

# WORKING DOCUMENT<sup>1</sup>

## RTO West Stage 2 Congestion Management Content Group Working Model Summary August 12, 2001

### A. Basic Approach<sup>2</sup>

The RTO West Congestion Management Model is based on flow-distributed rights.

The RTO creates Transmission Rights (“TR”) for flow paths that have commercially-significant congestion (“Flow Paths”).

In order to schedule over Flow Paths, a Scheduling Coordinator (“SC”) is required to submit certain TRs<sup>3</sup> with its day-ahead balanced schedule. The Flow Paths that an SC’s schedule flows over and the FTRs that are associated with its schedule are determined by applying RTO established and published Flow Distribution Factors (“FDF”) to the SC’s balanced schedules (injections and withdrawals). This will determine how many FTRs, by Flow Path and in what quantity (measured in megawatts), are needed for an SC to submit its balanced schedule(s).

An SC’s schedule will likely flow over a number of Flow Paths. An SC does not need to submit FTRs, however, on those Flow Paths that require FTRs in a quantity lower than a Forgiveness Threshold (discussed below). The SC is not directly responsible for any financial costs incurred by the RTO to arrange for this portion of its schedule. An SC may, but is not required to, submit FTRs on those Flow Paths that require FTRs in a quantity that is lower than a Scheduling Threshold (discussed below). To the extent an SC has opted not to submit FTRs below the Scheduling Threshold, it is financially responsible for the actions of the RTO in procuring needed FTRs or taking other actions to clear the congestion related to the “uncovered” portion of its schedule.

An SC can acquire FTRs in a number of ways. Prior to commencement of RTO operations, FTRs will be allocated to existing rightholders based upon their pre-existing contract rights and

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<sup>1</sup> This Working Document was drafted by the Coordinating Team and reflects their view of the status of the CM Working Model.

<sup>2</sup> A number of parties’ support for this approach is predicated on the understanding that “reasonable comparability” will be achieved in translation of pre-existing contracts and load service obligations to Firm Transmission Rights. In addition, a number of parties’ support for the approach is conditioned on the resolution of market power and market liquidity issues.

<sup>3</sup> There are three types of TRs: Firm Transmission Rights (“FTR”), Recallable Transmission Rights (“RTR”), and Non-Firm Transmission Rights (“NTR”). (FTRs are used in this paper for purposes of describing the working model (even though RTRs and NTRs would be sufficient for purposes of the RTO initially accepting a schedule).

load service obligations. In addition, the RTO will release unallocated FTRs in a series of auctions. It is anticipated that FTRs acquired through both of these mechanisms will be traded in a secondary market providing a third mechanism for SCs to acquire FTRs.

If the RTO incurs costs in managing “residual congestion” (inter-zonal congestion that results from differences between the commercial model and the system and intra-zonal congestion), these costs, as a general proposition, will be recovered through an uplift charge to all schedules. The specifics are detailed in Subsection \_\_\_ below.

## **B. Scheduling Basics**

An SC will be required to submit its schedule(s) in hourly quantities, and must specify for each hourly schedule its (i) generation injections (including imports from non-RTO West control areas), (ii) inter-SC trades (energy transfers to and from another SC), and (iii) load withdrawals (including exports to non-RTO West control areas). The SC must also submit certain TRs that correspond to the application of RTO FDFs to its scheduled injections and withdrawals (as detailed below).

Generation injections are scheduled on a bus-specific basis (this information is needed by the RTO for operational analyses), but will be aggregated at the zonal level for commercial purposes (including settlements).

Inter-SC Trades are scheduled on a zonal basis.

Load withdrawals except loads that are treated as Dispatchable Demand Withdrawals are scheduled on a zonal basis (unless the RTO determines that it needs more-refined sub-zonal data for operational analysis purposes). For settlement purposes load will be aggregated at the zonal level.

Schedules must be balanced for each hour and for each zone as follows:

$$\text{SGI} + \text{ISCI} + \text{SIC} + \text{SIZ} = \text{LW} + \text{ISCE} + \text{SEC} + \text{SEZ}$$

Where,

SGI = An SC’s scheduled generation injections in the zone;

ISCI = An SC’s inter-SC energy transfers from other SCs within the zone;

SIZ = An SC’s scheduled imports into the zone from another zone;

SIC = An SC’s scheduled imports to the zone from another control area;

LW = An SC’s load withdrawals within the zone;

ISCE = An SC's inter-SC energy transfers to other SCs within the zone;

SEZ = An SC's scheduled exports from the zone to another zone; and

SEC = An SC's scheduled exports from the zone to another control area

Provided all of the above factors are adjusted for transmission losses as appropriate based upon the to-be-developed RTO West losses methodology.

