The RTOWest Control Area Model

[August 1, 2000 Draft]

Introduction and Terminology

This document provides an overview of the duties and relationships of the Control Area Operator (CAO), Area Control Centers (ACCs) and Scheduling Coordinators (SCs) in the RTO model. It describes the ways in which the CAO acquires the Interconnected Operations Services (IOS) capacity that the CAO needs in order to securely operate the grid, how the CAO operates the grid through the deployment of Ancillary Services (AS), and the roles of the ACCs. The document also describes the various mechanisms, including "self-provision" of AS and "self-tracking" of AS, by which SCs, through their management of Generation Control Centers (GCCs), can control the dispatch of their resources and their exposure to RTO charges for Balancing Energy and other AS.

Overview of Market Structure

The basic structure of the RTO control area model is as follows:

1. There will be a single NERC-certified CAO for the entire RTO region. The RTO will be the CAO. Those entities owners who become Participating Transmission Owners (PTOs) will turn over some of their present CAO duties to the RTO. Other duties will be distributed to ACCs and to SCs.

2. Entities which are currently CAOs but do not choose to become PTOs - whether those entities are "islands" within the RTO region or located at or beyond the boundaries of the RTO region - would continue to operate their own control areas, just as today. Those entities would be entitled to obtain transmission services from the RTO (because they would be Eligible Customers under the RTO Tariff) by designating SCs to interface with the RTO for transmission services.

3. Every entity wishing to receive transmission service from the RTO must do so by becoming, or by designating, an SC. I.e., generators and loads receive transmission services from the RTO through their RTO-certified SCs. (The roles and responsibilities of SCs are described in other Ancillary Services Working Group documents, including the working draft of "Appendix J - Scheduling Coordinator Certification.")

4. The CAO will be independent of all market participants. It will not own any IOS resources. It will obtain IOS resources through the procurement mechanisms described in this and subsequent documents.

5. The ACCs will be independent of all market participants (although the degree of separation between the ACCs and affiliates of the entities which own the ACCs has not yet been discussed). The ACCs will not control the deployment of any IOS resources, except in certain emergency situations.

6. The SCs will be responsible for the management of their individual portfolios of resources.[1] The SCs may offer IOS resources to the CAO (although in certain cases, in which the CAO procures IOS resources through long-term agreements, the resources may, at their option, individually contract with the CAO) and will control the deployment of their portfolios of resources in response to commands from the CAO.

7. Each SC must operate a GCC.[2] A GCC is a 7 * 24 operations center[3] that is maintained by each SC which schedules energy and/or ancillary services capacity into, out of, or through the RTO grid. Through the GCC, the SC controls all generation and dispatchable demand for which the SC has responsibility. Depending on the circumstances and the technical requirements, this communication may be verbal, by computer, or through Direct Digital Control (DDC).

Description of Roles of the Parties

1. How are the duties of Control Area Operators handled?

CAO duties can be placed into five categories: energy balancing, grid security monitoring, redispatch of resources to maintain secure operation of the grid, switching operations, and response to system emergencies.

- Energy balancing duties will be transferred to the RTO and the SCs. The RTO will be responsible for balancing the entire grid to meet NERC control performance standards. To perform this duty, the RTO will acquire the authority to send dispatch signals (through SCs) to IOS resources that have been provided to the RTO either through self-provision or through SC offers of such IOS resources to the RTO. The RTO will decide which resources to dispatch by creating stacks of the IOS resources which have been provided for the RTO's use (through self-provision by the SCs and through the RTO's procurement processes). SCs will dispatch their resources consistent with the RTO's dispatch signals and the contractual commitments that the SCs have made to the RTO. Each SC will have the flexibility to operate its resources on a portfolio basis (provided that the changes in the resource schedules do not increase congestion unless permitted by existing contracts or licenses), and each SC will also be permitted to use those portions of its resources that have not been committed to other purposes to "self-track" the SC's loads.

[1] Note: throughout the document, "resources" should be understood to include both generation resources and dispatchable demands, unless the context dictates otherwise.

[2] Note: if an SC is not responsible for any resources - for example, the SC simply purchases energy from other SCs, sells energy to non-dispatchable loads, and sells no IOS to the RTO - then the SC's duties are much smaller and its "GCC" is responsible for fewer functions. However, the SC must still in most cases have a GCC in order to respond to real-time orders from the RTO regarding curtailment of transmission rights, emergency curtailments, etc.

[3] Note: the RTO's certification requirements for such operations centers have yet to be determined.

