Ancillary Service Obligation. ~~If a QSE's Self-Arranged Ancillary Service Quantity exceeds its actual Ancillary Service Obligation then ERCOT shall pay the QSE for the portion that exceeds its Ancillary Service Obligation, the price charged to purchasers of that Ancillary Service in the DAM.~~

(2) The QSE must indicate before 1000 in the Day-Ahead the ~~of~~Self-Arranged Ancillary Service Quantities, by service, so ERCOT can determine how much Ancillary Service capacity, by service, needs to be obtained through the DAM.

(3) At or after 1000 in the Day-Ahead, a QSE may not change its Self-Arranged Ancillary Service Quantities unless ERCOT opens a Supplemental Ancillary Service Market.

(4) Before 1430 in the Day-Ahead, all Self-Arranged Ancillary Service Quantities must be represented by physical capacity, either by Generation Resources or Load Resources, or backed by Ancillary Service Trades.

(5) When a QSE chooses to self-arrange all or a portion of its Ancillary Service Obligations, it commits to the following conditions:

(a) The QSE may self-arrange Regulation Up Service (Reg-Up), Regulation Down Service (Reg-Down), Responsive Reserve Service (RRS), and Non-Spin;

(b) The QSE may provide all or part of its Self-Arranged Ancillary Service Quantity from one or more Resources it represents;

(c) The QSE may provide all or a part of its Self-Arranged Ancillary Service Quantity through an Ancillary Service Trade;

(d) The additional Self-Arranged Ancillary Service Quantity specified by the QSE in response to a Supplemental Ancillary Service Market notice by ERCOT to obtain additional Ancillary Services in the Adjustment Period cannot be more than the additional Ancillary Service amount allocated by ERCOT to that QSE, as stated in the SASM notice, and cannot be changed once committed to ERCOT; and

(e) If a QSE does not self-arrange all of its Ancillary Service Obligation, ERCOT shall procure the remaining amount of the Ancillary Service Obligation for the QSE.

#### 4.4.7.2 Ancillary Service Offers

(1) By 1000 in the Day-Ahead, a QSE may submit Generation Resource-specific Ancillary Service Offers to ERCOT for the DAM and may offer the same Generation Resource capacity for any or all of the Ancillary Service products simultaneously with any Energy Offer Curves from that Generation Resource in



000142

the DAM. A QSE may also submit Ancillary Service Offers in a Supplemental Ancillary Service Market (SASM). Offers of more than one Ancillary Service product from one Generation Resource may be inclusive or exclusive of each other and of any Energy Offer Curves, as specified according to a procedure developed by ERCOT.

(2) By 1000 in the Day-Ahead, a QSE may submit Load Resource-specific Ancillary Service Offers for Regulation Service, Non-Spinning Reserve Service and Responsive Reserve Service to ERCOT and may offer the same Load Resource capacity for any or all of those Ancillary Service products simultaneously. Offers of more than one Ancillary Service product from one Load Resource may be inclusive or exclusive of each other, as specified according to a procedure developed by ERCOT.

(3) Ancillary Service Offers remain active for the offered period until either:

(a) Selected by ERCOT;

(b) Automatically inactivated by the software at the offer expiration time specified by the QSE when the offer is submitted; or

(c) Withdrawn by the QSE, but a withdrawal is not effective if the deadline for submitting offers has already passed.

(4) A Load Resource may specify whether its Ancillary Service Offer for Responsive Reserve Service may only be procured by ERCOT as a block.

#### *4.4.7.2.1 Ancillary Service Offer Criteria*

(1) Each Ancillary Service Offer must be submitted by a QSE and must include the following information:

(a) The selling QSE;

(b) The Resource represented by the QSE from which the offer would be supplied;

(c) The quantity in MW and Ancillary Service type from that Resource for this specific offer and the specific quantity in MW and Ancillary Service type of any other Ancillary Service offered from this same capacity;

(d) An Ancillary Service Offer linked to a Three-Part Supply Offer from a Resource designated to be Off-Line for the offer period in its COP may only be struck if the Three-Part Supply Offer is struck. The total capacity struck must be within limits as defined in 4.5.1(4)(c)(iii), DAM Clearing Process.

(e) An Ancillary Service Offer linked to other Ancillary Service offers or an Energy Offer Curve from a Resource designated to be On-Line for the offer period in its COP may only be struck if the total capacity struck is within limits as defined in 4.5.1(4)(c)(iii), DAM Clearing Process.

