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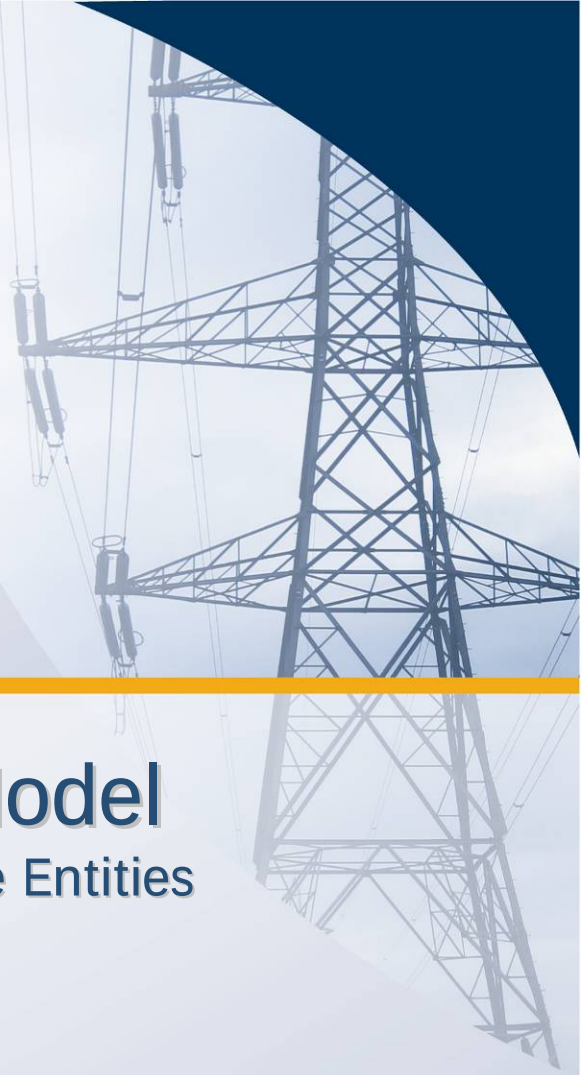

Reliability Functional Model

Function Definitions and Responsible Entities

Prepared by the
Functional Model Working Group

Version 4

Approved by Standing Committees
Approved by Board of Trustees

to ensure the reliability of the bulk power system

August 2008

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Revision Summary

Version 4 is an update of the Reliability Functional Model ("the Model" or "Functional Model") that includes the following changes from Version 3:

- The names Regional Reliability Assurance / Regional Reliability Organization / were changed to Reliability Assurance / Reliability Assurer.

  The changes reflect the view that reliability assurance could be performed on other than a regional basis. Moreover, the Responsible Entity need not be a Regional Entity.

- The names Compliance Monitoring / Compliance Monitor were changed to Compliance Enforcement / Compliance Enforcement Authority.

  The changes are judged to better reflect the strong role of compliance in the ERO regime.

- The wording was changed in a number of instances to ensure that the Model's Tasks and relationships between Responsible Entities do not specify prescriptive requirements. Prescriptive requirements are specified in reliability standards and NERC processes, not in the Model. For example, references in Version 2 that a Responsible Entity "must ensure" or "is required to ensure" are changed in Version 4 to simply "ensures".
- It was clarified that the Generator Owner and Transmission Owner *provide for the maintenance* of their respective assets. This recognizes that the performance of the maintenance may be assigned by the owner to another party, for example, to a Generator Operator or Transmission Operator, respectively.

Foreword

This document replaces version 3 of the NERC Reliability Functional Model that the NERC Board of Trustees approved on February 13, 2007.

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 balanced its load with its generation, implemented Interchange Transaction schedules with other Control Areas, and ensured 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 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 NERC Operating Policies in place at that time, which centered on Control Area operations, were beginning to lose their focus, and become more difficult to apply and enforce.

The NERC Operating Committee formed the Control Area Criteria Task Force (CACTF) 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." Ultimately, the Task Force decided to build a "Functional Model". This involved breaking down the previous reliability functions more finely, such that all organizations involved in ensuring reliability — whether they are traditional, vertically integrated control areas, regional transmission organizations, independent system operators, independent transmission companies or so on — can identify those functions they perform, and register with NERC as one or more of the Responsible Entities. Initially the Model dealt with operating functions, but it was subsequently expanded in Version 2 to incorporate planning-related functions. This Functional Model framework provides guidance to NERC standards drafting teams to write reliability standards in terms of the Responsible Entities who perform the reliability functions.

Excerpted and revised from Version 2 of the NERC Functional Model, February 10, 2004

Introduction

The NERC Reliability Functional Model provides the framework for the development and applicability of NERC's Reliability Standards[1], as follows:

- The Model describes a set of Functions that are performed to ensure the reliability of the bulk power system. Each Function consists of a set of related reliability Tasks. The Model assigns each Function to a Responsible Entity, that is, the entity responsible for ensuring the Function is performed. The Model also describes the interrelationships between that Responsible Entity and other Responsible Entities (that perform other Functions).
- NERC's Standards Development Teams develop Reliability Standards that assign each reliability requirement within a standard to a Responsible Entity (that is defined in the Model). This is possible because a given standard requirement will typically be related to a Task within a Function. A standard requirement will be very specific, whereas a Task will be more general in nature.
- The Model's Functions and Responsible Entities also provide for consistency and compatibility among different Reliability Standards.

While the Model is not a standard, and does not have compliance requirements, it is intended and expected that the Functions' Tasks and relationships as contained in the Model will guide the development of Reliability Standards. The Model is a guideline for the development of standards and their applicability, it is not a NERC requirement. Standards developers are not required to include tasks envisioned in the model, nor are the developers precluded from developing Reliability Standards that conflict with the Model. If it comes down to a choice, the needs of the Reliability Standards themselves take precedence over the Model.

The Model is independent of any particular organization or market structure.

An organization may perform more than one Function and register as the corresponding Responsible Entities.

The Functional Model describes a Responsible Entity envisioned to ensure that all of the Tasks related to its Function are performed. The Model, while using the term "Responsible" Entity", is a guideline and cannot prescribe responsibility. It is NERC's compliance processes, backed by regulatory authority, that specify the manner in which , a Responsible Entity is "legally responsible" for meeting the standards requirements assigned to that Responsible Entity.

The work performed to meet the requirements may be self performed or performed by others.

Functional Model maintenance. The Functional Model is maintained by the Functional Model Working Group (FMWG) under the direction of the NERC Standards Committee,

[1] The term "Responsible Entity" used in the Functional Model is synonymous with the "Functional Entity" used in the NERC Reliability Standards.

with technical content in the Model and accompanying technical document approved by the Standing Committees (OC, PC and CIPC)

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.

The following terms are used in the Functional Model.

Areas

The use of the term Area in the Functional Model is not to suggest that the different areas are the same. The Functional Model envisions that the actual definition of these areas will be through the NERC Standards.

Balancing Authority Area

Reliability Coordinator Area

Transmission Operator Area

Transmission Planner Area

Planning Coordinator Area.