- Grid security monitoring will be the responsibility of the RTO and the ACCs. The ACCs will be under the direction of the RTO in this regard. The types of system status data (voltages, line loadings, status of switches, etc.) which will be brought into the RTO control center vs. the types of data that will be managed at the ACC level needs to be determined.

- Redispatch of resources to resolve congestion (i.e., congestion management pursuant to the RTO's congestion management rules): the redispatch of resources in response to contingencies will be managed by the RTO and the SCs, under a structure similar to that described for energy balancing. The switching of transmission facilities in response to contingencies is described in the next category below.

- Switching operations, including the switching of transmission facilities in response to contingencies, the switching of facilities for forced outages and for maintenance outages, and the switching of facilities that affect the TTC of grid facilities, will be handled by the RTO and ACCs. In general, the RTO is responsible for approving all switching operations and the ACCs are responsible for carrying out the actual operations. (In some cases, and depending on how independent the ACCs are from the operations of their affiliated generation and load-serving functions, the ACCs may be responsible for routine switching activities without RTO intervention.)

- Response to system emergencies is the joint duty of the RTO and the ACCs. The RTO will be the NERC-approved Security Coordinator for the region and as such must have authority over certain aspects of emergency response.[4] Emergency response duties at the lower voltage levels and emergency response duties in the event of catastrophic events would be delegated between the RTO and ACCs pursuant to pre-defined agreements.

2. What is the relationship between RTO and Existing Control Areas?

As a condition for becoming a Participating Transmission Owner, an entity must turn over its CAO duties to the RTO and to the SCs who will assume responsibility for the entity's resources.[5] Existing NERC-certified Control Areas will no longer exist within the portions of the grid that are controlled by Participating Transmission Owners.[6]

[4] The RTO will either be the NERC-approved Security Coordinator or contract with an entity to perform these functions.

[5] Possible exception for Canadian transmission owners: If it is agreed that legal restrictions would prevent Canadian utilities from participating in the RTO under the model described in this document, the Canadian utilities may be permitted to become RTO participants under a slightly different model. The Canadian transmission owner would be required to (i) separate transmission functions from other functions in a way that meets FERC Order 2000's independence standards, and (ii) operate its control area under the hierarchical control area model that was described in an earlier draft of this document. [**Note: This footnote may be obsolete.]**

[6] Note that existing control area boundaries might continue to exist to the extent they define an SC's self-tracking area. This issue will require further discussion in the context of how a self-tracking SC would meter its loads and resources.

As noted above, the RTO will have operating relationships with SCs and through that, with each SC's Generation Control Center. Each SC will, through its GCC, have the ability to adjust generation as needed to meet the SC's power, non-power and legal obligations, including the obligations between the SC and the RTO. Communications between the RTO and the SC's GCC may range from phone calls to direct digital control between the RTO and GCCs, depending on the nature of the function.

3. What IOS are acquired by the RTO and what AS are provided by the RTO?

The table below lists the IOS and AS that are currently being considered by the Ancillary Services Working Group. The details (definitions, technical requirements, certification, deployment, compliance monitoring, compensation, billing determinants, etc.) are being developed by the Working Group.

Working List of Possible RTO IOS and AS[7]

Group	Interconnected Operations Services ("Raw Materials" Purchased by RTO)	Ancillary Services ("Finished Products" Provided by the RTO)
1	Regulation	Regulation
2	Load Following Up Load Following Down Spinning Reserve Supplemental Reserve "Non-Spin" Replacement Reserve	Load Following Up Load Following Down Spinning Reserve Supplemental Reserve "Non-Spin" Replacement Reserve
3	Supplemental Energy Congestion Redispatch (Forward)	Congestion Redispatch (Forward) Balancing Energy (and RT congestion mgmt)
4	Black Start Voltage Support (Gen & Non-gen) Area Control Center Support to RTO	Black Start Voltage Support Scheduling & Dispatch

4. Who defines the requirements - quantity/capacity, location and technical (certification, response time, metering, telecommunications, etc.) - for IOS and AS?

[7] In addition to the above, a fifth category of possible IOS services is being considered. This category might comprise some or all of the following services: Load Curtailment, Under-Frequency Load Shedding, Under-Voltage Load Shedding, Generation Dropping for RAS, Load Tripping for RAS, Transient Excitation Boosting for RAS, and Frequency Responsive Reserve. The costs of procuring these possible IOS services might be included in the transmission ratebase or they could be allocated through an unbundled charge for an Ancillary Service designated as "System Dynamic Response."