During the day ahead scheduling process (following schedule validation), the RTO will determine each SC's use of Flow Paths by applying its FDFs to the SC's Net Injections/withdrawals in each zone. After taking into account the applicable Forgiveness and Scheduling Thresholds, the RTO will determine which TRs are needed for the SC's schedule to be accepted. For settlement purposes, the RTO will "deem" the imports and exports submitted by the SC for each zone to have taken place, unless subsequent schedule changes are accepted by the RTO; the RTO will use the deemed imports and exports in the settlement process.

## C. FTRs

### 1. Inter-zonal Scheduling (Scheduling Between Congestion Zones)

#### a) Forgiveness Threshold Concept<sup>4</sup>

An SC is not required to submit FTRs associated with its schedule for Flow Paths that fall below the Forgiveness Threshold. The Forgiveness Threshold will be "W"% of the SC's balanced schedules ("W"% of the Net Injections<sup>5</sup> associated with the SCs' schedules). The Forgiveness

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<sup>4</sup> In order to illustrate the concept of the Forgiveness Threshold, this paper contains examples of Forgiveness Threshold percentages and how the Forgiveness Threshold might be applied. These examples are illustrative, and the CMCG will need further analysis, discussion, and consideration of a number of factors before the specific values of the Forgiveness Threshold can be finalized.

<sup>5</sup> "Net injections" is the sum of the SC's zonal net injections, where net injections are calculated for each zone of the SC's schedule as follows:

$$\text{Net Injection} = \text{SGI} + \text{ISCI} + \text{SIC} - \text{LW} - \text{ISCE} - \text{SEC}$$

Where,

SGI = An SC's scheduled generation injections in the zone;

ISCI = An SC's inter-SC energy transfers from other SCs within the zone;

SIC = An SC's scheduled imports to the zone from another control area;

LW = An SC's load withdrawals within the zone;

ISCE = An SC's inter-SC energy transfers to other SCs within the zone; and

SEC = An SC's scheduled exports from the zone to another control area

Threshold is exceeded if the quantity of FTRs required for a Flow Path are greater than W% of such SC's Net Injections. For discussion purposes, "W" is assumed to be somewhere in the 2%-10% range.

### **b) Scheduling Threshold Concept<sup>6</sup>**

An SC can opt to have the RTO procure rights on behalf of the SC with respect to FTRs that are associated with its schedule for Flow Paths that exceed the Forgiveness Threshold but are below the Scheduling Threshold ("Between Threshold FTRs").

The Scheduling Threshold would take the form of "Y"% of the SC's balanced schedules ("Y"% of the Net Injections associated with the SC's schedules). The Scheduling Threshold is exceeded if the FTRs required for a Flow Path are greater than Y% of such SC's Net Injections. For discussion purposes, "Y" is assumed to be in the 20% range.

An SC opts to have the RTO act on its behalf by not submitting all or a portion of Between Threshold FTRs. The SC remains responsible for the costs incurred by the RTO in procuring the Between Threshold FTRs on its behalf or taking other actions to manage the congestion related to the uncovered portion of the SC's schedule.

An SC must submit all of the FTRs for Flow Paths associated with its schedule that require FTRs in a quantity greater than the Scheduling Thresholds. For example, if there are 15 MWs of FTRs on a path associated with an SC's schedule and the Scheduling Threshold on that path is 14 MWs, the SC is required to submit all 15 MWs of FTRs.

## **2. Intra-zonal Scheduling (Scheduling Within a Congestion Zone)**

An SC is not required to submit FTRs for uses within a congestion zone (i.e., when the SC's schedule's point of injection and point of withdrawal are within the same zone).

## **D. Settlement Summary**

The RTO will calculate Energy Imbalances and the associated credits and charges for each ten-minute settlement period for each zone an SC has included in its final schedule and for additional zones in which the SC has unscheduled generation injections or load withdrawals. The RTO will make these calculations after the fact for each zone relevant to an SC as follows:

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[Provided all of the above factors are adjusted for transmission losses?]