Reliability Assurer Area

General

Responsible Entity. The term used in the model which applies to an organization that carries out the Tasks within a Function. Responsible Entities are registered by the Electric Reliability Organization (ERO) and maintained in its registry as described in the ERO Rules of Procedure and ERO Delegation Agreements. Such organizations are "responsible" to NERC for meeting the standards requirements assigned to the particular Responsible Entity.

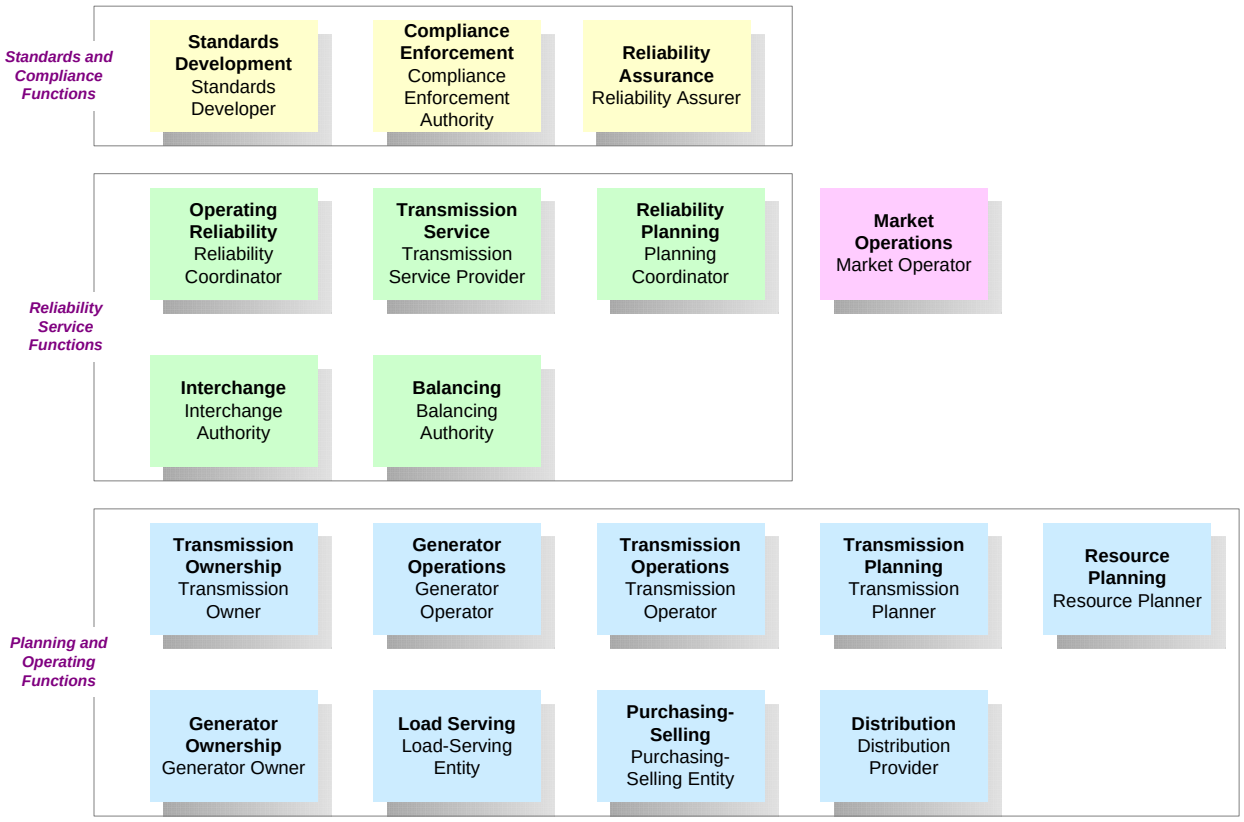
Function. A set of related reliability Tasks.

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

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

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

Functional Model Diagram



Function Name	***Responsible Entity***
Balancing	Balancing Authority
Compliance Enforcement	Compliance Enforcement Authority
Distribution	Distribution Provider
Generator Operations	Generator Operator
Generator Ownership	Generator Owner
Interchange	Interchange Authority
Load-Serving	Load-Serving Entity
Market Operations	Market Operator (Resource Integrator)
Operating Reliability	Reliability Coordinator
Planning Reliability	Planning Coordinator
Purchasing-Selling	Purchasing-Selling Entity
Reliability Assurance	Reliability Assurer
Resource Planning	Resource Planner
Standards Development	Standards Developer
Transmission Operations	Transmission Operator
Transmission Ownership	Transmission Owner
Transmission Planning	Transmission Planner
Transmission Service	Transmission Service Provider

Purpose of the Functional Model

The purpose of the NERC Reliability Functional Model is to:

1. Provide a framework for Reliability Standards developed through the NERC standards development process that will apply to certain Tasks defined in the Functional Model.
2. Define in general terms each Function and the relationships between the entities that are responsible for performing the Tasks within the Functions. The framework for developing the Function definitions is:
    a. The Functions are independent of the organization structure performing the functions, and
    b. The Functions provide flexibility to accommodate the range of presently conceivable organization structures, as well as accommodate alternative tools, procedures and processes.

Guiding Principles of the Functional Model

As explained in the Introduction, the Model provides the framework on which the NERC Reliability Standards are developed and applied. To ensure that this framework remains viable, the model itself is governed by a set of "guiding principles" that define a Function's Tasks and establish the relationships between the Responsible Entities which are responsible for meeting the requirements in the NERC Reliability Standards that correspond to these Tasks. These principles serve as a guideline to those revising or interpreting the Model.

For further details, refer to the Technical Discussions section in the Functional Model Technical Document.

1. The Model must be *complete*, that is, it must include all reliability Tasks and interrelationships between entities performing them. This helps ensure that any reliability requirement arising in a Reliability Standard will generally be related to a Task in the Model and therefore be assignable to a particular Responsible Entity.
2. The Model must group these Tasks into a set of Functions, such that:
    - There are enough Functions (and corresponding Responsible Entities) to accommodate the full range of organization structures and responsibilities within the industry, and
    - The number of Functions is kept as low as reasonably possible in order to avoid unnecessary complexity in standards development and compliance enforcement, and to assist organizations in identifying the Functions they provide.
        - In particular, where a number of entities that perform a given Function form a single group, the Model recognizes this as a business arrangement among entities, not a new Function and corresponding new type of Responsible Entity. That is, the fundamental reliability tasks, and hence the Function, remain the same - all that has changed is *how* the Function is performed. Examples of such groups are a reserve sharing group (a collection of entities that are Balancing Authorities), or a planned resource sharing group or demand side aggregator (collections of entities that are Load-Serving Entities).
3. The Model is structured to ensure there are no gaps or overlaps in the performance of operation Tasks anywhere in the bulk power system. This is achieved in part by associating an "area" of responsibility for each Responsible Entity. Areas are defined in term of the individual transmission, generator and customer equipment assets that collectively constitute the bulk power system. For example, each bulk power system asset has one Reliability Coordinator, one Balancing Authority, and one Transmission Operator. Regarding overlaps for planning, as described in the Technical Document, it is not always possible to achieve this in the case of planning Functions, where there may be overlapping levels of responsibility for given assets.
4. Tasks describe *what* is to be done, not *how* it is to be done.
5. The Model is a guideline that describes reliability Tasks and interrelationships between the entities that perform them - it is not prescriptive. In particular, the Model does not address requirements for registering or becoming certified as a Responsible Entity, or the delegation or splitting of responsibility for meeting standards requirements.