(f~~d~~) The first and last hour of the offer;

(g~~e~~) A fixed quantity block, or variable quantity block indicator for the offer;

(i) If a fixed quantity block, not to exceed 150 MW, which may only be offered by a Load Resource, the single price (in $/MW) and single quantity (in MW) for all hours offered in that block;

(ii) If a variable quantity block, which may be offered by a Generation Resource or a Load Resource, the single price (in $/MW) and single "up to" quantity (in MW) contingent on the purchase of all hours offered in that block; and

(h~~f~~) The expiration time and date of the offer.

(2) A valid Ancillary Service Offer in the DAM must be received before 1000 for the effective DAM. A valid Ancillary Service Offer in a SASM must be received before the applicable deadline for that SASM.

(3) No Ancillary Service Offer price may exceed $1,000 per MW.

(4) The minimum amount per Resource for each Ancillary Service product that may be offered is one MW.

(5) A Resource may offer more than one Ancillary Service.~~, if the sum of the Ancillary Service capacities committed to ERCOT is within the Resource limits specified in COP and the Resource parameters as described in Section 3.7, Resource Parameters, of the Resource specifying the type and maximum amount of Ancillary Service the Resource may provide.~~

### *4.4.7.2.2 Ancillary Service Offer Validation*

(1) A valid Ancillary Service Offer is one that ERCOT has determined meets the criteria listed in Section 4.4.7.2.1, Ancillary Service Offer Criteria.

(2) ERCOT shall continuously validate Ancillary Service Offers and continuously display on the MIS Certified Area information that allows any QSE named in an Ancillary Service Offer to view its confirmed Ancillary Service Offers.

(3) ERCOT shall notify the QSE submitting an Ancillary Service Offer if the offer was rejected or was considered invalid for any reason. The QSE may then resubmit the offer within the appropriate market timeline.

### 4.4.7.3 Ancillary Service Trades

(1) An Ancillary Service Trade is the information for a QSE-to-QSE transaction that transfers an obligation to provide Ancillary Service capacity between a buyer and a seller.

(2) An Ancillary Service Trade that is reported to ERCOT by 1430 in the Day-Ahead changes the Ancillary Service Supply Responsibility of the buyer and seller in the DRUC process. An Ancillary Service Trade that is reported to ERCOT after 1430 in the Day-Ahead changes the Ancillary Service Supply Responsibility of the buyer and seller in any applicable HRUC process, the deadline for which is after the trade is submitted.

(3) As soon as practicable, ERCOT shall notify each QSE through the Messaging System of any of its Ancillary Service Trades that are invalid Ancillary Service Trades. The QSE may correct and resubmit any invalid Ancillary Service Trade, but the reporting time of the trade is determined by when the validated Ancillary Service Trade was submitted and not when the original invalid Ancillary Service Trade was submitted.

#### *4.4.7.3.1 Ancillary Service Trade Criteria*

(1) Each Ancillary Service Trade must be reported by a QSE and must include the following information:

(a) The buying QSE;

(b) The selling QSE;

(c) The type of Ancillary Service;

(d) The quantity in MW; and

(e) The first and last hours of the trade.

(2) An Ancillary Service Trade must be confirmed by both the buyer and seller to be considered valid and to be used in an ERCOT process.

#### *4.4.7.3.2 Ancillary Service Trade Validation*

(1) A valid Ancillary Service Trade is an Ancillary Service Trade that ERCOT has determined meets the criteria listed in Section 4.4.7.3.1, Ancillary Service Trade Criteria.

(2) When an Ancillary Service Trade is reported to ERCOT, ERCOT shall notify both the buying and selling QSEs by using the Messaging System if available and the MIS Certified Area.

(3) ERCOT shall continuously validate Ancillary Service Trades and continuously display on the MIS Secure Area information that allows any QSE named in an Ancillary Service Trade to view its confirmed and unconfirmed Ancillary Service Trades.

(4) The QSE that reports the Ancillary Service Trade to ERCOT is deemed to have confirmed the Ancillary Service Trade unless it affirmatively rejects it. The QSE that reports an Ancillary Service Trade may reject, edit, or delete a trade that has not been confirmed by its counterparty. After both the buyer and seller have confirmed an Ancillary Service Trade, either party may reject it at any time, but the rejection is only effective for any ERCOT process for which the deadline for reporting Ancillary Service Trades has not already passed.

