

**Comment Version**

**Comments due  
February 27, 2004**

## **NERC Reliability Functional Model**

### ***Function Definitions and Responsible Entities***

Version 2

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***Prepared by the  
Functional Model Review Task Group  
Planning Reliability Model Task Force***

Function

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Entity





## Function – Operating Reliability

### Definition

Ensures the real-time operating reliability of the interconnected bulk electric transmission systems within a Reliability Authority Area.

### Tasks

1. Enforce operational reliability requirements
2. Monitor all reliability-related parameters within the Reliability Authority Area, including generation dispatch and transmission maintenance plans
3. Direct revisions to transmission maintenance plans as required and as permitted by agreements
4. Request revisions to generation maintenance plans as required and as permitted by agreements
5. Develop Interconnection Reliability Operating Limits (to and cascading outages).
6. Perform reliability analysis (actual and contingency) for the Reliability Authority Area
7. Approve or deny bilateral schedules from the reliability participants
8. Assist in determining Interconnected Operations Services requirements for balancing generation and load, and transmission reliability (e.g., reactive requirements, contingency reserves, location of operating reserves).
9. Identify, communicate, and direct actions to relieve reliability threats and limit violations in the Reliability Authority Area
10. Direct implementation of emergency procedures
11. Direct and coordinate System Restoration

**Please do not mark up this area.**

## Comments – Function – Operating Reliability

Add new Item 6: Direct actions to mitigate Interconnected Reliability Operating Limit violations.

8. Assist in determining Interconnected Operations Services requirements for balancing generation and demand, and transmission reliability (e.g., reactive requirements, contingency reserves, location of operating reserves).

**Place comments in this section. You may cut-and-paste and show markups to help us understand your suggestion.**

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## **Foreword**

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This document replaces Version 1 of the NERC Functional Model that the Board of Trustees approved in June 2001.

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Historically, Control Areas were established by vertically integrated utilities to operate their individual power systems in a secure and reliable manner and provide for their customers' electricity needs. The traditional Control Area operator balances its load with its generation, implements interchange schedules with other Control Areas, and ensures transmission reliability.

As utilities began to provide transmission service to other entities, the Control Area also began to perform the function of Transmission Service Provider through tariffs or other arrangements. NERC's Operating Policies and Standards have reflected this traditional electric utility industry structure, and ascribed virtually every reliability function to the Control Area.

Beginning in the early 1990s with the advent of open transmission access and restructuring of the electric utility industry to facilitate the operation of wholesale power markets, the functions performed by Control Areas began to change to reflect the newly emerging industry structure. These changes occurred because:

1. Some utilities were separating their transmission from their Merchant Functions (functional unbundling), and even selling off their generation,
2. Some states and provinces were instituting "customer choice" options for selecting energy providers, and
3. The developing power markets were requiring wide-area transmission reliability assessment and dispatch solutions, which were beyond the capability of many Control Areas to perform.

As a result, the current NERC Operating Policies, which are centered on Control Area operations, were beginning to lose their focus, and become more difficult to apply and enforce.

**The Control Area Criteria Task Force.** The NERC Operating Committee formed the Control Area Criteria Task Force in 1999 to address this problem. The Task Force began by listing all the tasks required for maintaining electric system reliability and then organizing these tasks into basic groups that it called "functions." The Task Force then attempted to assign these functions to the basic "reliability organizations" such as Control Areas or Regional Transmission Organizations. But that didn't work because the Control Areas themselves were unbundling some of the functions they traditionally performed, and the emerging RTOs and ISOs, while following structures as defined in Order 2000, were not alike.

Realizing that there was no longer a "standard" reliability organization, the Task Force decided to build a "Functional Model" consisting of the functions that ensure reliability and meet the needs of the marketplace. Then, organizations—whether they be traditional, vertically-integrated control areas, regional transmission organizations, independent

system operators, independent transmission companies or so on—can “roll up” those functions they perform, and register with NERC as one or more of the following: Generator Owners, Generator Operators, Transmission Service Providers, Transmission Owners, Transmission Operators, Distribution Providers, Load Serving Entities, Purchasing-Selling Entities, Reliability Authorities, Planning Authorities, Balancing Authorities, Interchange Authorities, Transmission Planners, Resource Planners, Standards Developers, and the Compliance Monitors. This enables NERC to rewrite its reliability standards in terms of these entities who perform the reliability functions.

*Excerpted and revised from Version 1 of the NERC Functional Model  
June 12, 2001*

### **Comments – Foreword**

**EDIT:**

As a result, the ~~current~~ NERC Operating Policies **in place at that time**, which are centered on Control Area operations, were beginning to lose their focus, and become more difficult to apply and enforce.

## Introduction

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The NERC Functional Model defines the set of functions that must be performed to ensure the reliability of the bulk electric system. It also explains the relationship between and among the entities responsible for performing the tasks within each function. The Model provides the foundation and framework upon which NERC develops and maintains its Reliability Standards. NERC's Reliability Standards establish the requirements of the responsible entities that perform the functions defined in this Model.

While the Model is not a standard, and does not have compliance requirements, the Reliability Standards must respect the definitions and interrelationships contained in the Model. Doing otherwise could result in Reliability Standards that conflict with one another.

The Model does not prescribe any particular organization or market structure. Organizations may perform one or more functions as they see fit, but must recognize that some functions require the organization and its personnel to be certified to perform that function. Organizations must also recognize that, as responsible entities, they are responsible for ensuring that all tasks within each function are performed. While organizations may agree to split the tasks of a particular function (for example, an RTO may perform some Transmission Operator tasks with their members performing the remainder), NERC will require that one of the organizations be the "responsible entity," ensuring that all of the tasks of the function are performed.

**Functional Model maintenance.** The Functional Model is maintained by the NERC standing committees and Board of Trustees. The section titled, "Functional Model Approval Procedure," in this document explains the procedures for reviewing and revising the Model.

**Technical discussions.** The companion document, "Functional Model – Technical Discussions," provides additional details on the functions themselves, how organizations can "roll up" those functions they wish to perform, and how organizations as "responsible entities" interrelate.

## Comments – Introduction

"While organizations may agree to split the tasks of a particular function (for example, an RTO may perform some Transmission Operator tasks with their members performing the remainder), NERC will require that one of the organizations be the "responsible entity," ensuring that all of the tasks of the function are performed".

**FUNDAMENTAL COMMENT:** As currently drafted, the model could be interpreted to promote decentralized control, multiple "hands on the wheel" operation, complex accountability, and an overtly flexible approach to core real-time operations functions. The August 14 blackout clearly demonstrated that this approach is not good for reliability. To say that an organization is the "responsible entity" in the eyes of NERC and that they can freely delegate a portion of these duties to some other entity or entities is not what the Functional Model should be encouraging. By permitting core functions to be broken apart and allowing more organizations to take on limited roles in the reliable

operation of the interconnection, there is increased reliability risk in effective coordination of these critical functions essential to bulk electric system operation.

We strongly believe in having “one set of hands on the wheel”, and centralizing control with respect to core reliability functions, and are convinced that the model, as proposed, would open the door for an increase in unreliable approaches to the assignment of core reliability functions (i.e. the “Swiss cheese” approach, generator-only control areas) and unacceptable levels of complexity.

We believe that The Functional Model itself should promote the simplest and most direct form of reliable operation and not be watered down to accommodate the multiple reliability methods currently in place. We feel that the Model as currently drafted has been influenced to accommodate such an array of different and sometimes unique organizational configurations and approaches to reliability that its purpose and usefulness is in jeopardy. The lack of clear direction given by the Model is evident in the difficulty surrounding the efforts already underway to draft Standards and determine responsible entities that adhere to those standards. The success of the Reliability Standards Process depends on the Functional Model to provide a firm foundation. We understand that not all areas approach the job of assuring reliable system operations in the same manner and there are variable methods that can be employed with no compromise in system reliability. In situations where the core reliability functions as detailed in a revised (Version 3) Functional Model cannot be achieved, requests for “Regional Differences” should be considered on a case-by-case basis and subject to the review and approval by the industry.

We also would draw the FMWG’s attention to the decision by NERC to form a Reliability Plan TF, which was put into place before the event of August 14 and charged with addressing the concerns of “delegated authority”.

**Technical discussions.** The companion document, “Functional Model – Technical Discussions,” provides additional details on the functions themselves, how organizations can “roll up” those functions they wish to perform, and how organizations as “responsible entities” interrelate”.

**COMMENT:** We would re-emphasize the point that organizations should not be permitted within the Functional Model, to pick and choose the functions they wish to perform.