The RTO will define these requirements for all of the IOS Groups and all of the AS Groups. The RTO will post these requirements (for example, x MW of Spinning Reserve per 100 MW of an SC actual demand-plus-exports) on the RTO website well in advance (weeks or more) of the Operating Day. The RTO's standards will at a minimum meet those established by NERC and the WSCC.

5. Who will procure IOS resources?

For IOS Groups 1-3: There are three mechanisms through which IOS resources are acquired under normal conditions: self-provision by the SC, self-tracking by the SC, and procurement by the RTO. Based on the requirements posted by the RTO on its website, each SC will know the quantity of each IOS resources for which it will be held responsible. Self-provision and self-tracking are optional - i.e., an SC is not required to do either of these, and may rely upon the RTO to acquire the SC's allocated share of IOS by simply purchasing AS from the RTO.

- Self-provision

  Under self-provision, an SC would acquire IOS resources by virtue of being the SC that is responsible for such resources and/or by acquiring from other SCs the rights to schedule such resources (through inter-SC trades of such resources made bilaterally or through external-to-the-RTO exchanges). The SC would turn over to the RTO the authority to request the dispatch of specified amounts of capacity from such resources.

  Self-provision exempts the SC from paying the RTO for the RTO's procurement of the quantity of IOS resources that was self-provided by the SC. Self-provided resources are deployed by the RTO for community use, and not for SC-specific contingencies or imbalances. Thus, through self-provision, the SC avoids the payment of capacity reservation charges for the IOS resources.

  The SC will remain responsible for real-time Balancing Energy charges or credits, to the extent that the SC's injections in each Congestion Zone, adjusted for transmission losses, do not equal the SC's withdrawals from the Congestion Zone. However, an SC that closely manages its generation/load balances over the Settlement Interval (for example, energy integrated over a 10-minute interval) may mitigate a portion of its exposure to Balancing Energy charges.[8]

  As outlined earlier, the RTO will define the standards and certification processes for self-provision.

- Self-tracking

[8] I.e., it is not necessary for an SC to conduct "self-tracking" in order to manage its exposure to Balancing Energy charges.

Self-tracking is an alternative to self-provision of certain ancillary services resources (Load Following and Regulation)[9] to the RTO. Under self-tracking, an SC contractually commits to the RTO that the SC will use the generation resources in the SC's portfolio to closely match the loads in the SC's portfolio, pursuant to performance requirements that will be consistent with the NERC CPS criteria. (This will require the SC to track its loads on a much more precise basis than simply matching integrated production to integrated consumption over a ten-minute period.) In return for relieving the RTO of the burden of following the SC's loads, the SC is exempted from all, or a part of,[10] the SC's pro rata requirement to self-provide - or have the RTO procure on the SC's behalf - Load Following and Regulation resources. Therefore, the self-tracking SC does not pay the RTO for some or all of the SC's share of Load Following and Regulation AS. Note however, that the self-tracking SC must dedicate capacity to this function from either its own resources or third-party resources that it has procured for this purpose.

Under self-tracking, the SC would deploy its own Load Following and Regulation resources for the SC's own use only. Each SC will remain responsible for its residual energy imbalances over the Settlement Interval,[11] just as would be the case for an SC that did not self-track. As is the case for all SCs, a self-tracking SC may net its energy imbalances with those of other SCs prior to the RTO's final calculation of imbalance energy charges or credits. As is the case for self-provision, the RTO will define the standards and certification processes for self-tracking.

Additional discussion of self-tracking is included in the Appendix to this document.

- <u>RTO procurement</u>

  After adjusting for the self-provision and self-tracking commitments of SCs, the RTO will determine whether it needs to procure additional IOS resources in its role as the AS "provider of last resort." The RTO will acquire such resources through purchases from the marketplace, which may include one or more external-to-the RTO ancillary services exchanges. The RTO's costs of procuring such IOS will be allocated to SCs based on their residual (after self-provision and self-tracking) AS obligations.[12]

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[9] Self-tracking of reserves has also been discussed. Under self-tracking of reserves, the SC's operating reserves would be deployed only for the SC's own contingencies. The SC would not be a participant in the RTO's reserve sharing program and therefore would be required to protect against its own single largest contingency. It does not appear to be a feature that anyone desires at this time. Thus, while it is agreed that the RTO will not prohibit self-tracking of reserves, the consensus is that the Working Groups should not spend much effort trying to define the concept at this time.

[10] Details of the self-tracking concept, including performance requirements, remain to be developed. For example, the SC would still be responsible to the RTO for some share (on a yet-to-be-determined basis) of the costs associated with the RTO's obligation to the interconnection for provision of the frequency bias component of Area Control Error.

