APPENDIX D

IMBALANCE ENERGY CHARGE COMPUTATION

D 1 Purpose of charge

The Imbalance Energy charge is the term used for allocating the cost of not only the Imbalance Energy (the differences between scheduled and actual Generation and Demand), but also any Unaccounted for Energy (UFE) and any errors in the forecasted Transmission Losses as represented by the GMMs. Any corresponding cost of Dispatched Replacement Reserve Capacity that is not allocated as an Ancillary Service is also included along with the Imbalance Energy charge.

D 2 Fundamental formulae

D 2.1 Imbalance Energy Charges on Scheduling Coordinators

The Imbalance Energy charge for Trading Interval t for Scheduling Coordinator j for Zone x is calculated using the following formula:

$$IEC_j = \left(\sum_i GenDev_i - \sum_i LoadDev_i\right) * P_{xt} + \left(\sum_q ImpDev_q\right) * P_{xt} - \left(\sum_q ExpDev_q\right) * P_{xt} + UFEC_j$$

The deviation between scheduled and actual Energy Generation for Generator i represented by Scheduling Coordinator j in Zone x during Trading Interval t is calculated as follows:

$GenDev_i = G_S * GMM_f - [(G_a - G_{adj}) * GMM_{ah} - G_{a/s}] - UnavailAncServMW_{ixt}$

Where:

$UnavailAncServMW_{ixt} = \quad Min[0, PMax_i - G_a - (G_{i,\,oblig} - G_{a/s})]$

The deviation between scheduled and actual Load consumption for Load i represented by Scheduling Coordinator j in Zone x during Trading Interval t is calculated as follows:

$$LoadDev_i = L_s - \left[\left(L_a - L_{adj}\right) + L_{a/s}\right] - UnavailDispLoadMW_{ixt}$$

Where:

$UnavailDispLoadMW_{ixt} = \quad Max[0, (L_{i,\,oblig} - L_{a/s}) - L_a]$

The deviation between forward scheduled and Real Time adjustments to Energy imports*, adjusted for losses, for Scheduling Point q represented by Scheduling Coordinator j into zone x during Trading Interval t is calculated as follows:

$ImpDev_q = I_s * GMM_{fq} – [(I_a – I_{adj}) *GMM_{ahq}]+I_{a/s}$

The deviation between forward scheduled and Real Time adjustments to Energy exports* for Scheduling Point q represented by Scheduling Coordinator j from Zone x during Trading Interval t is calculated as follows:

$$ExpDev_q = E_s - Ea - E_{adj}$$

D 2.2 Unaccounted for Energy Charge

The hourly Unaccounted for Energy Charge on Scheduling Coordinator j for Trading Interval t for each relevant Zone is calculated in the following manner:

The UFE for each utility service territory *k* is calculated as follows,

$$E_{UFE\_UDC\_k} = \left(I_k - E_k + G_k - \left(RTM_k + LPM_k\right) - TL_k\right)$$

The Transmission Loss calculation per Trading Interval t per relevant Zone for each utility service territory k is calculated as follows,

$$TL_k = \sum [G_a * (1 - GMM_{ah})] + \sum [I_a (1 - GMM_{ahq})]$$

Each metered demand point, either ISO grid connected or connected through a UDC, is allocated a portion of the UFE as follows:

$$E_{UFE\_z} = \frac{D_z}{\sum_z D_z} E_{UFE\_UDC\_k}$$

The UFE charge for Scheduling Coordinator j per Trading Interval per relevant Zone is then,

$$UFEC_j = (\sum_z E_{UFE\_z}) * P_{xt}$$

* Note that this deviation is a difference between a forward Market value and a Real Time value. It is not inadvertent energy.

D 3.36 **LPM_k – MWh**

The calculated total of the Load Profile metering in utility service territory k per Trading Interval t.

D 3.37 **TL_k – MWh**

The Transmission Losses per Trading Interval t in utility service territory k.

D 3.38 **$G_{i, oblig}$**

The amount of Spinning Reserve, the amount of Non-Spinning Reserve, and the amount of Replacement Reserve that Generating Unit or System Resource *i* has been selected to supply to the ISO, as reflected in final Ancillary Services Schedules.

D 3.39 **$PMax_i$**

The maximum capability (in MW) at which Energy and Ancillary Services may be scheduled from the Generating Unit or System Resource *i*.

D 3.40 **$L_{i, oblig}$**

The amount of Non-Spinning Reserve and Replacement Reserve that dispatchable Load *i* has been selected to supply to the ISO as reflected in final Ancillary Services schedules for Settlement Period *t*.