

# Scheduling and Imbalance Penalties

## -- A Double Screen Approach

(Draft - ~~October 28~~November 3rd, 2002)

The discussion below addresses the issue of the consequences of or penalties deriving from imbalanced energy schedules. A parallel paper discusses the issue of whether responses to RTO requirements (in non-emergency situations) should be “permissive.”

### Background

Imbalance energy needs to be distinguished from imbalance penalties. Imbalance energy is the difference between what is scheduled in the day-ahead (DA) market and what is delivered. The difference can be positive or negative. Imbalance energy generally will be measured on the same frequency that the RTO adopts for settlements but it may be financially reconciled on a different basis, such as integrated over an hour, day or month. Schedules will always be responsible for paying the cost or receiving the value of excess energy they inject or withdraw from the system at the prevailing market price. The issue of this paper is how much penalty, if any, should be added to levels of imbalance.

Imbalance penalties occur when the difference between scheduled and actual deliveries to the system exceed some pre-defined threshold. One purpose of the penalties is to encourage accurate scheduling and minimize the problems that the RTO may face in stabilizing the system in real time.

There are two levels of imbalance energy, termed here System Level and Schedule Level. System Level imbalances occur when the sum of all schedules on the RTO system differ from the actual deliveries. Schedule Level imbalances occur as the difference between an individual schedule and actual deliveries. Because of diversity, the (absolute value of a) System Level imbalance for any hour will almost certainly be less than the sum of Schedule Imbalances for that hour.

For example, a deviation of +10 MW for one schedule and -10 MW for another will result in no System Level imbalance. The positive deviation in one schedule will result in a charge for excess energy taken, and the negative deviation will result in a credit for that schedule. Whether or not there is a penalty to either one or both of these schedules, in addition to the energy charges or credit, depends on how penalties are defined.

Under the pro-forma OATT tariff, imbalance penalties are charged to both negative and positive schedule deviations (provided the imbalances exceed a specified threshold).

## Double Screen Method for Establishing Imbalance Penalties

Despite the best efforts of those involved, there will always be differences between schedules and actual transmission usage. Loads change unexpectedly; generating stations have events that alter their output. Perfect scheduling is impossible. Tension exists between being exposed to the consequences of imperfect schedules and being exposed to penalties. The following proposal attempts to minimize the consequences for unintended schedule imbalances while preserving the ability of the RTO to impose penalties, should they become necessary.

We propose that the RTO West tariff include the necessary terms and conditions to allow the RTO to quickly file with FERC to gain approval to impose penalties on individual scheduling coordinators. We recommend that the penalty terms of the tariff be left sufficiently general and that they refer to a yet to be developed "schedule" that the RTO would file with FERC, should it believe that penalties are necessary.

Although we recommend that the RTO have the flexibility to design an effective penalty size and structure, the ability of the RTO to impose imbalance penalties should be limited to cases where penalties are appropriate.<sup>1</sup> Imbalance penalties are appropriate if the RTO can demonstrate that the lack of penalties is causing a significant amount of imbalance energy that is threatening either the reliability of the system or causing it to violate its credit provisions and the scheduling coordinator being penalized is contributing to the problem.

To assure that both of these conditions are met we propose a two-staged method. In the first stage, at the System Level, there is a check to see if the RTO is, in aggregate, out of balance beyond a predetermined threshold. These predetermined levels should be adjusted to incorporate safe operating guidelines. If the System Level threshold for imbalance energy is not exceeded, there are no penalties imposed on any schedules (though the cost consequences will still be experienced via LMP prices and the potential allocation of call option costs to SC's with large imbalances).

If the ~~transmission provider~~RTO has an imbalance beyond the threshold, the Schedule Level stage kicks in. In any hour (or measurement period) it would be rare for a schedule to be in perfect balance. Some schedules will be short of what is promised; some will be long. Furthermore, there will be degrees of imbalance. Some schedules will exceed a predetermined threshold (that can be different from the threshold for the RTO), others will not. Some will exceed the threshold negatively; some positively.

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<sup>1</sup> [Penalties should not be used as a general revenue producing tool.](#)

In the two-stage method, only those schedules that exceed the Schedule threshold in the same direction as the RTO's threshold problem, will be exposed to penalties. Those schedules that benefit the system—in the opposite direction from the ~~transmission provider~~RTO's imbalance—even though they may be in the penalty range, will not be charged a penalty. The penalty—for example, 10% of the nodal price—will be charged to the individual schedules based on the amount an individual schedule exceeded the predetermined penalty threshold.

### Example Tariff

Below is an example tariff of this two stage proposal.