Functional Model — Clarification Service

The Functional Model is a reference tool that links responsible entities with associated reliability-related functions and respective tasks. Drafting teams use the Functional Model to help them determine which responsible entity should be required to comply with each requirement in a reliability standard.

In the past, drafting teams used an informal process when seeking answers to questions about the Functional Model. A drafting team coordinator contacted the FMWG chair and the chair responded to the request via e-mail.

With the recent expansion in the number of drafting teams working in parallel, it is no longer practical to use such an informal process for handling questions about the Functional Model. To provide consistent responses to questions about the Functional Model that can be used by all drafting teams, a more open and inclusive process is needed.

The FMWG is following this formal process for handling requests for clarification of the Functional Model. This process, which has been approved by the Standards Committee, is more open and inclusive as the avenue for requesting clarifications and the avenue for reviewing clarifications is accessible to all drafting teams as well as any other interested stakeholders. If a drafting team needs help in understanding tasks that make up a function and/or in determining which reliability model function entity is responsible for a function/tasks, the drafting team's coordinator will send an e-mail to the NERC Staff assigned as the FMWG facilitator with a request for clarification.

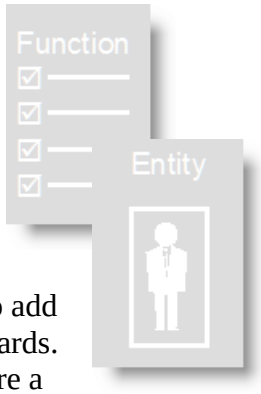
1. The NERC Staff assigned as the FMWG facilitator will convene a conference call/meeting of available members of the FMWG to review the question(s) and provide a clarification.

    - If the question(s) need more detailed discussion with the drafting team, the two coordinators will organize a conference call/meeting with available members of the FMWG and available members of the drafting team to discuss the issues in more detail.

2. Each FMWG request for clarification and the associated response will be posted on the NERC Functional Model Web Page under a Frequently Asked Questions section.

    - If the questions result in changes to the model, the changes will be added to a change summary table used to develop the next updated version of the Functional Model document.

Functions and Responsible Entities



This section defines the functions and associated tasks that are necessary to plan and operate the bulk power system in a reliable manner. This section also characterizes the Responsible Entities who perform these tasks, and provides examples of the inter-relationships that take place between entities to ensure reliability. As standards are developed, the Model may be revised to add and remove Tasks under specific Functions to aid in the development of standards. Relationships between Responsible Entities in the Model are reciprocal. Where a one-to-one relationship exists, the Model will include the relationship specifically; and where a one-to-many relationship exists, the reciprocal relationships are implied.

Function — Standards Development

Definition

Develops and maintains Reliability Standards to ensure the reliability of the bulk power system.

Tasks

1. Develop and maintain a standards development process.
2. Develop Reliability Standards for the planning and operation of the bulk power system .
3. Incorporate compliance measures for Reliability Standard requirements.
4. Provide for appeals procedures.
5. Submit reliability standards to appropriate regulatory authorities for approval.

Responsible Entity — Standards Developer

Introduction to the Standards Developer

The Model addresses Reliability Standards created at NERC using the NERC Standards development process and Regional Standards that are created through an open Regional process and approved by NERC for enforcement. The Functional Model is intended to serve as the framework for the development and application of these Reliability Standards. There are also Regional Criteria that are requirements that Regions create and enforce, that are not included in the Model.

Relationships with Other Responsible Entities

1. Receives request for reliability standards through the public process.
2. Sends reliability standards to the Compliance Enforcement Authority.

Function — Compliance Enforcement

Definition

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

Tasks

1. Evaluate and document compliance.
2. Develop, maintain and implement a compliance enforcement process.

Responsible Entity — Compliance Enforcement Authority

Relationships with Other Responsible Entities

1. Receives reliability standards from the Standards Developer.
2. Administers the compliance enforcement process for all Responsible Entities as required by Reliability Standards.

Function — Reliability Assurance

Definition

Monitors and evaluates the activities related to planning and operations, and coordinates activities of Responsible Entities to secure the reliability of the bulk power system within a Reliability Assurer Area and adjacent areas.

Tasks

1. Coordinate reliability assurance among adjacent Reliability Assurers through the development of necessary protocols and processes.
2. Coordinate the activities related to maintaining critical infrastructure protection.
3. Establish reliability assurance processes and documentation related to planning and operations within the Reliability Assurer's area including such things as a regional reliability plan or a Reliability Coordinator plan.
4. Identify gaps in reliability processes and responsibilities.
5. Conduct readiness assessments including certification evaluations.

Responsible Entity — Reliability Assurer

Relationships with Other Responsible Entities

1. Coordinates reliability assurance activities of the Responsible Entities within the Reliability Assurer Area.
2. Coordinates reliability assurance activities with adjacent Reliability Assurers.
3. Coordinates critical infrastructure protection programs with Responsible Entities.
4. Collects information from Responsible Entities related to Reliability Assurance processes.

Function — Planning Reliability

Definition

Ensures a plan (generally one year and beyond) is available for adequate resources and transmission within a Planning Coordinator Area. It integrates and evaluates the plans from the Transmission Planners and Resource Planners within the Planning Coordinator Area to ensure those plans meet the Reliability Standards.

Tasks

1. Maintain and develop methodologies and tools for the analysis and simulation of the transmission systems in the evaluation and development of transmission expansion plans and the analysis and development of resource adequacy plans.
2. Define information required for planning purposes, consolidate and collect or develop such information, including:
    a. Transmission facility characteristics and ratings.
    b. Demand and energy forecasts, capacity resources, and demand response programs.
    c. Generator unit performance characteristics and capabilities.
    d. Long-term capacity purchases and sales.
3. Evaluate, develop, document, and report on resource and transmission expansion plans for the Planning Coordinator Area. Integrate the respective plans and verify that the integrated plan meets reliability standards, and, if not, then to report on potential transmission system and resource adequacy deficiencies and then provide alternative plans to mitigate identified deficiencies.
    a. Evaluate the plans that are in response to long-term (generally one year and beyond) customer requests for transmission service.
    b. Review transmission facility plans required to integrate new (End-use Customer, generation, and transmission) facilities into the bulk power system. Leave as-is
    c. Review and determine transfer capability (generally one year and beyond) as appropriate.
    d. Monitor and evaluate transmission expansion plan and resource plan implementation.
    e. Coordinate projects requiring transmission outages that can impact reliability and firm transactions.
4. Coordinate with adjoining Planning Coordinators so that system models and resource and transmission expansion plans take into account modifications made to adjacent Planning Coordinator Areas.
5. Develop and maintain transmission and resource (demand and capacity) system models to evaluate transmission system performance and resource adequacy.