[11] The length of the Settlement Interval - for example, 10 minutes, 60 minutes, etc. - will be defined in the ongoing work of the Ancillary Services Work Group.

[12] Note that, as stated earlier, an SC may use its resources to both self-track and to bid into the AS marketplace. The SC would then only be charged for the amount of AS not self -tracked and not self-provided.

For IOS Groups 4-5: because these IOS are generally acquired through longer-term contracts or other longer-term commitments, and because generators and loads can change their SCs on short notice, the longer-term contractual commitments may be made directly (without required intervention of an SC) between the generator/load and the RTO through competitive solicitations or other contractual arrangements.

Under abnormal or unusual situations (for example, upon the loss of IOS resources or the loss of transmission capacity that is used to deliver IOU services) or unanticipated situations (for example, real-time demand far in excess of that which was anticipated by the RTO), the RTO will: (i) if time permits, allow SCs to procure and provide additional IOS resources to the RTO; (ii) procure additional IOS resources from ancillary services exchanges; (iii) as a last resort, exercise any backstop authority under the Tariff to order SCs to provide IOS resources.

6. Who sets the prices of IOS capacity and AS capacity?

For IOS Groups 1-3:

- For self-provided IOS resources: The capacity prices of the resources (i.e., the prices for the "capacity call options" that have been passed on to the RTO by the SCs) are determined in private exchanges and/or through bilateral arrangements, and the RTO will neither know nor care about such prices. The energy prices of such resources (i.e., the "strike prices" at which the IOS resources will be dispatched) will be provided to the RTO by the SCs who self-provide the IOS resources.

- For self-tracking SCs: Because the RTO does not dispatch the associated IOS resources (that being the self-tracker's duty), the RTO does not set the prices for such resources. Any excess or deficit of energy produced by resources which are used for self-tracking purposes will contribute to the SC's energy imbalance account for the Settlement Interval and the SC will therefore be credited or charged for such energy at the RTO's Balancing Energy price for the location and Settlement Interval.

- For resources acquired by the RTO through ancillary services exchanges: The capacity prices and energy strike prices are determined in the exchange. The capacity costs (plus the RTO's transaction costs for procuring the resources, including any associated software development and hardware costs) will be allocated to those SCs who are deemed to be responsible for the RTO's procurement.

For IOS Groups 4-5: the capacity prices are determined by the RTO through the RTO's longer-term procurement processes and/or other contracts. The associated costs are allocated to all SCs who are deemed to be responsible for the RTO's procurement.

7. Who develops the prices for real-time Balancing Energy and how?

From the IOS resources self-provided by SCs and procured by the RTO as described above, the RTO will create "stacks" of available sources of Balancing Energy. The RTO will create a

"Balancing Energy stack" for each congestion zone, comprising the applicable IOS resources that are located in the congestion zone and resources outside the zone with FTRs which in effect provide the IOS resource with access to the zone. As Balancing Energy is needed (and/or as residual congestion is cleared by the RTO) the cheapest resources in that stack are called upon, and the final resource that was dispatched in that zone will set the Balancing Energy price in that zone for that Settlement Interval.

These Balancing Energy prices are used to charge or credit each SC to the extent that the SC has a net imbalance during the Settlement Interval. This is true whether the SC self-provides, self-tracks, or procures its Ancillary Services from the RTO.

The Ancillary Services Working Group must still address many details, including how Balancing Energy will be dispatched (e.g. through a traditional bid stack or through permissive dispatch), duration of the Settlement Interval (e.g. 10 minutes), treatment of operating reserves (e.g., are they used only for contingencies or also for system energy balancing), and pricing and payment during Settlement Intervals in which resources may be both incremented and decremented.

8. Who creates the Operating Plans for the RTO grid?

The RTO will be responsible for developing the Operating Plan for the entire RTO grid. The Operating Plan includes the day-ahead plan for the deployment of IOS and AS and the creation of the Balancing Energy stacks that will be used for the dispatch of AS, and may include aggregated information from self-tracking SCs. The RTO will update its Operating Plans as system conditions change between day-ahead and real-time, based on input provided from the SCs and other sources.

9. Who determines which IOS resources will be deployed (dispatched)?

For the resources under the RTO's control - i.e., those IOS resources which have been self-provided or have been procured by the RTO - the RTO will issue operating instructions to SCs per the RTO's Operating Plan. Each SC will have the flexibility to select and/or distribute the response among its projects via the SC's Generation Control Center, consistent with the RTO's specifications for the IOS and assuming operating conditions allow. To the extent that the output of different plants would have the same effect in meeting an SC's commitment to the RTO and to the extent that shifts of responsibilities between such plants would not violate security limits, the SC can treat the those plants as a single "virtual resource."