### 4.4.7.4 Ancillary Service Supply Responsibility

(1) A QSE's Ancillary Service Supply Responsibility is the net amount of Ancillary Service capacity that the QSE is obligated to deliver to ERCOT, by hour and service type, from Resources represented by the QSE. The Ancillary Service Supply Responsibility is the difference in MW, by hour and service type, between the amounts specified in (a) and (b) defined as follows:

(a) ~~the~~ The sum of:

(i) the QSE's Self-Arranged Ancillary Service Quantity;

(ii) the total (in MW) of Ancillary Service Trades for which the QSE is the seller; plus

(iii) Awards to the QSE of Ancillary Service Offers in the DAM; and

(b) ~~the~~ The total Ancillary Service Trades for which the QSE is the buyer.

(2) A QSE may only use a Resource to provide its Ancillary Service during non-RUC-Committed Intervals.

(3) By 1430 in the Day-Ahead, the QSE must notify ERCOT, in the QSE's COP, which Resources represented by the QSE will provide the Ancillary Service capacity necessary to meet the QSE's Ancillary Service Supply Responsibility, specified by Resource, hour, and service type. The DAM Ancillary Service awards are Resource-specific; the QSE must include those DAM awards in its COP, and the QSE may not change that Resource-specific DAM award information until after 1600 under the conditions set out in Section 3.9, Current Operating Plan (COP).

(4) Section 6.4.8.1.3, Replacement of Ancillary Service Due to Failure to Provide, specifies what happens if the QSE fails on its Ancillary Service Supply Responsibility.

### *4.4.8 RMR Offers*

ERCOT shall decide, in its sole discretion, when to make an RMR Unit available for commitment in DRUC, HRUC, or DAM, considering relevant factors such as whether it is likely to be needed in Real-Time for reliability reasons, whether SCED will solve operating constraints, contractual constraints on the Resource, and any other adverse effects on the RMR Unit that may occur as the result of the dispatch of the RMR Resource.

(a) By 1000 in the Day-Ahead, ERCOT shall submit, in ERCOT's sole discretion, Three-Part Supply Offers based on RMR Agreement rates and any other relevant information as provided under contract on behalf of RMR Units for any RMR Units to be considered, in the DAM, DRUC, or HRUC.

(b) ERCOT may submit Energy Offer Curves based on RMR Agreement rates and any other relevant information as provided under contract on behalf of RMR Units committed in the DAM, DRUC, or HRUC.

### *4.4.9 Energy Offers and Bids*

#### 4.4.9.1 Three-Part Supply Offers

(1) A Three-Part Supply Offer consists of a Startup Offer, a Minimum-Energy Offer, and an Energy Offer Curve. ERCOT must validate each Startup Offer, Minimum-Energy Offer, and Energy Offer Curve before it can be used in any ERCOT process.

(2) The DAM uses all three parts of the Three-Part Supply Offer and also uses Energy Offer Curves submitted without a Startup Offer and without a Minimum-Energy Offer. The RUC only uses the Startup Offer and the Minimum-Energy Offer components for determining RUC commitments, but the Energy Offer Curve may be used in settlement to claw back some or all of a RUC-committed Resource's energy payments. The Energy Offer Curve may also be used by SCED in Real-Time Operations.

(3) A QSE may submit an Energy Offer Curve without also submitting a Startup Offer and a Minimum-Energy Offer for the DAM and during the Adjustment Period, but only Three-Part Supply Offers are used in the RUC process. A QSE that submits an Energy Offer Curve without also submitting a Startup Offer and a Minimum-Energy Offer is considered not to be offering the Resource into the RUC, but that does not prevent the Resource from being committed in the RUC process like any other Resource that does not submit an offer in the RUC.

(4) For any hours in which the Resource is not RUC-committed, ERCOT shall consider all Three-Part Supply Offers in the RUC process until:

(a) The QSE withdraws the offer; or

(b) The offer expires by its terms.

### 4.4.9.2 Startup Offer and Minimum-Energy Offer

The Startup Offer component represents all costs incurred by a Generation Resource in starting up and reaching breaker close. The Minimum-Energy Offer component represents a proxy for the costs incurred by a Resource in producing energy up to and including the Resource's LSL after breaker close.