Responsible Entity — Planning Coordinator

Introduction to the Planning Coordinator

The Planning Coordinator is responsible for assessing the longer-term reliability of its Planning Coordinator Area. While the area under the purview of a Planning Coordinator may include as few as one Transmission Planner and Resource Planner, the Planning Coordinator's scope of activities is more "global" than individual system plans. By its very nature, bulk power system planning involves multiple entities. Since all electric systems within an integrated network are electrically connected, whatever one system does can affect the other systems. Planning Coordinators work through a variety of mechanisms to conduct facilitated, coordinated, joint, centralized, or regional planning activities.

Relationships with Other Responsible Entities

1. Coordinates and collects data for system modeling from Transmission Planner, Resource Planner, and other Planning Coordinators.
2. Coordinates transfer capability (generally one year and beyond) with Transmission Planners, Reliability Coordinator, Transmission Owner, Transmission Operator, Transmission Service Provider, and neighboring Planning Coordinators.
3. Coordinates plans with Reliability Coordinator and other Planning Coordinators on reliability issues.
4. Receives Transmission Planner's plans.
5. Collects information including:
    a. Transmission facility characteristics and ratings from the Transmission Owners, Transmission Planners, and Transmission Operators.
    b. Demand and energy forecasts, capacity resources, and demand response programs from Load-Serving Entities, and Resource Planners.
    c. Generator unit performance characteristics and capabilities from Generator Owners.
    d. Long-term capacity purchases and sales from Transmission Service Providers.
6. Collects and reviews reports on transmission and resource plan implementation from Resource Planners and Transmission Planners.
7. Submits and coordinates the plans for the interconnection of facilities to the bulk power system within its Planning Coordinator Area with Transmission Planners and Resource Planners and adjacent Planning Coordinator Areas, as appropriate.
8. Provides and informs Resource Planners, Transmission Planners, and adjacent Planning Coordinators of the methodologies and tools for the simulation of the transmission system.
9. Provides the coordinated plans to affected Reliability Assurer(s), Transmission Service Providers, Transmission Planners, Transmission Operators, and Transmission Owners.
10. Integrates the respective plans of the Resource Planners and Transmission Planners within the Planning Coordinator Area.
    a. Verifies that the integrated plan meets Reliability Standards.

b. In coordination with the Resource Planners and Transmission Planners, develops corrective actions for plans that do not meet those Reliability Standards.

Function – Transmission Planning

Definition

Develops a plan (generally one year and beyond) for the reliability of the interconnected bulk power system within the Transmission Planner Area. Ensures that the plan integrates resources and transmission within its area as well as coordinating with the plans from adjacent and overlapping Transmission Planners and Resource Planners. The Transmission Planner also ensures that the plan meets the Reliability Standards.

Tasks

1. Maintain and develop, in cooperation with adjacent and overlapping Transmission Planners, methodologies and tools for the analysis and simulation of the transmission systems in the evaluation and development of transmission expansion plans to meet resource adequacy plans.
2. Define, consolidate and collect or develop, in cooperation with adjacent and overlapping Transmission Planners, information required for planning purposes including:
    a. Transmission facility characteristics and ratings.
    b. Demand and energy forecasts, capacity resources, and demand response programs.
    c. Generator unit performance characteristics and capabilities.
    d. Long-term capacity purchases and sales
3. Maintain transmission system models (steady state, dynamics, and short circuit) to evaluate bulk power system performance.
4. Coordinate with adjacent and overlapping Transmission Planners so that system models and resource and transmission expansion plans take into account modifications made to adjacent and overlapping Transmission Planner Areas.
5. Evaluate, develop, document, and report on resource and transmission expansion plans for the Transmission Planner Area. Verify that the integrated plan meets Reliability Standards, and, if not, report on potential transmission system deficiencies and provide potential alternative transmission solutions to mitigate identified deficiencies.
    a. Evaluate the plans that are in response to long-term (generally one year and beyond) customer requests for transmission service.
    b. Evaluate and plan for all requests required to integrate new (End-use Customer, generation, and transmission) facilities into the bulk power system .
    c. Determine transfer capability values (generally one year and beyond) as appropriate.
    d. Monitor, evaluate and report on transmission expansion plan and resource plan implementation.
    e. Coordinate projects requiring transmission outages that can impact reliability and firm transactions.
6. Notify Generation Owners and Transmission Owners of any planned transmission changes that may impact their facilities.

7. Define system protection and control needs and requirements, including special protection systems (remedial action schemes), to meet Reliability Standards.

Responsible Entity — Transmission Planner

Introduction to the Transmission Planner

The Transmission Planner is responsible for assessing the longer-term (generally one year and beyond) reliability of its Transmission Planner Area. By its very nature, bulk power system planning involves multiple entities. Since all electric systems within an integrated network are electrically connected, whatever one system does can affect the other systems. Transmission Planners work through a variety of mechanisms to conduct facilitated, coordinated, joint, centralized, or regional planning activities. The area under the purview of a Transmission Planner may include one or more Resource Planner areas and overlap one or more adjacent Transmission Planners. In addition, Transmission Planners may group together to create a "layered" Transmission Planner whose scope of activities is more "global" than individual members.

Relationships with Other Responsible Entities

1. Coordinates and collects data for system modeling from Load-Serving Entities, Generator Owners, Distribution Providers, other Transmission Planners, Transmission Owners, and Transmission Service Providers.
2. Collects information including:
    a. Transmission facility characteristics and ratings from the Transmission Owners, Transmission Planners, and Transmission Operators.
    b. Demand and energy forecasts, capacity resources, and demand response programs from Load-Serving Entities, and Resource Planners.
    c. Generator unit performance characteristics and capabilities from Generator Owners.
    d. Long-term transmission capacity purchases and sales from Transmission Service Providers
3. Informs Resource Planners and other Transmission Planners of the methodologies and tools for the simulation of the transmission system.
4. Coordinates with other Transmission Planners on bulk power system expansion plans.
5. Coordinates the evaluation of bulk power system expansion plans with Transmission Service Providers, Transmission Owners, Reliability Coordinators, Resource Planners, and other Transmission Planners.
    a. Verifies that the plan meets Reliability Standards.
    b. In coordination with the Resource Planners and Transmission Planners, develops corrective actions for plans that do not meet those Reliability Standards.
6. Reports on and coordinates its bulk power system expansion plan implementation with affected Transmission Planners, Resource Planners, Transmission Owners and Transmission Operators.
7. Notifies other Transmission Planners, Transmission Owners, Transmission Operators and other entities that may be impacted of any planned bulk power system changes.