For resources that are not under the RTO's control - i.e., that resource capacity that is being used to self-track and any other resources which have not been committed to the RTO through the self-provision or RTO procurement processes - the SC may dispatch such capacity as it desires, limited only by congestion limitations for which it has not provided FTRs and those RTO operating protocols that are needed to ensure that such dispatch would not violate any congestion management protocols.

10. Who deploys/dispatches the IOS resources?

Under the direction of the RTO, the SC will dispatch IOS resources over which the RTO has been granted dispatch authority (through self-provision or through RTO procurement of IOS), but only for the amounts of capacity over which the RTO has been granted dispatch authority. A self-tracking SC will dispatch its IOS resources.

11. Who conducts the settlement function?

The RTO will settle with SCs for IOS capacity purchased by the RTO and for AS capacity costs charged to the SCs. The RTO will settle with SCs for Balancing Energy charges. The RTO has no involvement with the settlement of SC to SC transactions.

12. Who monitors performance and enforces penalties for noncompliance?

The RTO will perform the monitoring functions specified in the RTO Tariff to ensure that IOS providers deliver and perform pursuant to the RTO-defined standardized product and performance standards, and to ensure that treatment of providers of IOS resources will be consistent and non-discriminatory. Enforcement issues addressed in provisions in the RTO Tariff will be the duty of the RTO and regulatory agencies. Other monitoring and enforcement duties may be the responsibilities of, or may be coordinated with, FERC, NERC/NAERO and WSCCWIO.

13. Who is responsible for inter-RTO tie-line schedules?

As a NERC-certified CAO, the RTO will be responsible for managing all schedules between itself and any other CAO, pursuant to applicable criteria for control area operation.

14. Who is responsible for intra-RTO tie-line schedules?

The RTO will operate a single, NERC-certified control area, and as such there are no intra-RTO tie-line "schedules," as the term "schedule" is used to define interchanges between CAOs. Instead, the RTO will manage flowgates within the RTO.

15. Who is responsible for managing flowgate schedules?

The RTO manages all flowgate schedules.

16. Who is responsible for managing congestion?

Most congestion is self-managed through the scheduling process by the SCs through the purchase, sale and scheduling of FTRs. Residual congestion, under both normal and emergency conditions, is managed by the RTO, through the protocols in the RTO Tariff.

17. When does the RTO acquire IOS resources (timeline from day-ahead to real-time)?

For Groups 1-3 IOS and AS:

a) The RTO will forecast the requirements for the ancillary services that may be self-provided on a long-term forward basis and will communicate these requirements to the marketplace through the RTO website, to promote SC self-provision.

b) Prior to the day-ahead prescheduling process, the RTO will adjust the forecast to reflect system conditions. The RTO could either: (i) base final ancillary services requirements on the original per-unit forecasts and actual load, acquire the residual IOS, and charge the costs out as an uplift; or (ii) deem the revised requirements to be the obligations of the SCs and allow SCs an opportunity to self-provide additional IOS resources. There are pros and cons to each of these alternatives, and they will be discussed in the Ancillary Services Work Group.

   Note: While self-tracking SCs would not be directly affected by this step, they would probably see the same effects indirectly, since the resources that they would need to dedicate to meet their self-tracking performance requirements would likely change in a similar fashion.

c) Through the day-ahead pre-scheduling process, the SCs will submit schedules and self-provision commitments to the RTO. SCs that self-track will inform the RTO of their proposed operating plans, to enable the RTO to determine whether or not those plans would create transmission congestion.

d) The RTO will procure the difference between the RTO's forecasted requirement and the amounts supplied by SCs through self-provision and self-tracking, as described earlier.

e) In the post-day-ahead scheduling process, SCs may submit additional schedules, provided that they meet any incremental AS demands, through self-provision or self-tracking, that may be created by the additional schedules.

f) Throughout the period between the close of the day-ahead scheduling process and real-time, the RTO will update its IOS requirements, based on changes in system conditions and input from the SCs and other sources.

g) In real-time, the RTO will, as described in Q&A #9, deploy the appropriate resources to meet the RTO's needs, by communicating with the SCs that are responsible for those resources.

The SCs are responsible to comply with the terms of their contractual obligation to the RTO (portfolio response or unit specific, quantity, response time, etc., depending on the service).

