***BIP$_{ix}$ = BEEP Interval Ex Post Price***

***j = the number of Scheduling Coordinators with instructed deviations***

***IIEC$_{jix}$ = the Instructed Imbalance Energy Charges for Scheduling Coordinator j for the BEEP Interval i in Zone x***

***IMWH$_{jix}$ = the Instructed Imbalance Energy for Scheduling Coordinator j for the BEEP Interval i in Zone x***

~~***P5Min$_{xt}$ = Five minute Ex Post Price in Zone x in period t***~~

~~***SysDev$_t$ = the absolute difference (whether positive or negative) between (the deviation between scheduled and metered Demand) and (the deviation between scheduled and metered Generation) in five minute period t in Zone x.***~~

If the ISO declares a System Emergency, e.g. during times of supply scarcity, and involuntary load shedding occurs during the real time ~~***dispatch***~~ ***Dispatch***, the ISO shall set the Hourly Ex Post Price at the Administrative Price.

**11.2.4.1 Net Settlements for *Uninstructed* Imbalance Energy.**

***Uninstructed*** Imbalance Energy attributable to each Scheduling Coordinator in each Settlement Period in the relevant Zone shall be deemed to be sold or purchased, as the case may be, by the ISO and ***charges or*** payments for ***Uninstructed*** Imbalance Energy shall be settled by debiting or crediting, as the case may be, the Scheduling Coordinator with an amount for each Settlement Period equal to ***the sum of*** :

***(a) The quantity of undelivered Instructed Imbalance Energy, multiplied by the Effective Price, and***

***(b) The quantity of deviation from the final Hour-Ahead Schedule multiplied by the Hourly Ex Post Price.***

***Imbalance Energy charge will be calculated as follows:***

***IECharge = DevC + ASSEDevC***

where:

$$DevC = \sum_i GenDevC_i - \sum_i LoadDevC_i + \sum_q ImpDevC_q - \sum_q ExpDevC_q + UFEC$$

$$ASSEDevC = \sum_{i} ASSEGenDevC_i + \sum_{i} ASSELoadDevC_i + \sum_{q} ASSEImpDevC_q$$

***and***

The deviation between scheduled and actual Energy Generation for Generator i represented by the Scheduling Coordinator for the Settlement Period is calculated as follows:

$$GenDev_i = G_s * GMM_f - \left[\left(G_a - G_{adj}\right) * GMM_{ah} - G_{a/s} - G_{s/e}\right] - UnavailAncServMW_{ixt}$$

***$UnavialAncServMW_{ixt}$ =Max[-($G_{i,\ oblig}$-$G_{a/s}$), Min(0,Pmax- Ga-( $G_{i,\ oblig}$-$G_{a/s}$))]***

***$GenDevC_i$= $GenDev_i$ * P in case of (b) above, and***

***If $G_{a/s}$ + $G_{s/e}$ > 0 and P < $P_{eff}$ then:***

***$ASSEGenDevC_i$=Max[0,[$G_{a/s}$ +$G_{s/e}$- Max[0,($G_a$ -$G_{adj}$-$G_s$)]]]* ($P_{eff-i}$ -P) in case of (a) above, or***

***If $G_{a/s}$ + $G_{s/e}$ < 0 and P > $P_{eff}$ then:***

***$ASSEGenDevC_i$=Min[0,[$G_{a/s}$ +$G_{s/e}$-Min[0,($G_a$ -$G_{adj}$-$G_s$)]]]* ($P_{eff-i}$ -P) in case of (a) above***

The deviation between scheduled and actual Load consumption for Load i represented by the Scheduling Coordinator for the Settlement Period is calculated as follows:

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

***Where:***

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

***$LoadDevC_i$=$LoadDev_i$ * P in case of (b) above, and***

***If $L_{a/s}$ + $L_{s/e}$ > 0 and P < $P_{eff}$ then:***

***$ASSELoadDevC_i$=Max[0,[$L_{a/s}$ + $L_{s/e}$-Max[0,-($L_a$ -$L_{adj}$-$L_s$)]]]* ($P_{eff-i}$ -P) in case of (a) above, or***

***If $L_{a/s}$ + $L_{s/e}$ < 0 and P > $P_{eff}$ then:***

***$ASSELoadDevC_i$=Min[0,[$L_{a/s}$ + $L_{s/e}$-Min[0,-($L_a$ -$L_{adj}$-$L_s$)]]]* ($P_{eff-i}$ -P) in case of (a) above***

The deviation between forward, scheduled and Real Time adjustments to Energy imports, adjusted for losses, for Scheduling Point q represented by the Scheduling Coordinator for the Settlement Period is calculated as follows:

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

***ImpDevC$_q$= ImpDev$_q$* P in case of (b) above, and***

***If $I_{a/s}$ > 0 and P < $P_{eff}$ then***

***ASSEImpDevC$_q$=Max[0,[$L_{a/s}$ -Max[0,($L_a$ -$L_{adj}$-$L_s$)]]]* ($P_{eff-q}$ -P) in case of (a) above, or***

***If $I_{a/s}$ < 0 and P > $P_{eff}$ then:***

***ASSEImpDevC$_q$=Min[0,[$L_{a/s}$ -Min[0,($L_a$ -$L_{adj}$-$L_s$)]]]* ($P_{eff-q}$ -P) in case of (a) above***

The deviation between forward, scheduled and Real Time adjustments to Energy exports for Scheduling Point q represented by the Scheduling Coordinator for the Settlement Period is calculated as follows:

$$ExpDev_q = E_s - (E_a - E_{adj})$$

***ExpDevC$_q$= ExpDev$_q$ * P***

and where:

***G$_s$*** = sum of effective schedules for Day-Ahead and Hour-Ahead

***GMM$_f$*** = estimated GMM for Day-Ahead

***G$_a$*** = actual metered Generation

***G$_{adj}$*** = deviations in real time ordered by the ISO for purposes such as Congestion Management

***GMM$_{ah}$***= hour-ahead GMM (proxy for ex-post GMM)

***G$_{a/s}$*** = Energy generated from Ancillary Service resource ~~or Supplemental Energy resource~~ due to ISO dispatch instruction

***G$_{s/e}$ = Energy generated from Supplemental Energy resource due to ISO dispatch instruction***

***L$_s$*** = sum of Demand scheduled for Day-Ahead and Hour-Ahead

$L_a$ = actual metered Demand

***follows:***

$$EnQPayTotal_{ijxt} = \sum_{i} EnQPay_{ijxt}$$

**C 3.18 $EnQ_{ijx}$ – MWh**

The Dispatched and Supplemental Energy output in the Real Time Market from resource i by Scheduling Coordinator j in Zone x for.

**C 3.20 $P_{xt}$ - $/MWh**

The Hourly Ex Post Price of Imbalance Energy in the Real Time Market in Zone x for Trading Interval t.

***~~D 2.1~~*** **D 2.1.1 *Uninstructed* Imbalance Energy Charges on Scheduling Coordinators**

Uninstructed Imbalance Energy attributable to each Scheduling Coordinator in each Settlement Period in the relevant Zone shall be deemed to be sold or purchased, as the case may be, by the ISO and charges or payments for Uninstructed Imbalance Energy shall be settled by debiting or crediting, as the case may be, the Scheduling Coordinator with an amount for each Settlement Period equal to the sum of:

(a) The quantity of undelivered Instructed Imbalance Energy, multiplied by the Effective Price, and

(b) The quantity of deviation from the final Hour-Ahead Schedule multiplied by the Hourly Ex Post Price.

Imbalance Energy charge will be calculated as follows:

$$IECharge = DevC + ASSEDevC$$

Where:

$$DevC = \sum_i GenDevCi - \sum_i LoadDevCi + \sum_q ImpDevCq - \sum_q ExpDevCq + UFEC$$

$$ASSEDevC = \sum_i ASSEGenDevCi + \sum_i ASSELoadDevCi + \sum_q ASSEImpDevCq$$

and

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

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

Where:

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

$GenDevC_i = GenDev_i * P$ in case of (b) above, and

If $G_{a/s} + G_{s/e} > 0$ and $P < P_{eff}$ then:

$ASSEGenDevC_i = Max[0,[G_{a/s}$ **$+ G_{s/e}$** $- Max\ [0,\ (G_a - G_{adj} - G_s)]]] * (P_{eff\text{-}l} - P)$ in case of (a) above,

or

If $G_{a/s} + G_{s/e} < 0$ and $P > P_{eff}$ then:

$ASSEGenDevC_i = Min[0,[G_{a/s}$ **$+ G_{s/e}$** $- Min\ [0,\ (G_a - G_{adj} - G_s)]]] * (P_{eff\text{-}l} - P)$ in case of (a) above,

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:

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

Where;

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

$LoadDevC_i = LoadDev_i * P$ in case of (b) above, and

If $L_{a/s} + L_{s/e} > 0$ *and* $P < P_{eff}$ then*:*

$ASSELoadDevC_i = Max[0,[L_{a/s}$ **$\underline{+ L_{s/e}}$** $- Max[0, - (L_a - L_{adj} - L_s)]]]* (P_{eff-l} - P)$ in case of (a) above, or