The issue of whether an SC may or is required to net its schedules is still open.

<sup>6</sup> In order to illustrate the concept of the Scheduling Threshold, this paper contains examples of Scheduling Threshold percentages and how the Scheduling Threshold might be applied. These examples are illustrative, and the CMCG will need further analysis, discussion, and consideration of a number of factors before the specific value of the Forgiveness Threshold can be finalized

$$\text{ZEI} = (\text{GI} + \text{SIC} + \text{SIZ} + \text{ISCI}) - (\text{LW} + \text{SEC} + \text{SEZ} + \text{ISCE})$$

Where,

- ZEI = Zonal Energy Imbalance for the SC for the zone in MW-hr;
- GI = An SC's generation injections based upon metering actual generation during the relevant settlement period (or meter information profiled into the relevant settlement period);
- SIZ = An SC's zone imports from other zones within RTO West based upon the amounts determined in the scheduling process that are subsequently "deemed" to have occurred for settlement purposes;
- SIC = An SC's zone imports from other control areas based upon the amounts determined in the scheduling process that are subsequently "deemed" to have occurred for settlement purposes;
- ISCI = An SC's Inter-SC transfers from other SCs within the zone based upon amounts scheduled that are subsequently "deemed" to have occurred for settlement purposes;
- LW = An SC's load withdrawals based upon metering actual usage during the relevant settlement period (or meter information profiled into the relevant settlement period);
- SEZ = An SC's zone exports to another zone within RTO West based upon the amounts determined in the scheduling process that are subsequently "deemed" to have occurred for settlement purposes;
- SEC = An SC's zone exports to another control area based upon the amounts determined in the scheduling process that are subsequently "deemed" to have occurred for settlement purposes; and
- ISCE = An SC's Inter-SC transfer to other SCs within the zone based upon amounts scheduled (that are "deemed" to have occurred for settlements' purposes).

Provided all of the above factors are adjusted for transmission losses as appropriate based upon the to-be-developed RTO West losses methodology.

The RTO will charge or credit each SC with a Zonal Energy Imbalance in a ten-minute settlement period an amount to be determined as follows:

The RTO will determine the Zonal Balancing Energy charge or credit related each zone an SC uses during a settlement period by multiplying the SC's Zonal Energy Imbalance in Mw-hr and the RTO's zone-specific Balancing Energy price in \$/MW-hr. A credit in a zone is the result when the SC has an energy surplus in a zone (a positive zonal energy imbalance). A charge in a zone is the result when the SC has an energy deficiency in a zone (a negative zonal energy imbalance)

The RTO will then determine the charge or credit to be made to such SC for such settlement period by summing the SC's Zonal Balancing Energy charges and credits for all of the zones used by the SC during that settlement period.

[Note: In addition to these charges, SCs will generally also be assessed charges as appropriate for Ancillary Services, RTO uplifts, and penalties for excessively large Energy Imbalances and excessively large deviations between actual and scheduled withdrawals.]

## **E. Voluntary Schedule Netting**

An SC's overall scheduling requirements might provide the SC with an opportunity to net underlying counter flows and reduce its balanced schedule and, possibly, the number of TRs that are required for acceptance of the balanced schedule. Under the working model, An SC may elect to net its overall schedule or to submit it in "scheduling packages" of individual balanced schedules. In the event that an SC submits scheduling packages, the RTO will determine the needed TRs by applying its FDFs to individual scheduling packages. The RTO will treat each scheduling package as if it were the only schedule submitted by the SC for commercial purposes. For example, each individual scheduling package will be (i) subject to applicable Forgiveness and Scheduling Thresholds, (ii) settled as outlined in Section D, and (iii) allocated uplift costs. In general, the rules that apply to an SC that has a fully netted schedule will apply to each of a SC's scheduling packages. To date no exceptions have been identified to this general rule.

In order to take full advantage of the RTO West system's transfer capability notwithstanding an SC's ability to submit scheduling packages (and to provide an incentive for an SC to voluntarily net), as a part of the day-ahead and hour-ahead scheduling process, the RTO will net the aggregate of all SCs as follows.