8. Coordinates with Distribution Providers, Transmission Owners, Generator Owners and Load Serving Entities in the evaluation and plans for all requests required to integrate new (End-use Customer, generation, and transmission) facilities into the bulk power system.
9. Submits and coordinates the plans for the interconnection of facilities to the bulk power system within its Transmission Planner Area with other Transmission Planners and Resource Planners, as appropriate.
10. Coordinates and develops transfer capability values with other Transmission Planners, Reliability Coordinators, Transmission Operators, Transmission Owners and Transmission Service Providers
11. Coordinates with Transmission Owners and Generator Owners to define system protection and control needs and requirements, including special protection systems (remedial action schemes), to meet Reliability Standards.
12. Receives maintenance schedules and construction plans from Transmission Operator or Transmission Owner for input into and evaluation of bulk power system expansion plans.

Function — Resource Planning

Definition

Develops a plan (generally one year and beyond) within its portion of a Planning Coordinator Area for the resource adequacy of its specific loads (End-use Customer demand and energy requirements) within a reliability area.

Tasks

1. Consider generation capacity from resources both within and outside of the Planning Coordinator Area.
2. Monitor and report, as appropriate, on its resource plan implementation.
3. Maintain resource (demand and capacity) models to evaluate resource adequacy.
4. Collect or develop information required for resource adequacy purposes, including:
   a. demand and energy forecasts, capacity resources, and demand response programs,
   b. generator unit performance characteristics and capabilities, and
   c. long-term capacity purchases and sales.
5. Evaluate, develop, document, and report on a resource adequacy plan for its portion of the Planning Coordinator Area.
6. Assist in the evaluation of the deliverability of resources.

Responsible Entity — Resource Planner

Relationships with Other Responsible Entities

1. Coordinates the resource models with its Planning Coordinator.
2. Coordinates with Transmission Owners and Transmission Planners on the deliverability of resources to customers.
3. Coordinates with and collects data for resource planning from the Load-Serving Entities, Generator Owners, Generator Operators, Transmission Owners, Transmission Operators, Interchange Authorities, and Reliability Assurers.
4. Coordinates with Transmission Planners, Transmission Service Providers, Reliability Coordinators, and Planning Coordinators on resource adequacy plans.
5. Coordinates with other Resource Planners within the Planning Coordinator Area to avoid the double-counting of resources.
6. Reports its resource plan to the Planning Coordinator for evaluation and compliance with Reliability Standards.
7. Reports on resource plan implementation to the Planning Coordinator and Reliability Assurer.
8. Works with the Planning Coordinator and Transmission Planners to identify potential alternative transmission solutions to meet Resource Planner plans.
9. Applies methodologies and tools for the analysis and development of resource adequacy plans from the Planning Coordinator.

Function – Reliability Operations

Definition

Ensures the real-time operating reliability of the bulk power system within a Reliability Coordinator Area.

Tasks

1. Monitor all reliability-related parameters within the reliability area, including generation dispatch and generation/transmission maintenance plans.
2. Identify, communicate, and direct actions if necessary to relieve reliability threats and limit violations in the reliability area.
3. Develop Interconnection Reliability Operating Limits (to protect from instability and cascading outages).
4. Assist in determining reliability-related services requirements for balancing generation and load, and transmission reliability (e.g., reactive requirements, location of operating reserves).
5. Perform reliability analysis (actual and contingency) for the reliability area.
6. Direct revisions to transmission maintenance plans as permitted by agreements.
7. Direct revisions to generation maintenance plans as permitted by agreements.
8. Direct implementation of emergency procedures including load shedding.
9. Direct and coordinate system restoration.
10. Deny or interrupt interchange schedules that adversely impact reliability.

Responsible Entity — Reliability Coordinator

Introduction to the Reliability Coordinator

The Reliability Coordinator is responsible for the real-time operating reliability of its Reliability Coordinator Area and in coordination with its neighboring Reliability Coordinator's wide-area view. The wide-area view includes situational awareness of its neighboring Reliability Coordinator Areas. Its responsibilities include both transmission and balancing operations, and it has the authority to direct other Responsible Entities to take certain actions to ensure that its Reliability Coordinator Area operates reliably.

Transmission operations. With respect to transmission operations, the Reliability Coordinator and Transmission Operator have similar roles, but different scopes. The Transmission Operator is directly responsible for its own defined area. However, the Reliability Coordinator is also responsible, in concert with the other Reliability Coordinators, for the Interconnection as a whole. Thus, the Reliability Coordinator needs a "wide-area" view that reaches beyond its boundaries to enable it to operate within Interconnection Reliability Operating Limits. The Transmission Operator may or may not have this "wide-area" view, but the Reliability Coordinator does have it. The Reliability Coordinator may direct a Transmission Operator within its Reliability Coordinator Area to take whatever action is necessary to ensure that Interconnection Reliability Operating Limits are not exceeded.

Balancing operations. The Reliability Coordinator ensures that the generation-demand balance is maintained within its Reliability Coordinator Area, which, in turn, ensures that the Interconnection frequency remains within acceptable limits. The Balancing Authority has the responsibility for generation-demand-interchange balance in the Balancing Authority Area. The Reliability Coordinator may direct a Balancing Authority within its Reliability Coordinator Area to take whatever action is necessary to ensure that this balance is maintained.

Relationships with Other Responsible Entities

Ahead of Time

1. Coordinates with other Reliability Coordinators, Transmission Planners, and Transmission Service Providers on transmission system limitations.
2. Receives facility and operational data from Generator Operators, Load-Serving Entities, Transmission Owners, Generator Owners, and Transmission Operators.
3. Receives generation dispatch from Balancing Authorities and issues dispatch adjustments to Balancing Authorities to prevent exceeding limits within the Reliability Coordinator Area (if not resolved through market mechanisms).
4. Receives integrated operational plans from Balancing Authorities for reliability analysis of Reliability Coordinator Area.
5. Receives transmission and generation maintenance plans from Transmission Operators and Generator Operators, respectively, for reliability analysis.

6. Develops Interconnection Reliability Operating Limits, based on Transmission Owners' and Generator Owners' specified equipment ratings, and provides them to Transmission Operators.
7. Assists Transmission Operators in calculating and coordinating System Operating Limits.
8. Provides reliability analyses to Transmission Operators, Generator Operators and Balancing Authorities in its area as well as other Reliability Coordinators.
9. Directs Generator Operators and Transmission Operators to revise generation and transmission maintenance plans respectively.
10. Receives balancing information from Balancing Authorities for monitoring.
11. Receives final approval or denial of Interchange Transactions from Interchange Authority.
12. Provide IROLs and TTC to the Transmission Service Provider for ATC calculation.
13. Develops operating agreements or procedures with Transmission Owners.
14. Coordinates with Transmission Operators on system restoration plans, contingency plans and reliability-related services.