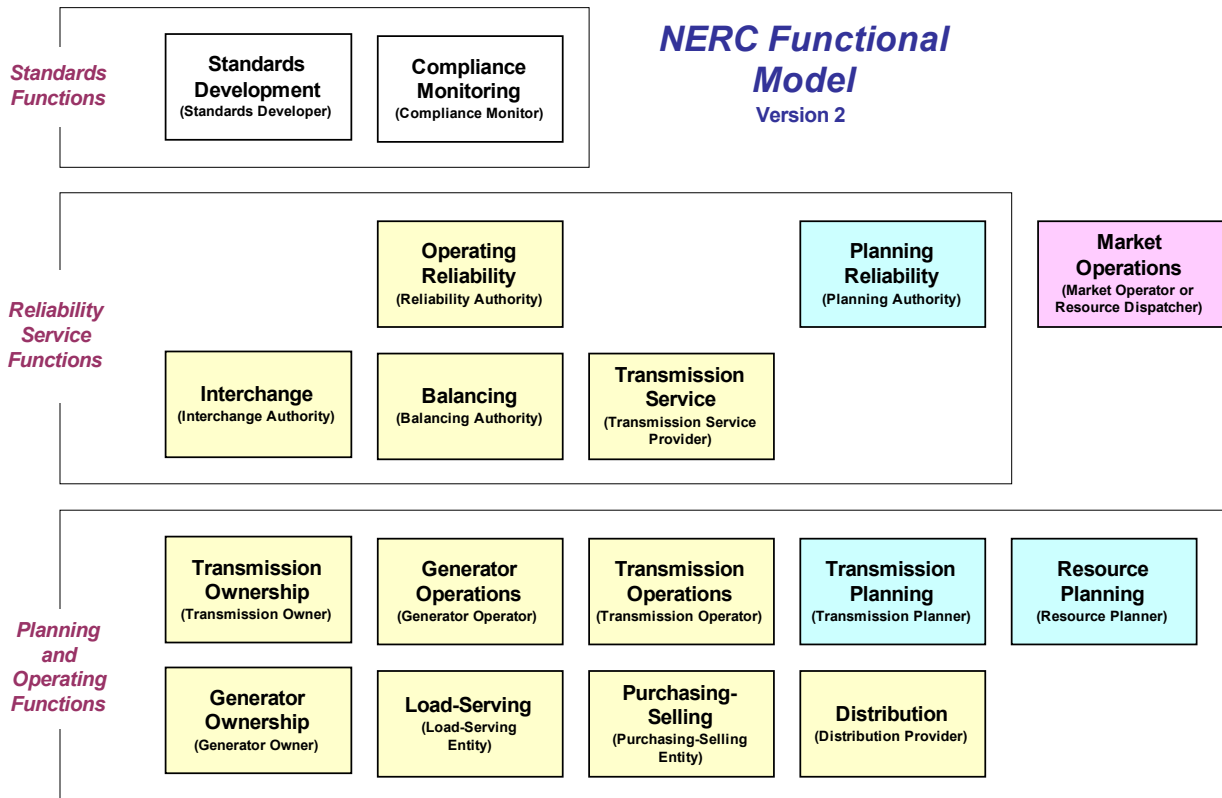
**COMMENT:** We believe all requirements and their supporting information must be appropriately detailed in the primary document itself, and not be reliant on any supporting documentation. Any Reference Documents associated with the Functional Model should be used strictly as a training tool; the Functional Model Document should be able to stand-alone, and contain enough details as to be self-explanatory.

**COMMENT:** The Model should recognize that other organizations may develop reliability standards that are separate from the NERC Reliability Standards. Therefore, we recommend that the following new paragraph be inserted following the third paragraph: “The Model recognizes that the Regional Councils and other organizations may develop reliability standards separate from the NERC Reliability Standards that are not inconsistent with the NERC Reliability Standards. Such standards may be more

detailed or more stringent than the NERC Reliability Standards. The Model accommodates any organization that develops reliability standards.”

**GENERAL COMMENT:** Throughout the document the terms “Reliability Standard”, “reliability standard”, “NERC Reliability Standard”, and “standard” appear. The document should be consistent in its use of this term. We suggest that “NERC Reliability Standard” be used throughout.

Functional Model Diagram



<b>Function Name</b>	<b>Responsible Entity</b>
Operating Reliability Function	Reliability Authority
Planning Reliability Function	Planning Authority
Balancing Function	Balancing Authority
Interchange Function	Interchange Authority
Transmission Service Function	Transmission Service Provider
Transmission Ownership Function	Transmission Owner
Transmission Operations Function	Transmission Operator
Transmission Planning Function	Transmission Planner
Resource Planning Function	Resource Planner
Distribution Function	Distribution Provider
Generator Ownership Function	Generator Owner
Generator Operations Function	Generator Operator
Load-serving Function	Load-serving Entity
Purchasing-Selling Function	Purchasing-Selling Entity
Market Operations Function	Market Operator (or Resource Dispatcher)
Standards Development Function	Standards Developer
Compliance Monitoring Function	Compliance Monitor

## Terms used in the Functional Model

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### Areas

**Reliability Authority Area.** The collection of generation, transmission, and loads within the boundaries of the Reliability Authority. Its boundary coincides with one or more Balancing Authority Areas.

**Balancing Authority Area.** The collection of generation, transmission, and loads within the metered boundaries of the Balancing Authority. The Balancing Authority maintains load-resource balance within this area.

**Transmission Planning Area.** That area under the purview of the Transmission Planner.

**Planning Authority Area.** That area under the purview of the Planning Authority. It will include one or more Transmission Planning Areas.

### General

**Task.** One of the elements that make up a Function in the Functional Model.

**Responsible Entity.** The label that NERC applies to an organization that is responsible for carrying out the tasks within a Function.

**Function.** A group of tasks that can not be logically subdivided into other groups.

**Authority.** The highest level of responsible entity for a particular function. The Reliability Authority is the highest level of all responsible entities.

**Transaction.** An agreement arranged by a Purchasing-Selling Entity to transfer energy from a seller to a buyer.

**Transmission Arrangements.** An agreement between a Transmission Service Provider and Transmission Customer (Purchasing-Selling Entity, Generator Owner, Load-Serving Entity) for transmission services.

**Customer.** A Purchasing-Selling Entity, Generator Owner, Load-Serving Entity, or End-user.

**End-use Customer.** The customer served by a Load-Serving Entity.

## Comments – Terms Used in the Functional Model

### EDIT:

**Reliability Authority Area.** The contiguous collection of generation, transmission, and loads within the clearly defined, non-overlapping boundaries of the Reliability Authority. Its boundary coincides with one or more Balancing Authority Areas. **The Reliability Authority Area needs to be of a functional size that is manageable and consistent with the computational tools and communication capabilities available,**

**and reliably manageable by operators should those tools and capabilities fail.**

**Balancing Authority Area.** The collection of generation, transmission, and loads within the **clearly defined, non-overlapping** metered boundaries of the Balancing Authority. The Balancing Authority maintains load-resource balance within this area. **The Balancing Authority Area must reside under one and only one Reliability Authority Area.**

**Responsible Entity.** The label that NERC applies to **a single** organization that is **directly** responsible for carrying out the tasks within a Function.

**Authority.** The highest level of responsible entity for a particular function. The Reliability Authority is the highest level of all responsible and **has the ultimate authority over all core reliability functions to ensure that action to meet the reliability requirements of the bulk power system can be performed efficiently and effectively.**

## **Purpose of the Functional Model**

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The purpose of the NERC Reliability Functional Model is to:

1. Functionalize the tasks being performed today for electric system reliability so that reliability organizations such as Control Areas, Regional Transmission Organizations, Independent System Operators and others can more easily and clearly identify the reliability functions they provide. A specific organization may provide one or more of the functions identified in the Functional Model.
2. Define in general terms each function and the relationships between the entities who are responsible for performing the tasks within the functions. The framework for developing the function definitions is:
  - a. The responsibility for performing a function should not be split by organizations
  - b. The functions are independent of the organization structure performing the function, and
  - c. The function definitions provide flexibility to accommodate the range of presently conceivable organization structures.
3. Provide a framework for Reliability Standards (including organization certification criteria) and compliance measures developed through the NERC Standards Development Process that will apply to certain tasks defined in the Functional Model.
  - a. It is not expected that standards will be developed for each task since the Functional Model is developed in more detail than is needed for reliability standards. However, standards may contain more detail than the associated activity in the Functional Model.
  - b. Responsibility for compliance with a standard will apply to the organizations performing that function.
  - c. Other organizations developing standards may use the NERC Functional Model in the same manner.
4. Provide linkages between business practices developed by other organizations showing how certain practices may relate to the reliability functions in the Functional Model.

### **Comments – Purpose of the Functional Model**

1. Functionalize the tasks being performed today for electric system reliability so that reliability organizations such as Control Areas, Regional Transmission Organizations, Independent System Operators and others can more easily and clearly identify the reliability functions they provide. A specific organization

may provide one or more of the functions identified in the Functional Model.