18. What obligations do the RTO and SC's have to offer AS?

Pursuant to Order 2000, the RTO must offer AS as a provider of last resort. This requirement is met fully through the process described above, in which the RTO acts as the agent for SCs who have not self-provided IOS resources (and for all SCs, in the case of non-self-providable ancillary services) by procuring Group 1-3 IOS resources through external-to the-RTO markets and procuring Group 4-5 IOS resources through longer-term procurement arrangements.

Each transmission owner (but not existing control areas per se) currently has an obligation under its FERC Order 888-compliant tariff to offer ancillary services to Eligible Customers who serve load connected to the transmission owner's grid. The SCs which become responsible for the generators that were affiliated with the transmission owner would inherit this obligation to the extent that they are required to do so by contracts and/or regulatory entities. Beyond these requirements, the pricing authorities of formerly-affiliated generators will be determined by the FERC. There is no intention that the transmission owner's participation in the RTO should expand the obligations of such formerly-affiliated generators.

19. How is market power mitigated?

- Designating the RTO as coordinator of grid-wide ancillary services processes mitigates market power by creating grid-wide IOS markets and consolidating the split of markets into subregions that are based on TO boundaries. Physical system constraints rather than historical control area boundaries will now determine market boundaries, creating larger markets in which there is more competition.

- Allowing SCs to transfer ancillary services across flowgates with FTRs further reduces market power by allowing transfer even across those physical constraints.

- Allowing SCs to self-provide and self-track, as an alternative to RTO procurement, creates a much more robust marketplace with many purchasers and with opportunities for continuous forward market deals to procure IOS resources. This mitigates against the market power of sellers of IOS resources.

- The RTO requirement that an efficient electronic trading exchange be put into place (at a minimum, as a mechanism for the RTO to use in its provider of last resort procurement process) will create liquidity and efficient and visible pricing, further mitigating market power.

- The RTO's use of grid-wide standards for certification and performance of IOS resources will make the services more portable.

- To the extent that limited transfer capability into portions of the RTO grid and concentration of generation ownership in those areas prevent the creation of a workably-competitive market for ancillary services in those areas, the RTO may require additional tools to mitigate market power. These might include bid caps, recourse obligations, and administrative pricing tied to the prices in competitive areas of the grid.

20. Who is the IOS provider and who is the AS customer?

For Groups 1-3, the SCs are IOS resource providers and the AS customers. Other entities (PSEs, LSEs, Customer Aggregators, Loads) either become SCs or interact with the RTO through their designated SCs. The RTO is the "Transmission Service Provider" for the RTO grid, and its role is described throughout the document. The Transmission Owners and the Local Distribution Companies play no role in the IOS/AS markets for Groups 1-3, except to the extent that their bundled affiliates are required to make IOS resources available to the SCs and RTO under the terms described in the answer to Question 18.

For Groups 4-5, the IOS resource providers are the generators, dispatchable demands and wires owners that are capable of providing the IOS resources. The AS customers are, once again, the SCs, who are billed for these IOS resources through a grid uplift charge, through payments of the TOs' Annual Transmission Revenue Requirements, or other mechanism specified in the RTO tariff.

Finally, for Scheduling and Dispatch service, the provider is the RTO. The customers are the SCs.

21. How are existing contracts treated?

IOS that are made available by a party pursuant to an existing contract would, if they meet the RTO's technical standards and do not impose limitations on the RTO's use of the IOS, be qualified to be submitted to the RTO by the SC (as self-provision) or to be offered to the ancillary services markets.

Obligations to provide or sell AS under existing contracts would have to be honored by the SC that is responsible for the obligations, pursuant to the terms of the existing contract.

22. How is "native load" treated?

"Native load" is treated no differently than any other load from the RTO perspective. From the RTO's perspective, "native load" is simply a group of bundled consumers that have a pre-designated SC. The RTO treats all SCs identically, regardless of whether the SCs represent bundled loads, unbundled loads, generators, wheel-throughs, or any combination thereof.

23. How will the answers above change under retail access?

Very little changes under retail access, because the SC model which is proposed for use in all of the RTO's relationships with grid users does not distinguish in any way between bundled and unbundled retails loads. The only thing that does change under retail access is that the formerly-bundled retail loads may have a choice of changing their SCs. This flexibility will need to be accommodated in the RTO's settlements and meter data acquisition protocols.

Settlements for Balancing Energy require resource and load data that reflects the "granularity" of the RTO's Balancing Energy markets. The Settlement Interval may be ten-minutes or shorter,

and there will in general be different Balancing Energy prices for each Settlement Interval. This may require that existing interval meters (which may provide data on an hourly basis) either be replaced with meters which can provide data on a Settlement Interval basis, or that some form of interpolation be used to develop "deemed" data for each Settlement Interval.