#### *4.4.9.2.1 Startup Offer and Minimum-Energy Offer Criteria*

(1) Each Startup Offer and Minimum-Energy Offer must be reported by a QSE and must include the following information:

(a) The selling QSE;

(b) The Resource represented by the QSE from which the offer would be supplied;

(c) The Resource's hot, intermediate, and cold Startup Offer in dollars;

(d) The Resource's Minimum-Energy Offer in dollars per MWh;

(e) The expiration time and date of the offer;

(f) Percentage of FIP to the extent that the startup and minimum energy will be supplied by gas to determine the offer cap; and

(g) Percentage of FOP to the extent that the startup and minimum energy will be supplied by oil to determine the offer cap.

(2) Valid Startup Offers and Minimum-Energy Offers (which must be part of a Three-Part Supply Offer) must be received before 1000 for the effective DAM and DRUC.

(3) A QSE may update and submit a Three-Part Supply Offer for a Resource during the Adjustment Period for any hours in which the Resource is not RUC-committed before the offer is updated or submitted.

(4) The Resource's Startup Offer must be equal to or less than the Resource Category Generic Startup Cost for that type of Resource listed in Section 4.4.9.2.3, Startup Offer and Minimum-Energy Offer Generic Caps, unless ERCOT has approved verifiable Resource-specific startup costs for that Resource, under Section 4.4.9.2.4, Verifiable Startup Offer and Minimum-Energy Offer Caps, in which case the Resource's Startup Offer must be equal to or less than those approved verifiable Resource-specific startup costs.

(5) The Resource's Minimum-Energy Offer must be equal to or less than the Resource Category Generic Minimum-Energy Cost for that type of Resource listed in Section 4.4.9.2.3, Startup Offer and Minimum-Energy Offer Generic Caps, unless ERCOT has approved verifiable Resource-specific minimum-energy costs for that Resource, under Section 4.4.9.2.4, Verifiable Startup Offer and Minimum-Energy Offer Caps, in which case the Resource's Minimum-Energy Offer must be equal to or less than those approved verifiable Resource-specific minimum-energy costs.

#### *4.4.9.2.2 Startup Offer and Minimum-Energy Offer Validation*

(1) A valid Startup Offer and Minimum-Energy Offer is an offer that ERCOT has determined meets the criteria listed in Section 4.4.9.2.1, Startup Offer and Minimum-Energy Offer Criteria, and that are part of a Three-Part Supply Offer for which the Energy Offer Curve has also been validated.

(2) ERCOT shall continuously display on the MIS Certified Area information that allows any QSE submitting a Startup Offer and Minimum-Energy Offer to view its valid Startup Offers and Minimum-Energy Offers.

(3) ERCOT shall notify the QSE submitting a Startup Offer and Minimum-Energy Offer (which must be part of a Three-Part Supply Offer) if the offer was rejected or was considered invalid for any reason. The QSE may then resubmit the offer within the appropriate market timeline.

(4) Where a Split Generation Resource has submitted a Startup Offer and Minimum-Energy Offer, ERCOT shall validate the offers in accordance with Section 3.8, Special Consideration for Split Generation Meters.

#### *4.4.9.2.3 Startup Offer and Minimum-Energy Offer Generic Caps*

(1) The Resource Category Startup Offer Generic Cap, by applicable Resource category, is ~~the Resource's other verifiable fuel in MMBtu times Fuel Index Price (FIP) or Fuel Oil Index Price (FOP); and~~ determined by the following O&M costs by Resource category:

| **Resource Category** | **O&M Costs ($)** |
|---|---|
| Nuclear, Coal, Lignite, Hydro, Renewable | 7,200 |
| Combined Cycle greater than 90 MW with 5+ HRS off line | 6,810 |
| Combined Cycle greater than 90 MW with less than 5 HRS off line | 5,310 |
| Combined Cycle less than or equal to 90 MW with 5+ HRS off line | ~~4,800~~6,810 |
| Combined Cycle less than or equal to 90 MW with less than 5 HRS off line | ~~3,000~~5,310 |
| Gas steam supercritical boiler | ~~2,310~~ 4,800? |
| Gas steam reheat boiler | ~~5,000~~3,000 |
| Gas steam non-reheat or boiler w/o air-preheater | ~~2,300~~2,310 |



000149