**COMMENT:** We agree and encourage that a specific organization provide more than one of the functions identified in the Functional Model. The more grouping of functions that is performed, the less chance that communication will be an issue in efficient operation.

**EDIT:**

2. Define in ~~general~~ **specific** terms each function and the relationships between the entities who are responsible for performing the tasks within the functions. While flexibility is provided to define the organizational structure that will perform a given function, the responsibility for performing all tasks in a function may not be split by organizations. Further, all tasks within a given function must be the ultimate responsibility of a single organization. ~~The framework for developing the function definitions is:~~
  - a. ~~The responsibility for performing a function should not be split by organizations~~
  - b. ~~The functions are independent of the organization structure performing the function, and~~
  - c. ~~The function definitions provide flexibility to accommodate the range of presently conceivable organization structures.~~

**COMMENT:** The purpose of developing this new functional model is not to accommodate what exists in the industry today, but to build a more reliable, robust system for the future. The goal should be to create a functional model premised on reliability, and then adjust current systems and operations to induce compliance - not to create a model that ensures current operation will be compliant upon implementation of the model. We need to use the events of August 14<sup>th</sup> as a benchmark. The question must be asked, "If Version 2 of the Functional Model were in place on August 14<sup>th</sup>, would it have prevented the blackout"? If the answer is NO, then the model is not adequate.

It should be noted that these comments are not provided in the context of 'everyone should do business as the Northeast'. We recognize that approval of our recommendations would require review and possible modification to our own member systems.

**EDIT:**

- 3b. Responsibility for compliance with a standard will apply to the **single** organizations **certified** for that function.

## Guiding Principles of the Functional Model

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For further details, refer to “Functions, Tasks, Responsible Entities, and Organizations” in the Technical Discussions document.

As explained in the “Purpose of the Functional Model,” the Functional Model provides the framework on which the NERC reliability standards are based. To ensure that this framework remains viable, the Model itself is governed by a set of “guiding principles” that define a *function*, and establish the relationship between the *responsible entities* who are responsible for performing the *tasks* listed in the Model, and the NERC *reliability standards*. NERC must work within these guiding principles when revising or interpreting the Functional Model to maintain the integrity of the Model and NERC’s Reliability Standards.

1. The Functional Model defines the *functions* that must be performed and does not imply organization structure or hierarchy.
  - a. Functions comprise *tasks*.
  - b. Tasks are *what* must be done, not *how*.
2. An *organization* who registers with NERC as performing a function is considered a *responsible entity* and must ensure that all tasks are performed.
  - a. Reliability standards are those requirements that must be performed by *responsible entities*. Thus, we say that the Functional Model is the framework on which the reliability standards are based.
  - b. An organization may delegate a task to another organization, but may not delegate its responsibility for ensuring that the task is accomplished.
3. Organizations that perform certain functions must be certified as being capable of performing those functions. Organization certification requirements are a category of NERC standards
4. Some tasks in the Functional Model may not result in a reliability standard.

### Comments – Guiding Principles of the Functional Model

**EDIT:**

1. The Functional Model defines the *functions* that must be performed and does not imply organization structure. ~~or hierarchy~~
2. An *organization* who registers with NERC as performing a function is considered a *responsible entity* and must ensure that all tasks are performed.
  - a. Reliability standards are those requirements that must be performed by *responsible entities*. Thus, we say that the Functional Model is the framework on which the reliability standards are based.
  - b. **The Functional Model provides the hierarchal order for authority over reliability issues in that all core reliability functions “roll-up”**

**under the Reliability Authority.**

- e. ~~An organization may delegate a task to another organization, but may not delegate its responsibility for ensuring that the task is accomplished.~~

**COMMENT:** It is essential that any entity performing the RA function have assigned to it the ultimate authority over **all core functions** to ensure that action to meet reliability requirements and bulk power system conditions can be performed efficiently and effectively.



## Function – Operating Reliability

### **Definition**

Ensures the real-time operating reliability of the interconnected bulk electric transmission systems within a Reliability Authority Area.

### **Tasks**

12. Enforce operational reliability requirements
13. Monitor all reliability-related parameters within the Reliability Authority Area, including generation dispatch and transmission maintenance plans
14. Direct revisions to transmission maintenance plans as required and as permitted by agreements
15. Request revisions to generation maintenance plans as required and as permitted by agreements
16. Develop Interconnection Reliability Operating Limits (to protect from instability and cascading outages).
17. Perform reliability analysis (actual and contingency) for the Reliability Authority Area
18. Approve or deny bilateral schedules from the reliability perspective
19. Assist in determining Interconnected Operations Services requirements for balancing generation and load, and transmission reliability (e.g., reactive requirements, location of operating reserves).
20. Identify, communicate, and direct actions to relieve reliability threats and limit violations in the Reliability Authority Area
21. Direct implementation of emergency procedures
22. Direct and coordinate System Restoration

### **Comments – Function – Operating Reliability**

**EDIT:**

#### ***Definition***

Ensures the real-time operating reliability of the interconnected bulk electric transmission systems within a Reliability Authority Area; **where a Reliability Authority Area is the contiguous collection of generation, transmission, and loads within the clearly defined, non-overlapping boundaries of the Reliability Authority. Its boundary coincides with one or more Balancing Authority Areas. The Reliability Authority Area system size needs to be manageable and consistent with the computational tools and communication capabilities available should those tools and capabilities fail.**

**COMMENT:** We feel the need to stress, the RA should be the ultimate authority; it is our opinion that the RA must have a **contiguous** electrical boundary/footprint, with

operational control over **all** of the transmission and generation facilities within its footprint. Also, there should be no overlap in RA responsibilities. That is not clear in the model at this time. To minimize confusion and ensure reliable operation, multiple RA's should not have control over common facilities.

**EDIT:**

14. Direct revisions to transmission maintenance plans as required ~~and as permitted by agreements~~ **to maintain system reliability.**
15. ~~Request~~ **Direct** revisions to generation maintenance plans as required ~~and as permitted by agreements~~ **to maintain system reliability.**

**COMMENT:** We recommend that the tasks in the Reliability Authority be broken down into 'near term' and 'realtime'/'short term' - consistent with current requirements in Policy 9. Some of these tasks will be repeated in both timeframes while others may only occur in one or the other. Relocate to RA section.

A global change of the words used above such as "Direct" to reflect that these are tasks which are assigned to a particular function. It may be appropriate to utilize the words such as ensure, meet etc.

We recommend that the text similar to that in Section 1 of the Technical Document, "Reliability Authority", be included in a 'Description' section prior to listing the specific Tasks.



## **Responsible Entity – Reliability Authority**

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### ***Relationships with other Responsible Entities***

#### **Ahead of Time**

1. Receives facility and operational data from Generator Operators, Load-Serving Entities, Transmission Owners, Generator Owners, Transmission Operators, Distribution Providers.
2. Calculates Interconnection Reliability Operating Limits based on Transmission Owners' and Generator Owners' specified equipment ratings.
3. Receives generation dispatch from Balancing Authorities and issues dispatch adjustments to Balancing Authorities to mitigate congestion within the Reliability Authority Area (if not resolved through market mechanisms).
4. Receives Interchange Transactions from Interchange Authorities for reliability analysis.
5. Provides Interchange Transaction approvals to Interchange Authorities based on reliability analysis.
6. Receives generation operation plans and commitments from Balancing Authorities for reliability analysis of Reliability Authority Area.
7. Receives transmission maintenance plans from Transmission Operators for reliability analysis of Reliability Authority Area.
8. Direct Transmission Operators to revise transmission maintenance plans as required and as permitted by agreements
9. Provides reliability analyses to Transmission Operators, Generator Operators, Transmission Service Providers, and Balancing Authorities in its Area as well as other Reliability Authorities.

#### **Real Time**

10. Receives real-time operational information from Balancing Authority and Transmission Operator for monitoring.
11. Issues reliability alerts to Generator Operators, Load-Serving Entities, Transmission Operators, Transmission Service Providers, Balancing Authorities, Interchange Authorities, Planning Authorities, Regional Councils, and NERC.
12. Issues corrective actions (e.g., curtailments or load shedding) to Transmission Operators, Transmission Service Providers, Balancing Authorities, and Interchange Authorities.
13. Coordinates reliability processes and actions with and among other Reliability Authorities.
14. Coordinates with Transmission Planners, Planning Authority, and Transmission Service Providers on transmission system limitations.
15. Coordinates with Planning Authorities on reliability issues, as appropriate.

### ***Special Considerations***

The Reliability Authority's purview must be broad enough to enable it to calculate Interconnection Reliability Operating Limits, which may be based on the operating

parameters of other transmission systems beyond the Transmission Operator’s vision. The Transmission Operator is responsible for the reliability of its “local” transmission system, and may not be aware that its system is violating an Interconnection Reliability Operating Limit. Therefore, the Reliability Authority may direct the Transmission Operators or Balancing Authorities to take action to mitigate Interconnection Reliability Operating Limits.

