

**ATTACHMENT C**

**FORMULAS FOR DETERMINING MINIMUM GENERATION AND START-UP AND CURTAILMENT INITIATION COST PAYMENTS**

Minimum Generation and Start Up Payment = Day-Ahead Minimum Generation and Start-Up Payment + Real-Time Market Minimum Generation and Start-Up Payment;

Day-Ahead Minimum Generation and Start-Up Payment =

$$\sum_{g \in G} \max \left[ \sum_{i=1}^{24} \left( \int_{MGH_{gi}^{DA}}^{EH_{gi}^{DA}} C_{gi}^{DA} + MGC_{gi}^{DA} MGH_{gi}^{DA} + SUC_{gi}^{DA} NSUH_{gi}^{DA} - LBMP_{gi}^{DA} EH_{gi}^{DA} - NASR_{gi}^{DA} \right), 0 \right]$$

Real-Time Market Minimum Generation and Start-Up Payment =

$$\sum_{g \in G} \max \left[ \sum_{i=1}^N \left( \int_{EI_{gi}^{DA}}^{EI_{gi}^{RT}} C_{gi}^{RT} + MGC_{gi}^{RT} (MGI_{gi}^{RT} - MGI_{gi}^{DA}) + SUC_{gi}^{RT} (NSUI_{gi}^{RT} - NSUI_{gi}^{DA}) - LBMP_{gi}^{RT} (EI_{gi}^{RT} - EI_{gi}^{DA}) - (NASR_{gi}^{TOT} - NASR_{gi}^{DA}) \right), 0 \right]$$

Where:

- G = set of Generators;
- $EH_{gi}^{DA}$  = Energy scheduled Day-Ahead to be produced by Generator g in hour i;
- $MGH_{gi}^{DA}$  = Energy scheduled Day-Ahead to be produced by minimum generation segment of Generator g in hour i;
- $C_{gi}^{DA}$  = Bid cost curve made by Generator g in the Day-Ahead Market for hour i;
- $MGC_{gi}^{DA}$  = **Generator g's Incremental cost of eEnergy while operating at the minimum generation level determined from the mMinimum gGeneration cost Bid** by Generator g for hour i in the Day-Ahead -Market;
- $SUC_{gi}^{DA}$  = **sStart-uUp cost bBid** by Generator g in hour i into Day-Ahead Market;
- $NSUH_{gi}^{DA}$  = number of times Generator g is scheduled Day-Ahead to start up in hour i;
- $LBMP_{gi}^{DA}$  = Day-Ahead LBMP at Generator g's bus in hour i;
- N = number of **SCRTD** intervals in 24-hour day;
- $EI_{gi}^{RT}$  = metered Energy produced by Generator g in **SCRTD** interval i;
- $EI_{gi}^{DA}$  = Energy scheduled in the Day-Ahead Market to be produced by Generator g in **SCRTD** interval i;

$NASR_{gi}^{DA}$  = Net Ancillary Services revenue paid to Generator g as a result of having been committed to produce Energy for the LBMP Market and/or Ancillary Services Day- Ahead to operate in hour i is computed by summing the following: (1) Voltage Support payments received by that Generator for that hour, if it is not a Supplier of Installed Capacity and has been scheduled to operate in that hour; (2) Regulation Service payments made to that Generator for all Regulation Service it is scheduled Day-Ahead to provide in that hour, adjusted for that Generator's performance that hour, less that Generator's Day-Ahead Bid to provide that amount of Regulation Service in that hour (unless the Bid exceeds the payments that Generator receives for providing Regulation Services that was committed to produce Energy for the LBMP Market and/or Ancillary Services Day- Ahead, in which case this component shall be zero); and (3) Availability payments made to that Generator for providing Spinning Reserve in that hour if it is committed Day- Ahead to provide Spinning Reserve in that hour, less that Generator's Day-Ahead Bid to provide Spinning Reserve in that hour.