1. By 9:00 in the day-ahead scheduling process, an SC notifies the RTO which FTRs it intends to release. This release creates RTRs that are auctioned by the RTO. The auction revenues go to the SC. This provides an incentive for early voluntary release, including an incentive for an SC to voluntarily net its overall schedule in order to free up FTRs for sale
2. At 9:00 and there after, the RTO using information provided by all SCs at 9:00 am will create additional RTRs by netting across all SCs. The RTO will hold the RTR recall rights and the

auction revenues will be used by the RTO to offset uplift costs. This provides a cost to an SC that has not netted its schedules voluntarily.

3. All RTRs become firm 120 minutes prior to the start of the operating hour. This provides a liquid, firm close to real time product.
4. Other volumetric scheduling charges will be applied to individual scheduling packages. This provides an additional incentive for SC's to net its schedules.

#### **F. Translation of Pre-existing Contracts and Load Service Obligations into FTRs**

Entities that have pre-existing contracts and load service obligations will be allocated FTRs as described in the Transmission Operating Agreement. During the allocation process, each such entity shall be allocated the FTRs that it would be required to provide to the RTO if it were its own SC. FTRs that fall below the Forgiveness Threshold will be allocated to each such entity and retained for it by the RTO (consistent with paragraph F, below); these FTRs shall be released to each such entity if and when the Forgiveness Threshold is reduced. Between Threshold FTRs will be allocated to the rightholders.

#### **G. RTO Release of FTRs Below the Forgiveness Threshold**

Initially, the RTO will not release the FTRs below the Forgiveness Threshold into the market as these FTRs are in effect "used". The RTO will have the discretion in its ongoing role of managing congested paths to determine whether it is appropriate to release these FTRs, and, if it does, will develop a process to release such FTRs into the market on an annual, monthly, weekly, and daily basis based upon path capability and historic RTO path inter-zonal congestion costs. The RTO will use the revenue from such sales to offset its costs incurred in managing inter-zonal congestion, which costs shall be allocated as discussed below.

#### **H. RTO Role In Managing Inter-zonal Congestion**

An underlying assumption of this model is that the cost incurred by the RTO to manage inter-zonal congestion resulting from the difference between the commercial model and actual operation will be relatively small and evenly distributed across the RTO grid.

In order to manage the amount of uplift that is spread to RTO schedules resulting from inter-zonal congestion, the RTO will apply the following triggers to consider whether to revise the threshold values described above or take other appropriate action. (These triggers are not the same as the criteria used for the creation and elimination of Flow Paths, which are described later in the document.)

Should the RTO determine that it is appropriate to revise a threshold, in general, changes will be made only within the timeframe that TRs have been sold for in the then-current RTO auction. For example, if a party acquires one-year FTRs, they should not be exposed to commercial model changes which increase financial risks during that year. (Pre-existing rights are generally

protected since FTRs held by the RTO under the Forgiveness Threshold can be reissued to the rightholders). In addition, changes to the thresholds must be viewed in concert with the rest of the congestion management commercial model.

### **1. Trigger to Revise Forgiveness Threshold**

The objective of the Forgiveness Threshold Trigger is to ensure that the uplift associated with a Forgiveness Threshold is not getting too large.

The steps of this trigger include:

- a) Track total congestion management costs during hours with system normal;
- b) Track congestion management costs associated with the Forgiveness Threshold with system normal; and
- c) If, for a 12-month period, total congestion management costs exceed some measure (e.g., “C”% of commercial value) *and* the costs associated with forgiveness exceed “D”% (e.g., 50%) of total congestion management cost *then* the RTO should consider reducing threshold W.

### **2. Trigger to Revise Scheduling Threshold**

The objective of the Scheduling Threshold Trigger is ensure that the amount of residual congestion that the RTO must fix due to uncovered schedules does not rise to the point that it becomes too difficult to manage and the benefits of a physical rights approach are lost.

The steps of the primary trigger include:

- a) Track total congestion management costs during hours with system normal;
- b) Track congestion management costs associated with uncovered schedules with system normal; and
- c) If, for a 12 month period, total congestion management costs exceed some measure (e.g., “C”% of commercial value) *and* the costs associated with uncovered schedules exceed “E”% (e.g., 50%) of total congestion management cost *then* the RTO should consider reducing threshold Y.