**Comments – Response Entity – Reliability Authority**

- 3. Receives generation dispatch from Balancing Authorities and issues dispatch adjustments to Balancing Authorities to mitigate congestion within the Reliability Authority Area (if not resolved through market mechanisms).

**COMMENT:** We suggest replacing the term “mitigate congestion” with “respect operating system limits”. The reference to mitigating congestion has a Market connotation to it and can be confusing despite the qualifying language within the parentheses.

**EDIT:**

- 8. Direct Transmission Operators to revise transmission maintenance plans as required to maintain system reliability ~~and as permitted by agreements~~

**8a Direct Generator Owners to revise generator maintenance plans as required to maintain system reliability**

**General Drafting Comment** - Coordination of language between Function and Entity:

In trying to map the Function Tasks to the Entity Relationships, there is some ambiguity in that some Tasks do not explicitly appear in the “Relationships with other Responsible Entities”. We recommend clarify the language such that this mapping is more obvious.

The verbs and tense used between the Function and the Relationship should clearly denote Actions versus Communications, respectively.

Function



## Function – Planning Reliability

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### **Definition**

Ensures a long-term (generally one year and beyond) plan is available for adequate resources and transmission within a Planning Authority Area. It integrates and assesses the plans from the Transmission Planners and Resource Planners within the Planning Authority Area to ensure those plans meet the reliability standards, and develops and recommends solutions to plans that do not meet those standards.

### **Tasks**

1. Develop and maintain transmission and resource (demand and capacity) system models to evaluate transmission system performance and resource adequacy.
2. Maintain and apply methodologies and tools for the analysis and simulation of the transmission systems in the assessment and development of transmission expansion plans and the analysis and development of resource adequacy plans.
3. Define and collect or develop information required for planning purposes, including:
  - a. Transmission facility characteristics and ratings,
  - b. Demand and energy end-use customer forecasts, capacity resources, and demand response programs,
  - c. Generator unit performance characteristics and capabilities, and
  - d. Long-term capacity purchases and sales.
4. Evaluate plans for customer requests for transmission service.
  - a. Evaluate responses to long-term (generally one year and beyond) transmission service requests.
  - b. Review transmission facility plans required to integrate new (end-use customer, generation, and transmission) facilities into the interconnected bulk electric systems.
5. Review and determine TTC values (generally one year and beyond) as appropriate.
6. Assess, develop, and document resource and transmission expansion plans.
  - a. Integrate and verify that the respective plans for the Planning Authority Area meet reliability standards.
  - b. Identify and report on potential transmission system and resource adequacy deficiencies, and provide alternate plans that mitigate these deficiencies.
7. Provide analyses and reports as required on the long-term resource and transmission plans for the Planning Authority Area.
8. Monitor transmission expansion plan and resource plan implementation.
9. Coordinate projects requiring transmission outages that can impact reliability and firm transactions.
10. Evaluate the impact of revised transmission and generator in-service dates on resource and transmission adequacy.

## Comments – Function – Planning Reliability

Suggested Edits;

- 3b. Demand and energy ~~end-use customer~~ forecasts, capacity resources, and demand response programs,
8. Monitor ~~transmission expansion plan and resource plan~~electric system plan implementation.



## **Responsible Entity – Planning Authority**

---

### ***Relationships with other Responsible Entities***

1. Collects information as appropriate, including:
  - a. Transmission facility characteristics and ratings from the Transmission Owners, Transmission Planners, Transmission Operators, and others.
  - b. Demand and energy end-use customer forecasts, capacity resources, and demand response programs from Load-Serving Entities and Resource Planners.
  - c. Generator unit performance characteristics and capabilities from Generator Owners and others.
  - d. Long-term capacity purchases and sales from Transmission Service Providers.
2. Receives requests for long-term transmission service from Transmission Planners and provides the resulting plans to Transmission Service Providers and Transmission Owners.
3. Provides transmission facility plans required to integrate new (end-use customer, generation, and transmission) facilities into the interconnected bulk electric systems to the Transmission Owners, Generator Owners, and other requesters.
4. Coordinates TTC values (generally one year and beyond) with Transmission Planners and neighboring Planning Authorities.
5. Integrates and verifies that the respective plans of the Resource Planners and Transmission Planners meet reliability standards.
6. Coordinates the plans for the interconnection of facilities<sup>1</sup> to the bulk electric systems within its Planning Authority Area with Transmission Planners and Resource Planners.
7. Coordinates as appropriate with resource suppliers outside of the Planning Authority Area.
8. Coordinates transmission system protection and control, including special protection systems, with Transmission Planners, other Planning Authorities, Generator Owners, Generator Operators, Transmission Owners, Transmission Operators, Reliability Authorities, and Distribution Providers.
9. Coordinates with its related Reliability Authority(ies) and other Planning Authorities on reliability issues, as appropriate.

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<sup>1</sup> Generators, transmission lines, and end-use customer equipment

**Comments – Responsible Entity – Planning Authority**

Suggested Edit

1b Demand and energy ~~end-use customer~~ forecasts, capacity resources, and demand response programs from Load-Serving Entities and Resource Planners.

Function



## Function – Balancing

---

### **Definition**

Integrates resource plans ahead of time, and maintains load-interchange-generation balance within a Balancing Authority Area and supports Interconnection frequency in real time.

### **Tasks**

1. Must have control of any of the following combinations within a Balancing Authority Area:
  - a. Load and Generation (an isolated system)
  - b. Load and Scheduled Interchange
  - c. Generation and Scheduled Interchange
  - d. Generation, Load, and Scheduled Interchange
2. Calculate Area Control Error within the Balancing Authority Area.
3. Review generation commitments, dispatch, and load forecasts.
4. Formulate an operational plan (generation commitment, outages, etc) for reliability assessment
5. Approve Interchange Transactions from ramping ability perspective
6. Implement interchange schedules by entering those schedules into an energy management system
7. Provide frequency response
8. Monitor and report control performance and disturbance recovery
9. Provide balancing and energy accounting (including hourly checkout of Interchange Schedules and Actual Interchange), and administer Inadvertent energy paybacks
10. Determine needs for Interconnected Operations Services
11. Deploy Interconnected Operations Services.
12. Implement emergency procedures

## Comments – Function – Balancing

**EDIT:**

### ***Definition***

Integrates resource plans ahead of time, and maintains load-interchange-generation balance within a Balancing Authority Area and supports Interconnection frequency in real time. **Where a Balancing Authority Area is the collection of generation, transmission, and loads within the clearly defined, non-overlapping metered boundaries of the Balancing Authority. The Balancing Authority maintains load-resource balance within this area. The Balancing Area must report to the single Reliability Authority in which it resides.**

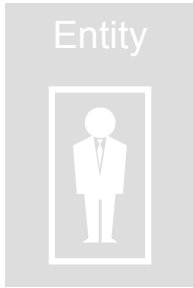
**COMMENT:** It seems worthwhile to repeat the definition of the Balancing Area, clearly defining its boundaries and the fact that it can only report to the one RA in which it resides.

**EDIT:**

1. Must have control of any of the following combinations within a Balancing Authority Area:
  - a. Load and Generation (an isolated system)
  - ~~b. Load and Scheduled Interchange~~
  - ~~c. Generation and Scheduled Interchange~~
  - d. Generation, Load, and Scheduled Interchange

**COMMENT:** We are concerned that generator-only and load-only control areas can continue to exist under this proposed model. The original definition itself of a **Balancing Authority Area** requires that load and generation both be present. As such, the model should ensure that anything less is not acceptable. (“The collection of generation, transmission, and loads within the metered boundaries of the Balancing Authority. The Balancing Authority maintains load-resource balance within this area.”)

**COMMENT:** The Functional Model should make clear the Interchange Schedules are applicable to both ac and dc interfaces. The following qualifier should be added as a footnote to the term Interchange Schedules in Item 6: **whether on ac or dc ties.**



## **Responsible Entity – Balancing Authority**

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### ***Relationships with other Responsible Entities***

#### **Ahead of Time**

1. Compiles load forecasts from Load-Serving Entities.
2. Receives operational plans and commitments from Generator Operators within the Balancing Authority Area
3. Determines amount required and deploys Interconnected Operations Services to ensure balance (e.g., amount of operating reserve, load-following, frequency response) in coordination with the Reliability Authority.
4. Submits integrated operational plans (including maintenance plans from Generator Operators) to the Reliability Authority for reliability assessment and provide balancing information to the Reliability Authority for monitoring.
5. Receives approved, valid, and balanced Interchange Schedules from the Interchange Authorities.
6. Confirms interchange schedules with Interchange Authorities.
7. Confirms ramping capability with Interchange Authorities.
8. Implements generator commitment and dispatch schedules from the Load-Serving Entities and Generator Operators who have arranged for generation within the Balancing Authority Area. The Balancing Authority provides this commitment and dispatch schedule to the Reliability Authority.
9. Provides generation dispatch to its Reliability Authority for reliability analysis.
10. Acquires Interconnected Operations Services from Generator Owners.