## SCHEDULE 4

### Definitions

**“Aggregate Scheduled Deliveries”** means, for the Clock Hour and for all Transmission Customers taking Energy Imbalance Service, the cumulative amount of energy (adjusted for any applicable losses on the Transmission System) scheduled and delivered to the Transmission System for delivery to Transmission Customers and subject to this Schedule \_\_\_\_.

**“Aggregate Actual Deliveries”** means, for the Clock Hour and for all Transmission Customers then taking Energy Imbalance Service, the cumulative amount of energy (adjusted for applicable losses on the Transmission System) actually delivered to Transmission Customers and subject to this Schedule \_\_\_\_.

**“Aggregate Bandwidth”** for aggregate deliveries shall mean ~~seven~~ \_\_\_\_ percent (~~7~~ \_\_%) of the Aggregate Scheduled Delivery.

**“Customer Actual Deliveries”** means, for the Clock Hour, the amount of energy (adjusted for applicable losses on the Transmission System) actually delivered to Transmission Customers and subject to this Schedule ~~4R~~ \_\_.

**“Customer Bandwidth”** for the Transmission Customer shall mean (i) one (1) megawatt; or (ii) ~~seven~~ \_\_\_\_ percent (~~7~~ \_\_%) of the Customer Scheduled Delivery, but not less than ~~2~~ \_\_ MW.

**“Customer Over-Deliveries”** means the amount of Customer Scheduled Deliveries less the Customer Actual Deliveries when the difference is positive.

**“Customer Scheduled Deliveries”** for the Clock Hour the amount of energy (adjusted for any applicable losses on the Transmission System) scheduled and delivered to the Transmission System for delivery to Transmission Customers and subject to this Schedule \_\_\_\_.

**“Customer Under-Deliveries”** means the amount of Customer Scheduled Deliveries less the Customer Actual Deliveries when the difference is negative.

**“Net Aggregate Imbalance”** means the result of the Net Over- or Under-Delivery calculation.

**“Net Aggregate Penalty Trigger”** means that, when the Net Aggregate Imbalance exceeds (in absolute value terms) the Aggregate Bandwidth penalties will be applied to Customer schedules that have imbalances in the same direction as the Net Aggregate Imbalance.

**“Net Aggregate Over-Deliveries”** means the amount of Aggregate Scheduled Deliveries less the Aggregate Actual Deliveries when the difference is positive.

**“Net Aggregate Under-Deliveries”** means the amount of Aggregate Scheduled Deliveries less the Aggregate Actual Deliveries when the difference is negative.

**“Transmission Energy Imbalance Service”** shall mean the energy imbalance service to be provided to a Transmission Customer, pursuant to this Schedule 4, with respect to the delivery of energy by the Transmission Customer to the ~~Transmission Provider~~RTO for simultaneous delivery to Transmission Customers.

**“RTO Incremental Cost” shall mean the LMP prices and the potential allocation of call option costs to SC’s with large imbalances**

#### **A. Penalties for Aggregate Under-Deliveries**

For each Clock Hour in which there is a Net Aggregate Penalty Trigger and there are Net Aggregate Under-Deliveries, the total penalty for the Clock Hour shall equal the product of \_\_\_ percent (\_\_\_\_) of the ~~Transmission Provider~~RTO’s Incremental Cost times the number of megawatts of a Customer’s (Stage 2) Under-Delivery that do not fall within the Customer Bandwidth.

#### **B. Penalties for Aggregate Over-Deliveries**

For each Clock Hour in which there is a Net Aggregate Penalty Trigger and there are Net Aggregate Over-Deliveries, the total penalty for the Clock Hour shall equal the product of ~~ten~~ \_\_\_ percent (~~10~~ %) of the ~~Transmission Provider’s~~RTO Incremental Cost times the number of megawatts that a Customer’s (Stage 2) Over-Delivery do not fall within the Customer Bandwidth.

#### **C. Charges for Customer Under-Deliveries**

For each Clock Hour in which there are Customer Under-Deliveries, each Transmission Customer who experiences Customer (Stage 1) Under-Deliveries will be assessed charges for the Clock Hour equal to the product of one hundred percent (100%) of the ~~Transmission Provider’s~~RTO Incremental Cost times the number of megawatts of the Customer Under-Deliveries.

#### **D. Charges for Customer Over-Deliveries**

For each Clock Hour in which there are Customer (Stage 1) Over-Deliveries, each Transmission Customer who experiences Customer Over-Deliveries will

receive credits for the Clock Hour equal to the product of one hundred percent (100%) of the ~~Transmission Provider's~~[RTO](#) Incremental Cost times the number of megawatts of the Customer Over-Deliveries.