The steps of the backstop trigger include:

- a) Track number of hours that the RTO makes schedule reductions in the preschedule process with system normal;
- b) Track number of hours the RTO must curtail schedules in the preschedule process due to uncovered schedules with system normal; and
- c) If the hours associated with uncovered schedules exceeds “U”% of the total, then the RTO should consider reducing threshold Y.

## **I. RTO Options To Control Its Costs of Inter-zonal Congestion**

Where one (or more) inter-zonal congestion cost trigger level(s) has been exceeded, the RTO must consider taking action to reduce congestion costs. For example, the RTO could:

- i) Revise the manner in which FTRs are released;
- ii) Revise the thresholds associated with one or more paths as described above;
- iii) Make fundamental changes to the congestion management model; and
- iv) Explore the possibility of having a sponsor “fix” congestion through construction or construction alternatives.<sup>7</sup>

The above list of options is not all-inclusive.

## **J. RTO Action Related to Costs of Intra-zonal Congestion**

The RTO will consider creating new Flow Paths when the costs of intra-zonal congestion become commercially significant or take other appropriate action.

The underlying principle to be applied in these criteria is one of commercial significance. Facilities that are not currently designated as part of a Flow Path will be considered by the RTO for designation as a Flow Path if the RTO cost to resolve congestion on the facilities exceeds a commercially significant level. Conversely, for a Flow Path that fails to continue to be commercially significant it will be eliminated as a Flow Path.

For both addition and elimination of Flow Paths, the commercially significant cost level would be evaluated over a predetermined period of time (e.g. 12 months) to avoid the creation or elimination of Flow Paths based upon conditions that may exist for only a short period of time.

## **K. Allocation of Inter-zonal and Intra-zonal Congestion Costs**

The RTO will separate the costs it incurs in managing congestion into (i) costs related to inter-zonal congestion and (ii) costs related to intra-zonal congestion.

The RTO will further separate the costs related to inter-zonal congestion to (i) costs related to acting as an SC's agent with respect to Between Threshold FTRs and (ii) those related to other inter-zonal congestion.

The RTO will assign that portion of the inter-zonal costs related to Between Threshold FTRs to the responsible SC.

- L. The RTO will allocate the remainder of its costs related to inter-zonal congestion, together with its costs related to intra-zonal congestion (with one exception) on a MW-hr basis to all schedules. The exception applies to the allocation of intra-zonal costs, and can be expressed as the following general principle. To the extent Transmission Customers currently pay for

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<sup>7</sup> One of the underlying assumptions is that the RTO can change the model provided that Day One FTRs that were allocated to cover pre-existing contracts and load service obligations will be retranslated as necessary to continue to provide “reasonable comparability”.

intra-zonal congestion under pre-Order No. 888 contracts that are converted, those customers should not be required to pay a second time for the cost of the RTO's actions in clearing intra-zonal congestion. (This could take the form of a credit to the transfer payment obligation of a customer for such pre-existing contracts to reflect that it paid the RTO uplift relating to intra-zonal congestion or some other agreed-to mechanism.) RTO Role In Managing Congestion in the Day-Ahead Scheduling Process

If schedules submitted during the day ahead scheduling process would create congestion, RTO West will take action prior to the close of the day ahead scheduling process to resolve such congestion through one or more of the following actions:

1. Adjust control variables (i.e., phase shifters)
2. Purchase congestion redispatch (incs/decs)
3. Buy back FTRs
4. Derate FTRs and NCRS consistent with the term sheet and appropriate contracts
5. Other actions as appropriate

## **M. Working Map**

## **N. Working Path List**

## **O. Open Issues**

Treatment of outages/operational changes

Threshold percentages

More discussion regarding exception to uplift for intra-zonal congestion costs

Compatibility of the recommendation and the Stage 1 Pricing Model

Liquidity

Expansion

Treatment of over-subscription of capability (before and after formation of RTO)

Development of a workable transmission market

Mitigation of potential market power

Mechanics of auction and release of FTRs

Translation of existing rights

Treatment of non-converted contracts

Further discussion regarding revenue from below Forgiveness Threshold FTRs

Possibility of having SC's with "uncovered" schedules be financially responsible for costs to clear congestion below Forgiveness Threshold as well as for Between Threshold FTRs

Settlement details