#### **Real Time**

11. Directs resources (Generator Operators and Load-Serving Entities) to take action to ensure balance in real time.
12. Directs Transmission Operator to reduce voltage or shed load if needed to ensure balance within its Balancing Authority Area.
13. Receives loss allocation from Transmission Service Providers (for repayment with in-kind losses).
14. Provides real-time operational information for Reliability Authority monitoring.
15. Complies with reliability requirements specified by Reliability Authority.
16. Informs Reliability Authority and Interchange Authorities of Interchange Schedule interruptions (e.g., due to generation or load interruptions) within its Balancing Authority Area.
17. Directs Generator Operators to implement redispatch for congestion management as directed by the Reliability Authority.
18. Requests operating information from Generator Operators.
19. Verifies implementation of emergency procedures to Reliability Authority.
20. Coordinates use of controllable loads with Load Serving Entities (i.e., interruptible load that has been bid in as Interconnected Operations Services).

21. Implements emergency procedures as directed by the Reliability Authority.

**After the hour**

22. Confirms Interchange Schedules with Interchange Authorities after the hour for “checkout.”

23. Confirms Actual Interchange with adjacent Balancing Authorities after the hour for “checkout.”

**Comments – Responsible Entity – Balancing Authority**

**COMMENT:** The interface/interrelationship with the potential for Market Operator is unclear, in cases where a Market is present it’s conceivable that a more efficient method of receiving an operational plan and generator commitment plan would be directly from the Market Operator, this fact should be referenced.

**EDIT:**

2. Receives operational plans and commitments from Generator Operators or if present within the Balancing Authority Area, the Market Operator.

**COMMENT:** Communications between adjacent BAs, seem to be absent with the exception to after the fact “checkout”. This concept seems inconsistent with current practices. It would seem at the very minimum, communications between BAs should be required when instituting Emergency Procedures as a failsafe measure incase communications with and between the RAs is unsuccessful. The following is the suggested addition to the Real-time section;

**EDIT:**

- 21a Confirms with or notifies, adjacent Balancing Authorities of the implementation of emergency procedures as directed by the Reliability Authority.

**General Drafting Comment** - The items should be represented in chronological order. For example, Item 21 seems to occur before Item 19, but is listed after it. This is confusing.

Function

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- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

## Function – Market Operations

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### ***Definition***

Integrates energy, capacity, balancing, and transmission resources to achieve an economic, reliability-constrained dispatch of resources. The dispatch may be either cost-based or bid-based.

### ***Tasks***

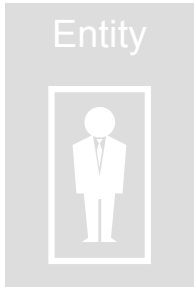
1. Administer a market that provides capacity, energy, balancing resources, and other Ancillary Services subject to system requirements and constraints.
2. Arrange resources for congestion management.
3. Provide dispatch plans.

### ***Special Considerations***

The Market Operations function, its tasks, and the interrelationships with other entities is included in the Functional Model only as an interface point with other types of industry models.

## **Comments – Function – Market Operations**

See comments on Market Operator “Relationships with other Responsible Entities”
---



## **Responsible Entity – Market Operator (or Resource Dispatcher)**

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### ***Relationships with other Responsible Entities***

Market Operator tasks and relationships are specific to a particular Market Operator and will depend on the market structure over which the Market Operator presides.

The Resource Dispatcher performs the same dispatch duties as the Market Operator, but in a non-market environment.

### **Comments – Responsible Entity – Market Operator (or Resource Dispatcher)**

**COMMENT:** Even though the Functional Model is not intended to mandate how a Market interacts with the entities responsible for reliability (thus does not require a Standard to be written), the opportunity to indicate logical interrelationships should not be overlooked. This has been a source of confusion related to the Functional Model in the past; to offer possibilities for these solutions would greatly enhance the understanding of how the Model may work with a Market. To simply offer the Market Operator as a placeholder with no indication for where it may interact, frankly adds to the confusion. We feel the Market Operator must be referenced in the Model; but it must also come with further information.

#### **EDIT:**

Market Operator tasks and relationships are specific to a particular Market Operator and will depend on the market structure over which the Market Operator presides.

**The following is offered as an example for how the Market Operator could interact with entities responsible for reliability.**

#### **Making Deals**

1. **Approves or denies Market Transaction requests from Purchasing-Selling Entities, Generator Owners, and Load-Serving Entities based on market clearing.**

#### **Ahead of Time**

2. **Provide individual commitment plans to Generators Operators**
3. **Provide operational plans and generation commitment to the Balancing Authority.**

Function

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## Function – Resource Planning

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### **Definition**

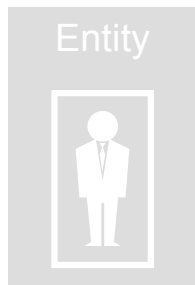
Develops a long-term (generally one year and beyond) plan for the resource adequacy of specific loads (customer demand and energy requirements) within a Planning Authority Area.

### **Tasks**

1. Maintain resource models and apply appropriate tools for the development of adequate resource plans.
2. Define and collect or develop demand and resource information required for planning purposes.
3. Provide capacity resource information to planning and operating functions and service functions.
4. Assist in the evaluation of the deliverability of resources to customers.
5. Include consideration of generation capacity from resources both within and outside of the Planning Authority Area.
6. Develop and report, as appropriate, on its resource plans to others for assessment and compliance with reliability standards.
7. Monitor and report, as appropriate, on its resource plan implementation.

### **Comments – Function – Resource Planning**

No comment at this time.



## **Responsible Entity – Resource Planner**

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### ***Relationships with other Responsible Entities***

1. Coordinates the resource models with its Planning Authority.
2. Works and coordinates with Transmission Owners and Transmission Planners on the deliverability of resources to customers.
3. Reports its resource plan to the Planning Authority for assessment and compliance with reliability standards.
4. Reports on resource plan implementation to the Planning Authority.
5. Works with Planning Authority to identify potential alternative solutions to meet resource requirements.
6. Coordinates with and collects data for resource planning from the Load-Serving Entities, Generator Owners, Generator Operators, Transmission Owners, Transmission Operators, and Interchange Authorities.
7. Coordinates with Transmission Service Providers, Reliability Authorities, and Planning Authorities on resource adequacy plans as appropriate.
8. Coordinates with other Resource Planners within the Planning Authority Area to avoid the double-counting of resources.

### ***Special Considerations***

In some markets, it may be required that the same entity perform the Resource Planning Function and the Planning Authority Function. For example, the Resource Planner may also be the Planning Authority in those markets where there are no entities responsible or obligated to serve load. In these cases, the Resource Planning Function becomes a resource assessment function performed by the Planning Authority that identifies the need for additional resources to be provided by the market.

### **Comments – Responsible Entity – Resource Planner**

<p><b>No comment at this time.</b></p>
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Function

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## Function – Transmission Operations

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### **Definition**

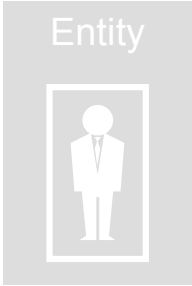
Operates or directs the operations of the transmission facilities.

### **Tasks**

1. Maintain reliability of the transmission area in accordance with Reliability Standards.
2. Provide detailed maintenance schedules (dates and times)
3. Adjust dc ties within the transmission area for those Interchange Transactions that include the dc tie in the transmission path
4. Maintain defined voltage profiles.
5. Define operating limits, develop contingency plans, and monitor operations of the transmission facilities.
6. Provide telemetry of transmission system information

### **Comments – Function – Transmission Operations**

No comment at this time.



## **Responsible Entity – Transmission Operator**

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### ***Relationships with other Responsible Entities***

#### **Ahead of Time**

1. Receives maintenance requirements and plans from the Transmission Owner.
2. Defines operating limits, develops contingency plans, and monitors operations of the transmission facilities under the Transmission Operator's control and as directed by the Reliability Authority.
3. Provides operating information to the Reliability Authority.
4. Determines amount required and arranges for interconnected operations services from Generator Owners to ensure voltage support (e.g., reactive supply from generation resources) in coordination with the Reliability Authority.
5. Provides maintenance schedules and construction plans to Reliability Authority and Planning Authority.
6. Revises transmission maintenance plans as requested by the Reliability Authority and as permitted by agreements, recognizing that equipment maintenance must be performed as needed to ensure the life of the equipment and meet warranty requirements.
7. Provides Planning Authority information on capability to curtail (reduce) and shed load during emergencies.