$C_{gi}^{RT}$  = Bid cost curve made by Generator g in the Real-Time dispatch for the hour that includes SCRTD interval i;

$MGI_{gi}^{RT}$  = metered Energy produced by minimum generation segment of Generator g in SCRTD interval i;

$MGI_{gi}^{DA}$  = Energy scheduled Day-Ahead to be produced by minimum generation segment of Generator g in SCRTD interval i;

$MGC_{gi}^{RT}$  = Generator g's Incremental cost of eEnergy while operating at the minimum generation level determined from the mMinimum gGeneration cost-bBid by Generator g in the Real-Time mMarket for the hour that includes SCRTD interval i;

$SUC_{gi}^{RT}$  = sStart-uUp cost-bBid by Generator g in hour i into Real-Time dispatch;

$NSUI_{gi}^{RT}$  = number of times Generator g started up in SCRTD interval i;

$NSUI_{gi}^{DA}$  = number of times Generator g is scheduled Day-Ahead to start up in SCRTD interval i;

$LBMP_{gi}^{RT}$  = Real-Time LBMP at Generator g's bus in SCRTD interval i;

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$NASR_{gi}^{TOT} =$  Net Ancillary Services scheduled revenue paid to Generator  $g$  as a result of either having been committed Day-Ahead to operate in hour  $i$  or having operated in hour  $i$  is computed by summing the following: (1) Voltage Support payments received by that Generator for that hour, if it is not a Supplier of Installed Capacity; (2) Regulation Service payments made to that Generator for that hour, adjusted for that Generator's performance for that hour, less the Bid(s) placed by that Generator to provide Regulation Service in that hour at the time it was committed to produce Energy for the LBMP Market and/or Ancillary Services to do so (unless the Bid(s) exceeds the payments that Generator receives for providing Regulation Service, in which case this component shall be zero); (3) Availability payments made to that Generator for providing Spinning Reserve in that hour, less the Bid placed by that Generator to provide Spinning Reserve in that hour at the time it was scheduled to do so; (4) Payments made to that Generator in that hour for Energy in excess of that Generator's aActual Energy iInjections (such payments may be made to providers of Regulation Service when the SCRTD Basepoint sSignals sent to those Generators exceed the AGC Base Point Signals sent to those Generators); and (5) Lost Opportunity Cost payments made to that gGenerator in that hour as a result of reducing that Generator's output in order for it to provide Voltage Support Service or Spinning Reserve.

Time periods including reserve pick-ups, and time periods following a reserve pick-up in which the dispatch of a given Generator is constrained by its downward ramp rate, will not be included in the above calculation of supplemental payments for that Generator.

Also, in the above calculations, if a Supplier of Regulation Service moves above its SCRTD Bbase Ppoint as a result of responding to the AGC Base Points sent to it, its Bid cost for producing that Energy will be deemed equal to its Bid at its SCRTD Bbase Ppoint.

Supplemental payments to units that trip before completing their minimum run-time (for units that were not scheduled to run Day-Ahead) or before running for the number of hours they were scheduled to operate (for units scheduled to run Day-Ahead) may be reduced by the ISO, per ISO Procedures.

Penalty charges resulting from failure to provide an Ancillary Service will not be taken into account when calculating supplemental payments for that Supplier.

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#### Supplemental Payment for Curtailment Initiation Costs

A Supplemental payment for Curtailment Initiation Costs shall be made when the Curtailment Initiation Cost Bid and the Demand Reduction Bid price for any Demand Reduction committed by the ISO in the Day-Ahead market over the twenty-four (24) hour day exceeds Day-Ahead LBMP revenue, provided however that Supplemental payments made to Demand Reduction Providers that fail to complete their scheduled reductions may be reduced by the ISO, pursuant to ISO Procedures.

#### Supplemental Payment for Special Case Resources

A Supplemental payment for Minimum Payment Nominations shall be made when the Minimum Payment Nomination for any Special Case Resource committed by the ISO during a Forecast Operating Reserve shortage exceeds the LBMP revenue received for performance by that Special Case Resource.

Generators with start-up times of greater than twenty-four (24) hours will have their ~~s~~Start-up ~~U~~ ~~cost~~ Bids equally prorated over the course of each day included in their start-up period. Consequently, units whose start-ups are aborted will receive a prorated portion of those payments, based on the portion of the start-up sequence they have completed (e.g., if a unit with a seventy-two (72) hour start-up time has its start-up sequence aborted after forty-eight (48) hours, it would receive two-thirds (2/3) of its start-up cost Bid).

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Sheet Nos. 425 through 426 are reserved for future use.

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