Real Time

15. Coordinates reliability processes and actions with and among other Reliability Coordinators.
16. Receives real-time operational information from Balancing Authorities, Interchange Authorities and Transmission Operators for monitoring.
17. Issues reliability alerts to Generator Operators, Transmission Operators, Transmission Service Providers, Balancing Authorities, Interchange Authorities, Regional Entities and NERC.
18. Issues corrective actions and emergency procedures directives (e.g., curtailments or load shedding) to Transmission Operators, Balancing Authorities, Generator Operators, Distribution Providers, and Interchange Authorities.
19. Specifies reliability–related requirements (e.g., reactive requirements, location of operating reserves) to Balancing Authorities.
20. Receives verification of emergency procedures from Balancing Authorities.
21. Receives notification of Interchange Transaction schedule changes from Balancing Authorities.
22. Orders redispatch of generation by Balancing Authorities.
23. Directs use of flow control devices by Transmission Operators.
24. Responds to requests from Transmission Operators to assist in mitigating equipment overloads.

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. Control any of the following combinations within a reliability 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 reliability area.
3. Operate in the reliability area to maintain load-interchange-generation balance.
4. Review generation commitments, dispatch, and load forecasts.
5. Formulate an operational plan (generation commitment, outages, etc.) for reliability evaluation.
6. Approve, Interchange Transactions from ramping ability perspective
7. Implement Interchange schedules by incorporating those schedules into its ACE calculation.
8. Operate the reliability area to support Interconnection frequency.
9. Monitor and report control performance and disturbance recovery.
10. Provide balancing and energy accounting (including hourly checkout of Interchange schedules and actual interchange), and administer inadvertent energy paybacks.
11. Determine needs for reliability-related services.
12. Deploy reliability-related services.
13. Implement emergency procedures.

Responsible Entity — Balancing Authority

Relationships with Other Responsible Entities

Ahead of Time

1. Receives operating and availability status of generating units and operational plans and commitments from Generator Operators (including annual maintenance plans) within the Balancing Authority Area.
2. Receives reliability evaluations from the Reliability Coordinator.
3. Receives approved valid, and balanced Interchange Schedules from the Interchange Authorities.
4. Compiles load forecasts from Load-Serving Entities.
5. Develops agreements with adjacent Balancing Authorities for ACE calculation parameters.
6. Submits integrated operational plans to the Reliability Coordinator for reliability evaluation and provides balancing information to the Reliability Coordinator for monitoring.
7. Confirms Interchange Schedules with Interchange Authorities.
8. Confirms ramping capability with Interchange Authorities.
9. Implements generator commitment and dispatch schedules from the Load-Serving Entities and Generator Operators who have arranged for generation within the Balancing Authority Area.
10. Acquires reliability-related services from Generator Operator.
11. Receives dispatch adjustments from Reliability Coordinators to prevent exceeding limits.
12. Receives generator information from Generator Owners including unit maintenance schedules and retirement plans.
13. Receives information from Load Serving Entities on self-provided reliability-related services.
14. Coordinates system restoration plans with Transmission Operator.
15. Provides generation dispatch to Reliability Coordinators.
16. Receives final approval or denial of Interchange Schedules from Interchange Authority.

Real Time

17. Coordinates use of controllable loads with Load-Serving Entities (i.e., interruptible load that has been bid in as a reliability-related service or has agreed to participate in voluntary load shedding program under resource/reserve deficiency situations).
18. Receives loss allocation from Transmission Service Providers (for repayment with in-kind losses).
19. Receives real-time operating information from the Transmission Operator, adjacent Balancing Authorities and Generator Operators.

20. Receives operating information from Generator Operators.
21. Provides real-time operational information for Reliability Coordinator monitoring.
22. Receives reliability alerts from Reliability Coordinator.
23. Complies with reliability-related requirements (e.g., reactive requirements, location of operating reserves) specified by Reliability Coordinator.
24. Verifies implementation of emergency procedures to Reliability Coordinator.
25. Informs Reliability Coordinator and Interchange Authorities of Interchange Schedule changes (e.g., due to generation or load interruptions) within its Balancing Authority Area.
26. Directs resources (Generator Operators and Load-Serving Entities) to take action to ensure balance in real time.
27. Directs Transmission Operator (or Distribution Provider) to reduce voltage or shed load if needed to ensure balance within its Balancing Authority Area.
28. Directs Generator Operators to implement redispatch for congestion management as directed by the Reliability Coordinator.
29. Implements corrective actions and emergency procedures as directed by the Reliability Coordinator.
30. Implements system restoration plans as directed by the Transmission Operator.
31. Directs Transmission Operator to implement flow control devices.
32. Receives information of Interchange Schedule curtailments from Interchange Authority.

After the hour

33. Confirms Interchange Schedules with Interchange Authorities after the hour for "checkout."
34. Confirms interchange with adjacent Balancing Authorities after the hour for "checkout."

Function — Market Operations

The Market Operations function, its tasks, and the interrelationships with other entities are included in the Functional Model only as an interface point of reliability Functions with commercial functions.

Responsible Entity — Market Operator (Resource Integrator)

Relationships with Other Responsible Entities

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

Function — Transmission Operations

Definition

Ensures the real-time operating reliability of the transmission assets within a Transmission Operator Area.

Tasks

1. Monitor and provide telemetry (as needed) of all reliability-related parameters within the reliability area.
2. Monitor the status of, and deploy, facilities classed as transmission assets, which may include the transmission lines connecting a generating plant to the transmission system, associated protective relaying systems and Special Protection Systems.
3. Provide transmission maintenance schedules.
4. Develop system limitations such as System Operating Limits and Total Transfer Capabilities, and operate within those limits.
5. Develop and implement emergency procedures.
6. Develop and implement system restoration plans.
7. Operate within established Interconnection Reliability Operating Limits.
8. Perform reliability analysis (actual and contingency) for the Transmission Operator Area.
9. Adjust flow control devices within the transmission area for those Interchange Transactions that include these facilities in the transmission path.
10. Deploy reactive resources to maintain transmission voltage within defined limits.

Responsible Entity — Transmission Operator

Introduction to the Transmission Operator

The Transmission Operator is responsible for the real-time operating reliability of the transmission assets under its purview, which is referred to as the Transmission Operator Area. The Transmission Operator has the authority to take certain actions to ensure that its Transmission Operator Area operates reliably.

The Transmission Operator and Reliability Coordinator have similar roles with respect to transmission operations, but different scopes. The Transmission Operator scope is narrower than the Reliability Coordinator, and the Transmission Operator does not necessarily "see" very far beyond its own boundaries. Therefore, the Transmission Operator can calculate System Operating Limits, but the Model does not require the Transmission Operator to calculate Interconnection Reliability Operating Limits, which requires the wider scope of the Reliability Coordinator.