#### **Real Time**

8. Operates or directs the operations of the transmission system within equipment and facility ratings established by the Transmission Owners and Generator Owners, and system ratings established by the Reliability Authority.
9. Deploys reactive resources from Transmission Owners and Generator Owners as Interconnected Operations Services to maintain acceptable voltage profiles.
10. Provides real-time operations information to the Reliability Authority.
11. Notifies Generator Operators of transmission system problems (e.g., voltage limitations or equipment overloads that may affect generator operations).
12. Requests Reliability Authority to mitigate equipment overloads. (e.g., redispatch, transmission loading relief).
13. Coordinates load shedding with, or as directed by, the Reliability Authority.
14. Directs Distribution Providers to shed load.
15. Implements dc tie operations for those ties under the Transmission Operator's purview as directed by the Transmission Service Provider.

**Comments – Responsible Entity – Transmission Operator**

**EDIT:**

6. Revises transmission maintenance plans as ~~requested~~ **required** by the Reliability Authority ~~and as permitted by agreements~~, recognizing that equipment maintenance must be performed as needed to ensure the life of the equipment and meet warranty requirements.

**COMMENT:** We do not see why the TSP would be directing the operation of the dc tie. The IA and BA would communicate under the normal process to validate the Interchange Schedules. Subsequently, the BA would direct the TO to implement the agreed upon schedule.

7. Provides Planning Authority information on capability to curtail (reduce) and shed load during emergencies.

**COMMENT:** Unless intended in bullets 2 or 3 and if so it should be clarified, it seems that the RA would need this information “Ahead of Time” as well as the Planning Authority.

**EDIT:**

15. Implements dc tie operations for those ties under the Transmission Operator’s purview as directed by the **Balancing Authority** ~~Transmission Service Provider~~.



## Function – Interchange

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### **Definition**

Authorizes implementation of valid and balanced Interchange Schedules between Balancing Authority Areas, and ensures Interchange Transactions are properly identified for reliability assessment purposes.

### **Tasks**

1. Determine valid, balanced, Interchange Schedules (validation of sources and sinks, transmission arrangements, interconnected operations services, etc.).
2. Verify ramping capability of the source and sink Balancing Authority Areas for requested Interchange Schedules
3. Collect and disseminate Interchange Transaction approvals, changes, and denials
4. Authorize implementation of Interchange Transactions
5. Enter Interchange Transaction information into Reliability Assessment Systems (e.g., the Interchange Distribution Calculator in the Eastern Interconnection)
6. Maintain record of individual Interchange Transactions

### **Comments – Function – Interchange**

**EDIT:**

#### **Definition**

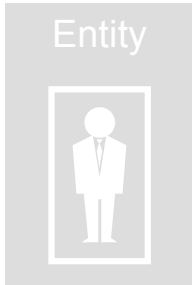
Authorizes implementation of valid and balanced Interchange Schedules (**over both AC and DC interfaces**) between **all** affected Balancing Authority Areas and ensures Interchange Transactions are properly identified for reliability assessment purposes.

**COMMENT:** We feel the Functional Model should clearly denote that the Interchange Schedule process applies to both AC and DC interfaces as assuring all Balancing Authorities have approved an interchange transaction.

**EDIT:**

1. Determine valid, balanced, Interchange Schedules (validation of sources and sinks, **intermediate BAs**, transmission arrangements, interconnected operations services, etc.).

**COMMENT:** The IA Function must clarify that all BA's including those intermediate on the contract path must approve an Interchange Schedule.



## **Responsible Entity – Interchange Authority**

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### ***Relationships with other Responsible Entities***

#### **Ahead of Time**

1. Verifies ramping capability for requested Interchange Schedules with Balancing Authorities.
2. Receives requests from Purchasing-Selling Entities to implement Interchange Transactions.
3. Submits all Interchange Transaction requests to the Reliability Authorities, Balancing Authorities, and Transmission Service Providers for approvals.
4. Receives confirmation from Transmission Service Providers of transmission arrangement(s).
5. Receives confirmation from Balancing Authorities of the ability to meet ramping requirements for submitted Interchange Schedules.
6. Receives information from Balancing Authorities of expected Interconnected Operations Services deployments that result in an Interchange Transaction (for example, an Interchange Schedule that is enabled by reducing load in a Balancing Authority Area, which frees up resources.)
7. Informs Purchasing-Selling Entities on implementation of load-provided Interconnected Operations Services that were bid into the market that result in an Interchange Transaction.
8. Provides approved, valid, and balanced Interchange Schedules to the Balancing Authorities for implementation.

#### **Real Time**

9. Provides Transmission Service Providers with the requested Interchange Transactions received from Purchasing Selling Entities using that Transmission Service Providers' transmission system.
10. Receives curtailments and redispatch implementation from Reliability Authorities.
11. Informs Transmission Service Providers, Purchasing-Selling Entities, Reliability Authorities, and Balancing Authorities of Interchange Schedule Implementations and Curtailments.
12. Receives information on Interchange Schedule interruptions due to generation loss or load interruption from the Balancing Authorities.

#### **After the hour**

13. Maintains and provides records of individual Interchange Transactions for the Balancing Authorities.

## Comments – Responsible Entity – Interchange Authority

**EDIT:**

3. Submits all Interchange Transaction requests to ~~the~~ **all identified** Reliability Authorities, Balancing Authorities, and Transmission Service Providers for approvals.

**4a Receives approval of submitted Interchange Schedules from all identified Reliability Authorities and Balancing Authorities.**

5. Receives confirmation from **source and sink** Balancing Authorities of the ability to meet ramping requirements for submitted Interchange Schedules.

**COMMENT:** Bullet #7 seems to contradict the premise of the current Model to not interact with Market influence. Regardless, it would seem that this type of notification to the PSE should come from the BA that implemented it (referenced in Bullet #6), not the IA, suggest moving this to the BA.

8. Provides approved, valid, and balanced Interchange Schedules to **all identified** ~~the~~ Balancing Authorities for implementation.

**COMMENT:** Bullet #9 is listed in the Real Time section, why? It would seem that if it remained in the current order that it could be accomplished in the Ahead of Time section.

The IA Function has been a source of much debate. From the definition, it can be interpreted that the intention is for there to be a single entity that assures all reliability aspects of every interchange transaction has been submitted and approved by the proper authorities. There is no question that this is a vital role to assure system reliability, however there needs to be more definition within the Functional Model to define the interrelationships. The Model does not define if there is one IA assigned for a given area or if there are to be several. We are concerned that with this detail undefined, there is the potential for serious complexities and delays if RAs and BAs must interact with a multitude of IAs. Unless at the very least, a common interface tool (like E-Tag) is identified, it's hard to imagine how approval/denial communications can take place in a timely manner. We feel that the Functional Model must give this level of detail and that it should be in the direction of a single IA for the entire Eastern Interconnection, if not for the entire NERC Region. We further recommend consideration that this function be accomplished by software (like E Tag) since it would seem that the function is primarily moving data and collecting approvals from all reliability entities involved in an interchange transaction.

Function

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## Function – Transmission Planning

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### **Definition**

Develops a long-term (generally one year and beyond) plan for the reliability (adequacy) of the interconnected bulk electric transmission systems within its portion of the Planning Authority Area

### **Tasks**

Develops a long-term (generally one year and beyond) plan for the reliability (adequacy) of the interconnected bulk electric transmission systems within a portion of the Planning Authority Area.

### **Tasks**

1. Maintain transmission system models (steady-state, dynamics, and short circuit) and apply appropriate tools for the development of transmission plans.
2. Define and collect transmission information and transmission facility characteristics and ratings.
3. Develop plans within defined voltage and stability limits and within appropriate facility thermal ratings.
4. Define system protection and control needs and requirements, including special protection systems (remedial action schemes), to meet reliability standards.
5. Determine TTC values<sup>2</sup> as appropriate.
6. Notify others of any planned transmission changes that may impact their facilities.
7. Evaluate and plan for transmission service and interconnection requests beyond one year.
8. Develop and report, as appropriate, on its transmission expansion plan for assessment and compliance with reliability standards.
9. Monitor and report, as appropriate, on its transmission expansion plan implementation.

### **Comments – Function – Transmission Planning**

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<sup>2</sup> TTC is the total transfer capability and refers to the amount of electric power that can be moved or transferred reliably from one area to another area of the interconnected transmission systems by way of all transmission lines (or paths) between those areas under specified system conditions.