Retail access extends this problem from that of determining ten-minute loads from hourly meter data, to that of determining ten-minute loads from monthly load data. Under some states' retail access programs, "load profiling" processes have been developed to convert data from monthly cumulative meters to more-granular hourly data. This type of approach may also be considered for use in the RTO's settlements process. Details of settlement processes and the sources of data for use in those processes will be discussed by the Ancillary Services Working Group.

Additional Discussion of Self-Provision and Self-Tracking

Under the proposed models for Ancillary Services procurement and for the roles of Scheduling Coordinators, an SC is responsible for managing its portfolio of resources and loads by submitting to the RTO balanced schedules (i.e., injections equal withdrawals plus deemed losses). An SC may "self-provide" its allocated shares of various ancillary services resources to the RTO (by offering dispatch authority to the RTO for capacity from the SC's resources or from the resources of another SC with whom the first SC has a bilateral agreement); or the SC may elect to have the RTO procure, on behalf of the SC, part or all of those quantities of ancillary services resources (in which case, the RTO would charge the SC for the full purchase price of the resources plus the RTO's procurement costs). The RTO dispatches those resources (whether self-provided or RTO-procured) for the collective benefit of the SCs, using the resources to balance the Area Control Error for the RTO grid and to respond to contingencies. To the extent that an SC has real-time energy imbalances[13] in its portfolio, it sells excess energy to the RTO at the 10-minute Balancing Energy price or purchases energy from the RTO at the 10-minute Balancing Energy price.

An SC can manage its exposure to real-time Balancing Energy charges by closely matching its real-time generation to its real-time demand (integrated over a ten-minute interval). The SC has the ability to move its generation resources in real-time to match changes in its demand; and it also has the ability to make bilateral deals with other SCs to provide/consume energy in real-time (in which case, the two SCs' countervailing imbalances would be netted out against one another before the RTO charged the SCs for Balancing Energy based on any residual imbalances).

In addition, each SC is responsible for the managing the portfolio of resources (which can be generation or demand-side resources) that it has committed to the RTO's ancillary services stacks. Except for emergency situations , the RTO does not issue commands directly to the SC's resources. Instead, the RTO issues such commands to the SC, which is responsible for maintaining a 7 * 24 operations center (or "Generation Control Center") that is capable of providing the RTO with the IOS resources that the SC has committed to provide. Thus, each SC possesses the flexibility to offer to the RTO ancillary services from groups of resources which are located in electrically-similar locations; and to manage the SC's response to the RTO's ancillary services deployment orders on a group basis. This allows each SC the flexibility to manage resources on a watershed, to manage groups of dispatchable demands in accordance with the contracts struck between the SC and the demands, etc.

With these basic features, each SC has the ability to fully manage its resources. Each SC may also mitigate its exposure to charges for real-time Balancing Energy to the extent that the SC is able to match its loads and resources over each ten-minute window while at the same time meeting any commitments that the SC has made to provide the RTO with IOS resources.

Self-Tracking

Some participants may desire to more-completely remove themselves from the RTO's ancillary services and Balancing Energy processes, and to have their retail merchants (which are simply SCs)

[13] Note: "Imbalance" is the difference between the SC's actual generation and actual demand (i.e., scheduled quantities are irrelevant), calculated on a zone-by-zone basis.

operate their resources to match their loads in the same manner as would a vertically-integrated utility that is a control area operator.[14] I.e., the SC would agree to match its loads and resources on a much more refined basis (consistent with NERC Control Performance Standards), relieving the RTO of this burden and thereby relieving the SC from its obligation to self-provide (or have the RTO procure) Load Following and Regulation resources.[15] This functionality can be provided through the concept of "self-tracking."

Self-tracking is an alternative to self-provision of certain ancillary services resources (Load Following and/or Regulation) to the RTO, under which an SC would contractually commit to the RTO that the SC would use the generation resources in the SC's portfolio to closely track the loads in the SC's portfolio. In return for relieving the RTO of the burden of following the SC's loads, the SC would be exempted from all (or a part of) the SC's pro rata requirement to self-provide (or have the RTO procure on the SC's behalf) Load Following and/or Regulation resources.