Relationships with Other Responsible Entities

Ahead of Time

1. Coordinates restoration plans with Reliability Coordinator, Transmission Operators, Balancing Authorities, and Distribution Providers.
2. Receives maintenance requirements and construction plans and schedules from the Transmission Owners and Generation Owners.
3. Receives Interconnection Reliability Operating Limits as established by the Reliability Coordinator.
4. Receives reliability evaluations from the Reliability Coordinator.
5. Develops agreements with adjacent Transmission Operators for joint transmission facilities.
6. Revises transmission maintenance plans as directed by the Reliability Coordinator and as permitted by agreements.
7. Defines Total Transfer Capabilities and System Operating Limits based on facility information provided by the Transmission Owners and Generator Owners and assistance from Reliability Coordinator.
8. Determines amount required and arranges for reliability-related services from Generator Operators to ensure voltage support (e.g., reactive supply from generation resources) in coordination with (or under the direction of) the Reliability Coordinator.
9. Develops contingency plans, and monitors operations of the transmission facilities within the Transmission Operator Area control and as directed by the Reliability Coordinator.
10. Provides maintenance schedules and construction plans to Reliability Coordinator and Transmission Planner.
11. Provides facility and operating information to the Reliability Coordinator.

12. Provides to the Transmission Planner information on the capability to curtail (reduce) and shed load during emergencies.
13. Provides Total Transfer Capabilities and System Operating Limits to, and coordinates Available Transfer Capability with, Transmission Service Provider.
14. Receives operating and availability status of generating units from Generation Operators including status of automatic voltage regulators.
15. Develops operating agreements or procedures with Transmission Owners.

Real Time

16. Coordinates load shedding with, or as directed by, the Reliability Coordinator.
17. Provides real-time operations information to the Reliability Coordinator and Balancing Authority.
18. Notifies Generator Operators of transmission system problems (e.g., voltage limitations or equipment overloads that may affect generator operations).
19. Requests Reliability Coordinator to assist in mitigating equipment overloads. (e.g., redispatch, transmission loading relief).
20. Deploys reactive resources from Transmission Owners and Generator Owners to maintain acceptable voltage profiles.
21. Directs Distribution Providers to shed load if needed to ensure reliability within the Transmission Operator Area.
22. Implements flow control device operations for those ties under the Transmission Operator's purview as directed by the Balancing Authorities or Reliability Coordinator.
23. Receives reliability alerts from Reliability Coordinator.
24. Directs Balancing Authorities and Distribution Providers to implement system restoration plans.

Function — Interchange

Definition

Ensures communication of Interchange Transactions for reliability evaluation purposes and coordinates implementation of valid and balanced Interchange Schedules between Balancing Authority Areas.

Tasks

1. Coordinate (i.e., collect, consolidate, and disseminate) Interchange Schedule approvals changes, and denials. Approvals may be explicit or by exception.
2. Receive confirmations of Balancing Authorities for requested Interchange Schedules.
3. Consolidate evaluations of valid, balanced, Interchange Schedules (validation of sources and sinks, transmission arrangements, reliability-related services, etc.).
4. Communicate Interchange Schedule approval for implementation.
5. Communicate Interchange Schedule information to Reliability Assessment Systems (e.g., the interchange distribution calculator in the Eastern Interconnection).
6. Maintain record of individual Interchange Schedules.

Responsible Entity — Interchange Authority

Relationships with Other Responsible Entities

Ahead of Time

1. Receives requests from Purchasing-Selling Entities to implement Interchange Schedules.
2. Submits all Interchange Transaction requests to the Balancing Authorities, and Transmission Service Providers for approvals.
3. Receives approval or denial from Transmission Service Providers of transmission arrangement(s).
4. Receives approval or denial from Balancing Authorities of the ability to meet ramping requirements for submitted Interchange Schedules.
5. Communicates final approval or denial of Interchange Schedules to the Balancing Authorities, Transmission Service Providers, Reliability Coordinators, and Purchase Selling Entities for implementation.

Real Time

6. Receives curtailments and redispatch implementation requests from Reliability Coordinators.
7. Receives information on Interchange Schedules interruptions from the Balancing Authorities and communicates the Interchange Schedule status to Balancing Authorities, Transmission Service Providers, Reliability Coordinators, and Purchase-Selling Entities.
8. Informs Transmission Service Providers, Purchasing-Selling Entities, Reliability Coordinators, and Balancing Authorities of Interchange Schedule curtailments.

After the hour

9. Maintains and provides records of individual Interchange Schedules for the Balancing Authorities.
10. Confirms Interchange Schedules with Balancing Authorities after the hour for “checkout.”

Function — Transmission Service

Definition

Administers the transmission tariff and provides transmission services 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. Determine and post available transfer capability values.
3. Approve or deny transmission service requests.
4. Approve Interchange Schedules from transmission service arrangement perspective.
5. Allocate transmission losses (MWs or funds) among Balancing Authority Areas.

Responsible Entity — Transmission Service Provider

Relationships with Other Responsible Entities

Ahead of Time

1. Receives Total Transfer Capabilities, System Operating Limits and Interconnection Reliability Operating Limits from Planning Coordinator, Transmission Planner, Transmission Operator and Reliability Coordinator, and coordinates Available Transfer Capability with these entities and other Transmission Service Providers.
2. Receives transmission facility ratings from Transmission Owners.
3. Receives transmission expansion plans identified by the Planning Coordinator to help determine ability to accommodate long-term transmission service requests.
4. Approves or denies transmission service requests from Purchasing-Selling Entities, Generator Owners, and Load-Serving Entities.
5. Confirms transmission service requests to Interchange Authorities.
6. Develops agreements or procedures with Transmission Owners.
7. Receives final approval or denial of Interchange Schedules from Interchange Authority.

Real Time

8. Receives Interchange Schedules implementation and revisions (including curtailments) from the Interchange Authorities.
9. Receives reliability alerts from Reliability Coordinator.
10. Provides loss allocation to Balancing Authorities.

Function — Transmission Ownership

Definition

Owns and provides for the maintenance of transmission facilities.

Tasks

1. Develop interconnection agreements.
2. Establish ratings of transmission facilities.
3. Authorize maintenance of transmission facilities and rights-of-way.
4. Design and install owned facilities classified as transmission and obtain associated rights-of-way.
5. Design and authorize maintenance of transmission protective relaying systems and Special Protection Systems.

Responsible Entity — Transmission Owner

Relationships with Other Responsible Entities

1. Coordinates with Transmission Planners and the Planning Coordinator, Generator Owners, other Transmission Owners, and Load-Serving Entities desiring to connect with the bulk power system.
2. Receives approved transmission expansion plans from the Transmission Planner.
3. Develops agreements or procedures with the Transmission Service Providers.
4. Develops operating agreements or procedures with the Transmission Operators, Reliability Coordinators and Distribution Providers.
5. Develops agreements with adjacent Transmission Owners for joint transmission facilities.
6. Provides transmission expansion plans and changes to the Planning Coordinator and Transmission Planners.
7. Provides transmission facility ratings to Transmission Operators, Reliability Coordinators, Transmission Service Providers, Distribution Providers, Transmission Planners, and Planning Coordinator.
8. Provides construction plans and schedules to the Transmission Operator, and Transmission Planner.
9. Provides maintenance plans and schedules to the Transmission Operator and Transmission Planner.
10. Develops interconnection agreements with the Distribution Providers and Generation Owners for connecting to the bulk power system.
11. Provides reactive resources to Transmission Operators.