**In the Definition and Tasks Sections**

Develops a long-term (generally one year and beyond) plan for the reliability (~~adequacy~~) of the interconnected bulk electric transmission systems within its portion of the Planning Authority Area



## **Responsible Entity – Transmission Planner**

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### ***Relationships with other Responsible Entities***

1. Provides transmission information, as appropriate, to planning and operating entities and service entities.
2. Coordinates and collects data as appropriate for system modeling, and plans transmission system modifications and expansion for Load-Serving Entities, Generator Owners, and Distribution Providers with other Transmission Planners, Transmission Owners, and Transmission Service Providers.
  - a. Coordinates its transmission models with its Planning Authority.
  - b. Notifies Generator Owners and Transmission Owners of any planned transmission changes that may impact their facilities.
  - c. Coordinates with Resource Planners on the deliverability of new and proposed generation facilities, as appropriate.
3. Coordinates with Transmission Service Providers, Transmission Owners, Reliability Authorities, Planning Authorities, and other Transmission Planners on system limitations, transmission adequacy plans, and the determination of TTC values as appropriate.
4. Coordinates with its Planning Authority, other Planning Authorities, and other Transmission Planners within its Planning Authority Area on reliability issues, as appropriate, including
  - a. Develops and reports its transmission expansion plan to its Planning Authority for assessment and compliance with reliability standards.
  - b. Works with its Planning Authority to identify potential alternative solutions, including solutions proposed by stakeholders, to meet interconnected bulk electric system requirements.
  - c. Reports on transmission expansion plan implementation to its Planning Authority.

### **Comments – Responsible Entity – Transmission Planner**

No comment at this time.



## Function – Transmission Service

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### **Definition**

Administers the transmission tariff. Provides transmission services to qualified market participants under applicable transmission service agreements (for example, the *pro forma* tariff).

### **Tasks**

1. Receive transmission service requests and process each request for service according to the requirements of the tariff.
  - a. Maintain commercial interface for receiving and confirming requests for transmission service according to the requirements of the tariff (e.g., OASIS).
2. Approve or deny transmission service requests
3. Approve Interchange Transactions from transmission service arrangement perspective
4. Determine and post available transfer capability (ATC<sup>3</sup>) values.
5. Allocate transmission losses (MWs or funds) among Balancing Authority Areas.

### **Comments – Function – Transmission Service**

No comment at this time.

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<sup>3</sup> In this document, we use the term “ATC” in the generic sense to refer to the amount of transmission transfer capability that is offered under regulatory requirements.



## **Responsible Entity – Transmission Service Provider**

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### ***Relationships with other Responsible Entities***

#### **Making Deals**

1. Approves or denies transmission service requests from Purchasing-Selling Entities, Generator Owners, and Load-Serving Entities

#### **Ahead of Time**

2. Receives transmission expansion plans identified by the Planning Authority to help determine ability to accommodate long-term transmission service requests
3. Coordinates ATC with Reliability Authority (who may adjust operating reliability limits) and other Transmission Service Providers
4. Confirms Transmission Service requests to Interchange Authorities.

#### **Real Time**

5. Receives Interchange Transaction implementation and revisions from the Interchange Authorities

### **Comments – Responsible Entity – Transmission Service Provider**

No comment at this time.



## Function – Transmission Ownership

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### ***Definition***

Owns and maintains transmission facilities.

### ***Tasks***

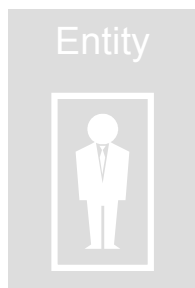
1. Install and maintain transmission facilities according to prudent utility practice
2. Establish ratings of transmission facilities.
3. Develops interconnection agreements.

### **Comments – Function – Transmission Ownership**

Change prudent to Good-
-------------------------

## Responsible Entity – Transmission Owner

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### ***Relationships with other Responsible Entities***

1. Coordinates with Transmission Planners and the Planning Authority and those entities (Generator Owners, other Transmission Owners, and Load-Serving Entities) desiring to interconnect facilities with the bulk electric systems.
2. Considers transmission expansion plans identified by the Planning Authority
3. Provides transmission expansion plans and changes to the Planning Authority and Transmission Planners.
4. Develops agreements or procedures with the Transmission Service Providers.
5. Develops operating agreements or procedures with the Transmission Operators and Reliability Authorities.
6. Provides transmission facility ratings to Transmission Operators, Reliability Authorities, Transmission Service Providers, Transmission Planners, and Planning Authority.
7. Provides construction plans to the Reliability Authority and Planning Authority
8. Provides maintenance plans to the Transmission Operator.
9. Develops agreements with adjacent Transmission Owners for the design, construction and operation and maintenance of joint transmission facilities.

### **Comments – Responsible Entity – Transmission Owner**

**No comment at this time.**



## Function – Distribution

---

### ***Definition***

Provides and operates the “wires” between the transmission system and the end-use customer.

### ***Tasks***

1. Provide the interface between the transmission system and the end-use customer.
2. Provide voltage reduction and load shedding as necessary

### **Comments – Function – Distribution**

No comment at this time.



## **Responsible Entity – Distribution Provider**

---

### ***Relationships with other Responsible Entities***

#### **Ahead of Time**

1. Coordinates with Load-Serving Entities, Transmission Planners and their related Planning Authority on transmission expansion (e.g., coordination of system protection, special protection systems, load shedding, etc).
2. Works with end-use customers to identify new facility connection needs.

#### **Real Time**

3. Implements voltage reduction and sheds load as directed by Transmission Operators.

### ***Special Considerations***

The Distribution Provider provides the physical connection between the end-use customer and the electric system. For those end-use customers who are served at transmission voltages, the Transmission Owner also serves as the Distribution Provider. Thus, the Distribution Provider is not defined by a specific voltage, but rather as performing the Distribution function at any voltage.

The Distribution Provider is responsible for “local” safety and reliability. The Distribution Provider knows which customers are “critical” loads that should be shed only as a last resort, and provides the switches and reclosers for this emergency action.

### **Comments – Responsible Entity – Distribution Provider**

No comment at this time.

Function

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## Function – Generator Operation

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### ***Definition***

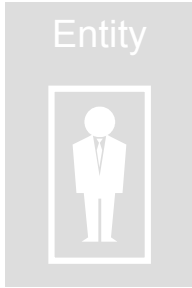
Operates generating unit(s) and performs the functions of supplying energy and Interconnected Operations Services.

### ***Tasks***

1. Operate generators to provide energy or Interconnected Operations Services (or both) per contracts or arrangements
2. Formulate daily generation plan
3. Report operating and availability status of units and related equipment, such as automatic voltage regulators.
4. Develop annual maintenance plan for generating units and performs the day-to-day generator maintenance

### **Comments – Function – Generator Operation**

No comment at this time.



## **Responsible Entity – Generator Operator**

---

### ***Relationships with other Responsible Entities***

#### **Ahead of Time**

1. Provides generation commitment plans to the Balancing Authority after notification by Purchase-Selling Entities or Load Serving Entities of transaction approvals.
2. Provides Balancing Authority and Transmission Operator with requested amount of Interconnected Operations Services.
3. Provides operating and availability status of units to Reliability Authority and Balancing Authority for reliability analysis.
4. Reports annual maintenance plan for generating units to Balancing Authority.
5. Reports status of automatic voltage regulators to Transmission Operators.
6. Provides long-term unit maintenance schedules and unit retirement plans to Resource Planner and Planning Authority.

#### **Real Time**

7. Implements, upon direction by Balancing Authority, redispatch and interchange schedules
8. Provides real-time operating information to the Transmission Operator and Balancing Authority (to both the “host” Balancing Authority in which the Generator is physically located and the sink Balancing Authority in case the generation is dynamically transferred between Balancing Authority Areas).

### **Comments – Responsible Entity – Generator Operator**

**EDIT:**

1. Provides generation commitment plans to the Balancing Authority **or** **Market Operator** after notification by Purchase-Selling Entities or Load Serving Entities of transaction approvals.



## Function – Generator Ownership

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### **Definition**

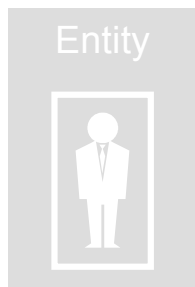
Owns and maintains generating units.

### **Tasks**

1. Establish generating unit ratings, limits and operating requirements.
2. Maintain its generation facilities according to prudent utility practices.
3. Verify generating unit performance characteristics

### **Comments – Function – Generator Ownership**

Change “prudent” to “good”.



## Responsible Entity – Generator Owner

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### *Relationships with other Responsible Entities*

1. Provides generator ratings, limits, and models to Transmission Planners and Planning Authorities.

### **Real Time**

2. May deal directly<sup>4</sup> with either Load Serving Entities or Purchase-Selling Entities via bilateral contracts for energy, capacity, and Interconnected Operations Services products
3. Provides voltage support to Transmission Operators

### **Comments – Responsible Entity – Generator Owner**

**COMMENT:** Real Time Relationships –

Bullet #2 would seem more appropriately labeled as “**Deal Making**”.

Bullet #3 – Although voltage support to the Transmission Operator is critical, it would seem for this to be the job of the Generator Owner that it would be in conflict with the relationships identified for the Generator Operator, in particular bullet #8, **we suggest it be removed from the Generator Owner section.**

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<sup>4</sup> The Generator Owner can serve as its own Purchasing-Selling Entity, or be affiliated with a Load-Serving Entity.