If $L_{a/s} + L_{s/e} < 0$ *and* $P > P_{eff}$ then:

$ASSELoadDevC_i = Min[0,[L_{a/s}$ **$\underline{+ L_{s/e}}$** $- Min[0, - (L_a - L_{adj} - L_s)]]]* (P_{eff-l} - P)$ in case of (a) above

The deviation between forward scheduled and Real Time adjustments to Energy imports[1], adjusted for losses, for Scheduling Point q represented by Scheduling Coordinator j into zone x during ~~***Trading Interval t***~~ ***Settlement Period t*** is calculated as follows:

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

$ImpDevC_q = ImpDev_q * P$ in case of (b) above, and

If $l_{a/s} > 0$ *and* $P < P_{eff}$ then:

$ASSEImpDevC_q = Max[0,[l_{a/s}$ $\underline{-}$ $Max[0, (l_a - l_{adj} - l_s)]]]* (P_{eff-q} - P)$ in case of (a) above,

or

If $l_{a/s} < 0$ *and* $P > P_{eff}$ then;

$ASSEImpDevC_q = Min[0,[l_{a/s}$ $\underline{-}$ $Min[0, (l_a - l_{adj} - l_s)]]]* (P_{eff-q} - P)$ in case of (a) above

The deviation between forward scheduled and Real Time adjustments to Energy exports[2] for Scheduling Point q represented by Scheduling Coordinator j from Zone x during ~~***Trading Interval t***~~ ***Settlement Period t*** is calculated as follows:

$ExpDev_q = E_s - (E_a - E_{adj})$

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

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

$ExpDevC_q = ExpDev_q * P$

***The Hourly Ex Post Price applicable to uninstructed deviations in Settlement Period t in each zone will equal the Energy weighted average of the BEEP Interval charges in each zone, calculated as follows:***

$$P_{xt} = \frac{(\sum_{ji} |MWh_{jix}| * BIP_{ix})}{\sum_{ji} |IMWh_{jix}|}$$

***Where:***

***$BIP_{ix}$= BEEP Interval Ex Post Price***

***$P_{xt}$ = the Hourly Ex Post Price in Zone x***

***IIEC $_{jix}$ = the Instructed Imbalance Energy Charges for Scheduling Coordinator j for BEEP Interval i in Zone x***

***IMWH $_{jix}$ = the Instructed Imbalance Energy for Scheduling Coordinator j for the BEEP Interval i in Zone x***

***D 2.1.2 Instructed Imbalance Energy Charges on Scheduling Coordinators***

***The Instructed Imbalance Energy charge for Settlement Period t for Scheduling Coordinator j for Zone x is calculated using the following formula:***

***$IIEC_j = IGDC_j + ILDC_j + IIDC_j$***

***The instructed Generation deviation payment/charge is calculated as follows:***

Regulation resources as a result of the ISO's control of those resources. The payment for Scheduling Coordinator j for providing incremental or decremental Energy from resource i in Zone x for Trading Interval t is calculated as follows:

$REPA_{ijxt} = [(RUP_{ijxt} * CUP) + (RDN_{ijxt} * CDN)] * max ($20/MWh, P_{xt})$

REPA shall not be payable unless the Generating Unit is available and capable of being controlled and monitored by the ISO Energy Management System over the full range of its Scheduled Regulation capacity for the entire Settlement Period at at least the ramp rates (increase and decrease in MW/minute) stated in its bid. In addition, the total Energy available ($R_{UP}$ plus $R_{DN}$) may be adjusted to be only $R_{UP}$ or only $R_{DN}$, a percentage of $R_{UP}$ or $R_{DN}$, or the sum of $R_{UP}$ and $R_{DN}$, depending on the needs of the ISO for each direction of Regulation service.

**C 2.2.5 Real-Time Market**

(a) The ISO will charge the costs of purchasing Instructed Imbalance Energy output from Dispatched Spinning Reserve, Non-Spinning Reserve, Replacement Reserve and Supplemental Energy Resources through the Instructed Imbalance Energy settlement process.

(b) The ISO will charge the costs of purchasing Uninstructed Imbalance Energy (including incremental and decremental Energy from Generating Units providing Regulation) through the Uninstructed Imbalance Energy settlement process.

(c) The ISO will charge the costs of Regulation Energy Payment Adjustments as calculated in accordance with Section 2.5.27.1 of the ISO Tariff, in accordance with SABP 3.1.1(d).