Function — Distribution

Definition

Provides facilities that interconnect an End-use Customer load and the electric system for the transfer of electrical energy to the End-use Customer.

Tasks

1. Provide and operate electrical delivery facilities between the transmission system and the End-use Customer.
2. Implement voltage reduction.
3. Design and maintain protective relaying systems, under-frequency load shedding systems, under-voltage load shedding systems, and Special Protection Systems that interface with the transmission system.
4. Provide and implement load-shed capability.
5. Maintain voltage and power factor within specified limits at the interconnection point.

Responsible Entity — Distribution Provider

Introduction to the Distribution Provider

The Distribution Provider delivers electrical energy to the End-use Customer and the transmission system. For those End-use Customers who are served at transmission voltages, the Transmission Owner may also serve 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 provides the switches and reclosers that could be used to shed load for emergency action.

Relationships with Other Responsible Entities

Ahead of Time

1. Coordinates with Transmission Planners on transmission expansion.
2. Coordinates system restoration plans with Transmission Operator.
3. Coordinates with End-use Customers and Load-Serving Entities to identify new facility connection needs.
4. Develop interconnection agreements with Transmission Owners on a facility basis.
5. Provides operational data to Transmission Operator.
6. Coordinate with Load-Serving Entities to identify critical loads that are to be precluded from load shedding where avoidable.

Real Time

7. Implements voltage reduction and sheds load as directed by the Transmission Operator or Balancing Authority.
8. Implements system restoration plans as coordinated by the Transmission Operator.
9. Directs Load-Serving Entities to communicate requests for voluntary load curtailment.

Function — Generator Operation

Definition

Operates generating unit(s) to provide real and reactive power.

Tasks

1. Formulate daily generation plan.
2. Report operating and availability status of units and related equipment, such as automatic voltage regulators.
3. Develop annual maintenance plan for generating units and perform the day-to-day generator maintenance.
4. Operate generators to provide real and reactive power or reliability-related services per contracts or arrangements.
5. Monitor the status of facilities classed as generating assets.
6. Support Interconnection frequency.

Responsible Entity — Generator Operator

Relationships with Other Responsible Entities

Ahead of Time

1. Provides generation commitment plans to the Balancing Authority.
2. Provides Balancing Authority and Transmission Operators with requested amount of reliability-related services.
3. Provides operating and availability status of generating units to Balancing Authority and Transmission Operators for reliability analysis.
4. Reports annual maintenance plan for generating units to Reliability Coordinator, Balancing Authority and Transmission Operators.
5. Reports status of automatic voltage regulators to Transmission Operators.
6. Provides operational data to Reliability Coordinator.
7. Revises generation maintenance plans per directive of Reliability Coordinator.
8. Receives reliability analyses from Reliability Coordinator.
9. Receives notice from Purchasing-Selling Entity if Interchange Transaction approved or denied.
10. Receives reliability alerts from Reliability Coordinator.
11. Receives notification of transmission system problems from Transmission Operators.

Real Time

12. Provides real-time operating information to the Transmission Operators and the required Balancing Authority.
13. Adjusts real and reactive power as directed by the Balancing Authority and Transmission Operators.

Function — Generator Ownership

Definition

Owns and provides for maintenance of generating facilities.

Tasks

1. Establish generating facilities ratings, limits, and operating requirements.
2. Design and authorize maintenance of generation plant protective relaying systems, protective relaying systems on the transmission lines connecting the generation plant to the transmission system, and Special Protection Systems.
3. Authorize maintenance of owned facilities classified as generating assets.
4. Provide verified generating facility performance characteristics / data.

Responsible Entity — Generator Owner

Relationships with Other Responsible Entities

1. Provides generator information to the Transmission Operator, Reliability Coordinator, Balancing Authority, Transmission Planner, and Resource Planner.
2. Provides unit maintenance schedules and unit retirement plans to the Transmission Operator, Balancing Authority, Transmission Planner, and Resource Planner.
3. Develops an interconnection agreement with Transmission Owner on a facility basis.
4. Receives approval or denial of transmission service request from Transmission Service Provider.
5. Provides reliability related services to Purchasing-Selling Entity pursuant to agreement.

Function — Purchasing-Selling

Definition

Purchases or sells energy, capacity, and necessary reliability-related services as required.

Tasks

1. Purchase and sell energy or capacity.
2. Arrange Interchange Transactions.
3. Arrange for transmission service that is required by tariffs.
4. Request implementation of Interchange Transactions.

Responsible Entity — Purchasing-Selling Entity

Relationships with Other Responsible Entities

Ahead of Time

1. Arranges for transmission service from Transmission Service Providers and makes arrangements for reliability-related services with Generator Owners or Load-Serving Entities as applicable for Interchange Transactions.
2. Submits requests to Interchange Authorities to implement Interchange Transactions.
3. Notifies Generator Operators and Load-Serving Entities if Interchange Transaction requests are approved or denied.
4. Receives final approval or denial of Interchange Transaction from Interchange Authority.

Real Time

5. Notifies Interchange Authorities of Interchange Transaction cancellations or terminations.
6. Receives notice of interchange schedule curtailments from Interchange Authority.
7. Receives load profiles and forecasts from Load Serving Entities.

Function — Load-Serving

Definition

Secures capacity, energy and transmission services (including necessary reliability-related services) to serve the End-use Customer.

Tasks

1. Collect individual load profiles.
2. Identify capability for and communicate requests for voluntary load curtailment.
3. Participate in under-frequency load shedding systems and under-voltage load shedding systems through identification of critical customer loads that are to be excluded from the load shedding systems.
4. Identify need for facilities and provide capability of self-provided reliability-related services for its load.
5. Develop overall load profiles and forecasts of end-user energy requirements.
6. Acquire necessary transmission service, and reliability-related services.
7. Manage resource portfolios to meet demand and energy requirements of End-use Customers.

Responsible Entity — Load-Serving Entity

Relationships with Other Responsible Entities

Ahead of Time

1. Submits load profiles and characteristics, plans, and forecasts as needed to the Balancing Authorities, Purchasing-Selling Entities, Planning Coordinator, Resource Planners, and Transmission Planners.
2. Identifies new facility connection needs for End-use Customers.
3. Provides generation commitments and dispatch schedules to the Balancing Authority.
4. Provides information as to self-provided reliability-related services to the Balancing Authority.
5. Provides planned purchases to the Resource Planner and Transmission Planner for system modeling and reliability evaluation.
6. Arranges for transmission service via Transmission Service Providers.
7. Coordinates with Distribution Provider on identifying new facility interconnection needs.

Real Time

8. Receives requests from the Balancing Authority and Distribution Provider for voluntary load curtailment.
9. Communicate requests for voluntary load curtailment to end-use customers as directed by the Balancing Authority and Distribution Provider.
10. Informed by Purchasing-Selling Entity if Interchange Transaction requests approved or denied.