Function

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- \_\_\_\_\_
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## Function – Purchasing-Selling

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### **Definition**

Purchases or sells energy, capacity and all necessary Interconnected Operations Services as required. Purchasing-Selling Entities may be Marketers or Merchant Affiliates.

### **Tasks**

1. Purchase and sell generation or capacity
2. Arrange Interchange Transactions
3. Arrange for transmission service (as required by tariffs)
4. Purchase and sell Interconnected Operations Services
5. Request implementation of Interchange Transactions

### **Comments – Function – Purchasing-Selling**

No comment at this time.
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## **Responsible Entity – Purchasing-Selling Entity**

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### ***Relationships with other Responsible Entities***

#### **Making Deals**

1. Assists Load Serving Entities (LSE) define Interchange Transactions in meeting the LSE's needs.
2. Assists Load Serving Entities and other Purchasing-Selling Entities in supplying the Interconnected Operations Services needs of the Load-Serving Entities. (E.g., supplying regulation service via Interchange Transactions).
3. Arranges for transmission service from Transmission Service Providers and makes arrangements for Interconnected Operations Services with Generator Owners or Load-Serving Entities as applicable for Interchange Transactions.

#### **Transaction Approval and Plans Ahead of Time**

4. Submits requests to Interchange Authorities to implement Interchange Transactions.
5. Notifies Generator Operators and Load Serving Entities if Interchange Transaction requests are approved or denied.

#### **Real Time**

6. Notifies Interchange Authorities of Transaction Cancellations or Terminations.

### **Comments – Responsible Entity – Purchasing-Selling Entity**

**EDIT:**

1. Assists Load Serving Entities (LSE) in defining Interchange Transactions ~~in~~ to meeting the LSE's needs.

**3a Submits Market Transaction Requests to the Market Operator (if applicable).**

5. Notifies the Market Operator (if applicable), Generator Operators and Load Serving Entities if Interchange Transaction requests are approved or denied.



## Function – Load-Serving

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### **Definition**

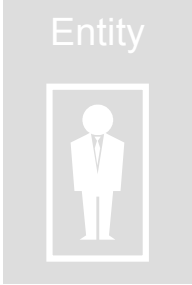
Secures energy and transmission service (and related Interconnected Operations Services) to serve the end-use customer.

### **Tasks**

1. Collect individual and develop overall load profiles and forecasts of end-user energy requirements. (Daily, weekly, monthly, annually etc...)
2. Identify and provide facilities for load curtailment
3. Identify and provide facilities for self-provided Interconnected Operations Services
4. Negotiate agreements for needed energy, transmission service, and Interconnected Operations Services
5. Manage resource portfolios to meet demand and energy requirements of end-use customers.

### **Comments – Function – Load-Serving**

No comment at this time.



## **Responsible Entity – Load-Serving Entity**

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### ***Relationships with other Responsible Entities***

#### **Making Deals**

1. Assists end-use customers develop and submit load profiles, plans, and forecasts as needed to the Balancing Authorities, Generator Owners, Generator Operators, Purchasing-Selling Entities, Planning Authority, Resource Planners, Transmission Planners, and Market Operator(s).
2. Assists Purchasing-Selling Entities in arranging for the delivery of energy to a specific metering point for loads via bilateral contracts
3. Assists Generator Owners and Generator Operators on behalf of end-use customers in securing energy and Interconnected Operations Services needed via bilateral contracts. (In this role the Load Serving Entity is acting like the Purchasing-Selling Entity.)

#### **Ahead of Time**

4. Arranges for transmission service via Transmission Service Providers.
5. Provides generation (affiliated and non-affiliated) commitments and dispatch schedules to the Balancing Authority.
6. Works with end-use customers to identify new facility connection needs
7. Works with Resource Planners to ensure planned purchases that cross Planning Authority Area boundaries are properly reported for system modeling and reliability assessments
8. Coordinates with Transmission Planner and the Planning Authority on data requirements for system modeling and transmission expansion.
9. Works with the Balancing Authorities and Transmission Operators for implementing load shedding during emergency conditions and to provide load interruption capability as an Interconnected Operations Service.

#### **Real Time**

10. Assists Distribution Providers in implementing load shedding during emergency conditions and Balancing Authorities to provide load interruption capability as an Interconnected Operations Service

### **Comments – Responsible Entity – Load-Serving Entity**

**EDIT:**

5. Provides generation (affiliated and non-affiliated) commitments and dispatch schedules to the Balancing Authority **or Market Operator (if applicable).**

Function

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## Function – Compliance Monitoring

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### **Definition**

Monitors, reviews, and ensures compliance with Reliability Standards and administers sanctions or penalties for non-compliance to the standards.

### **Tasks**

1. Audit and document compliance of all registered Responsible Entities to Reliability Standards
2. Recommend sanctions or penalties for non-compliance with Reliability Standards

### **Comments – Function – Compliance Monitoring**

**EDIT:**

#### **Definition**

Monitors, reviews, and ensures compliance with Reliability Standards and administers ~~sanctions or~~ penalties for non-compliance to the standards.

1. Audit and document **Reliability Standards** compliance of all registered Responsible Entities ~~to Reliability Standards~~
2. Recommend sanctions ~~or penalties~~ for non-compliance with Reliability Standards **as deemed appropriate.**

**COMMENT:** There is an issue with the concept of a monetary sanction matrix and what its implications are. NPCC, has continually expressed concern over its inclusion and maintains that the use of market mechanisms where possible, as well as, letters of increasing degrees of severity and notifications to regulatory agencies are more effective in ensuring compliance.

Entity



## **Responsible Entity – Compliance Monitor**

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### ***Relationships with other Responsible Entities***

1. Receives oversight direction from the Standards Developer for consistency
2. Monitors all responsible entities as required by Reliability Standards and Certification Criteria.
3. Provides compliance information to the Standards Developer and others as appropriate

### **Comments – Responsible Entity – Compliance Monitor**

No comment at this time.

Function

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## Function – Standards Development

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### ***Definition***

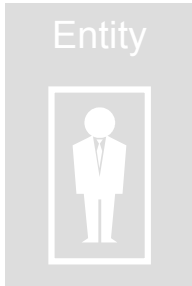
Develops, maintains, and implements Reliability Standards to ensure the reliability of the interconnected bulk electric transmission systems in the United States, Canada, and Baja California Norte, Mexico.

### ***Tasks***

1. Develop Reliability Standards for the planning and operation of the interconnected bulk electric transmission systems that serve the United States, Canada, and Baja California Norte, Mexico.
2. Develop compliance measurement and enforcement procedures for each Reliability Standard.
3. Develop Criteria and Certification Procedures for Balancing, Interchange, and Reliability Authorities, Transmission Operators, and others as needed.
4. Provide for appeals and dispute resolution procedures.

### **Comments – Function – Standards Development**

No comment at this time.



## **Responsible Entity – Standards Developer**

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### ***Relationships with other Responsible Entities***

Coordinates with other standards-approving organizations

### **Comments – Responsible Entity – Standards Developer**

No comment at this time.

## Functional Model Approval Procedure

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Changes to the Functional Model are approved by the standing committees and the board of trustees. The Functional Model is the framework for the Reliability Standards, and the functions, their definitions, and interrelationships must be observed as SARs and Standards are drafted. Doing otherwise would cause conflicts among the Reliability Standards as they are developed over time.

The Functional Model Working Group considers all requests to revise the Functional Model, and manages the revision process:

1. Functional Model Working Group reviews the proposed revision to the Model, considering current Reliability Standards, and SARs and Standards being drafted. The Working Group will work with the individual or group requesting the change to the Model.
2. Working Group posts revision for public comment for 45 days.
3. Working Group submits revision to the standing committees for review and approval. (The revision will include an implementation date for the revisions.)
4. Working Group submits standing committee-approved revision to the NERC Board of Trustees for approval.
5. NERC staff posts revised Functional Model.

### Comments – Functional Model Approval Procedure

**EDIT:**

Changes to the Functional Model **are to be reviewed by the Technical Committees, which recommend approval or denial, and then those changes must be approved** by the ~~standing committees~~ **Standing Committees** and the ~~board of trustees~~ **NERC Board of Trustees before implementation**. **Associated implementation plan(s) with their timelines should be included with the proposed revision and also considered by all the Committees and the Board if Trustees during the approval process.**

2. Working Group posts revision for public comment for 45 **working** days.

**COMMENT:** We believe it would be more appropriate for the approval process to also include the review and approval of its technical subject matter experts such as the RCWG, ORS, IS, etc. prior to seeking approval by the standing committees. The technical subject matter experts provide critical feedback to the standing committees on reliability issues. With the Functional Model providing the framework for defining how entities will perform those tasks critical to reliable operation, it would seem appropriate to have those committees review the drafts prior to any standing committee approval.