Some of the features of self-tracking are as follows:

- An SC which has committed to self-track would not have those parts of its resources which it is using for self-tracking called upon by the RTO to meet the RTO's requirements to balance ACE on the RTO grid, or for any other reason except to deal with residual congestion management when there are no other alternatives, or pursuant to the RTO Tariff's rules for the management of system emergencies. (Actually, the reason for this is not related for self-tracking, but is because the SC would not have committed to provide those resources to the RTO, either through self-provision or through bidding them into the RTO's ancillary services procurement process.[16])

- In order to qualify for self-tracking, the SC must demonstrate that it has the capability to perform self-tracking. The SC would also be obligated to provide data to the RTO (on a 2-4 second basis rather than an integrated 10-minute basis) to enable the RTO to monitor and verify that the SC did indeed meet its obligation to self-track and to settle for undergeneration or overgeneration by the SC.[17]

- Performance standards need to be defined for how closely the SC must match its loads and resources. For an SC to either receive a reduction in or be exempted from Load Following

[14] Note: The concept of control area operator is currently undergoing a major overhaul at NERC to completely separate the role of managing grid security from commercial functions. Under that overhaul, an integrated utility's retail merchant arm would be separated from the entity (known as a "Balancing Authority") which is responsible for managing the control area's ACE and for dealing with other grid security issues. The Balancing Authority must be independent of all market participants - including the retail merchant - in order to ensure that it does not leverage its grid security responsibilities to provide preferential treatment to its affiliates (including the retail merchant).

[15] It is difficult to conceive of many, if any, situations in which an SC would be better off under this alternative to self-provision. But, under the proposal in this discussion paper, that decision would be left to each SC.

[16] Note: The RTO's ancillary services procurement process is intended to be a simple, external-to-the-RTO process. For example, the RTO could annually contract with an operator of an ancillary services exchange, in which case the RTO would procure by submitting its quantity bids into the exchange.

[17] This data would include energy imbalance data (e.g., similar to ACE) for the group of loads and resources in the SC's portfolio and real-time generation data.

and Regulation charges, the standard would probably be similar to that in the NERC CPS and as a result may require additional certifications for GCC operators over and above the operators of an SC that chooses not to self-track. (If a second level of self-tracking was developed, under which an SC would be exempted from Load Following capacity charges but would self-provide Regulation resources as described in the introduction, the standard might be looser - e.g., integrated imbalance must be less than a specified tolerance for every 2-minute period.)

- Tolerances need to be developed in order to define acceptable performance. For example, the SC's imbalance must be less than x MWh during every 2-minute period. The SC could exceed this value by z% no more then i times per day.

- Charges need to be defined for non-performance. This could be addressed in several ways. A ratcheted "backup charge" could be developed ($J for exceeding the tolerance the first time, $K for exceeding it the second time, etc.). The purpose of this charge is to prevent the SC from leaning on the RTO. Alternatively, a percentage of the SC's responsibility under self-provision could be charged (e.g., 20% of the self-provision requirement) in return for a looser set of self-tracking performance requirements.[18]

- To the extent that the SC does not precisely match its loads and resources over a ten-minute interval, the SC would be charged (or would receive) the Balancing Energy price for the excess energy taken from (or provided to) the RTO grid. (This is equivalent to paying for inadvertent energy under the old-world control area model.)

- The question of how the SC would real-time meter its loads and generation in order to keep its imbalance close to zero in real-time needs more thought. In the case of a self-tracking SC which desires to rely on the real-time metering of an affiliated transmission or distribution wires entity, this issue needs to be addressed in a way that is equitable to both the self-tracking SC and any SCs who are responsible for generators or loads (whether wholesale loads or unbundled retail loads) within the geographic boundaries of the wires entity.

Conclusion

The concept of self-tracking, together with the other basic features of the ancillary services and SC models, provides an SC with the capability to match its loads and resources, with no interference from the RTO, no new exposure to imbalance energy prices, and no exposure to the RTO's charges for Load Following and Regulation ancillary services. The concept allows an SC to be treated almost as if it were a traditional control area (the primary differences being that: (i) the SC is not responsible for transmission security functions; and (ii) the SC – since it would not actually be a control area operator – could not leverage a role in the transmission arena[19] to gain preferential treatment over SCs).

[18] In addition, some residual charges for RTO Load Following and Regulation capacity might still be appropriate since the RTO would be responsible to the non-RTO portions of the Western Interconnection for a share of the interconnection's frequency bias response, whereas the self-tracking SC would have been absolved of such responsibility.

[19] Examples include preferential access to real-time data as to the status of the grid, control over the dispatch of ancillary services for the grid (rather than for its own use), control over the resources and loads of other SCs in the

control area, ability to park and lend (while other SCs could not), and ability to lean on other control areas for real-time energy (while other SCs could not).