NEW BRUNSWICK SYSTEM OPERATOR

Transmission Planning Methodology and Governance

NBSO - TPR - 001.0

Version: 003.0

Document Approval

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0	07/07/25	First release	Carl Gautreau	
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Version 2.0	09/01/21	Replaced term “Ten Year Outlook” with “Ten Year Assessment”. Revised to align with Market Procedure 22.	Carl Gautreau	Alden Briggs
Version 3.0	09/05/12	Renamed “Transmission Planning Methodology and Governance” from “Transmission Planning Requirements and Governance”. Included role of Resource Planning Coordinator, Transmission Planning Coordinator and Resource Planner.	Carl Gautreau	Alden Briggs

Reference Documents

The New Brunswick

Electricity Act: **Part III**

NBSO Market Rules: **Chapter 5 (System Reliability)**

NBSO Market Rules: **Chapter 9 (**Transmission System Planning, Investment and Operations)

NBSO Market Procedure: **MP-10 (**Information Required for Forecast and Assessments)

NBSO Market Procedure: **MP-21 (**Connection Assessments)

http://www.nbso.ca/Public/_private/MP-21.pdf

NBSO Market Procedure: **MP-22 (Procedures to Address System Adequacy Issues)**

NBSO Market Calendar:

http://www.nbso.ca/Public/en/docs-EN/MarketCalendar/Market%20Calendar%202007.pdf

NBSO-TPR-001.1: **Transmission Planning Performance Requirements**

NBSO-TPR-001.2: **Maritimes Area Technical Planning Committee**

NBSO-TPR-002.0: **TTC and TRM Rationale for NB**

Applicable NERC Reliability Standards

The following NERC Standards, or requirements within the standard, are applicable to all or one of the following:

- Planning Coordinator
- Transmission Planner
- Resource Planner

TPL-001-0 System Performance under Normal Conditions

TPL-002-0 System Performance Following Loss of a Single BES Element

TPL-003-0 System Performance Following Loss of Two or More BES Elements

TPL-004-0 System Performance Following Extreme BES Events

MOD-010-0 Steady-State Data for Transmission System Modeling and Simulation

MOD-011-0 Regional Steady-State Data Requirements and Reporting Procedures

MOD-012-0 Dynamics Data for Transmission System Modeling and Simulation

MOD-016-0 Actual and Forecast Demands, Net Energy for Load, Controllable DSM

MOD-017-0 Aggregated Actual and Forecast Demands and Net Energy for Load

MOD-018-0 Reports of Actual and Forecast Demand Data

MOD-019-0 Forecasts of Interruptible Demands and DCLM Data

MOD-020-0 Providing Interruptible Demands and DCLM Data

MOD-021-0 Accounting Methodology for Effects of Controllable DSM in Forecasts

Applicable NPCC Documents

A-02	Basic Criteria for Design and Operation of Interconnected Power Systems
A-06	Operating Reserve Criteria
A-10	Classification of Bulk Power System Elements
B-04	Guidelines for NPCC Area Transmission Reviews
B-08	Guidelines for Area Review of Resource Adequacy
C-29	Procedures for System Modeling Data Requirements and Facility Ratings

Applicable NPCC Task Forces and Working Groups

TFCO Coordination of Operation - CO-12 Operations Planning

TFCP Coordination of Planning - CP-8 Review of Resource and Transmission Adequacy

TFSS System Study

- SS-37 Base Case Development
- SS-38 Inter-Area Dynamic Analysis

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1.0 General

1.1 Purpose and Scope

Within New Brunswick, the New Brunswick System Operator (NBSO) is to undertake and coordinate power system planning and development responsibilities to maintain and ensure the adequacy and reliability of the integrated electricity system for present and future needs and for the efficient operation of a competitive market[1] (New Brunswick *Electricity Act*).

Through its participation with the Northeast Power Coordinating Council (NPCC) and the North American Reliability Corporation (NERC) the NBSO has a shared responsibility for coordination of planning within the Maritimes Area. The planning process is to be coordinated, open and transparent.

Coordinated

Transmission providers must meet with all of their transmission customers and interconnected neighbors to develop a transmission plan on a nondiscriminatory basis.

Open

Transmission planning meetings must be open to all affected parties (including all transmission and interconnection customers)

Transparent

- Transmission Service Providers, like the NBSO, will disclose to all customers and other stakeholders the basic criteria, assumptions, and data that underlie their transmission system plans

[1] New Brunswick Electricity Act, s. 42 Object of the NBSO, ss. (i).

- Transmission Service Providers will make available the basic methodology, criteria, and processes they use to develop their transmission plans, including how they treat retail native loads, in order to ensure that standards are consistently applied.
- Transmission Service Providers will make available information regarding the status of upgrades identified in their transmission plans in addition to the underlying plans and related studies.

This document provides Governance for Transmission Planning within New Brunswick to ensure that coordinated, open and transparent planning occurs. Other documents to be referenced are:

NBSO Market Rules:	Chapter 9 (Transmission System Planning, Investment and Operations)
NBSO Market Procedure:	MP-10 (Information Required for Forecast and Assessments)
NBSO Market Procedure:	MP-21 (Connection Assessments)
NBSO Market Procedure:	MP-22 (Procedures to Address System Adequacy Issues)
NBSO-TPR-001.1	Transmission Planning Performance Requirements
NBSO-TPR-001.2	Maritimes Area Technical Planning Committee
NBSO-TPR-002.0	TTC and TRM Rationale for NB

1.2 Identification of Connected Systems

New Brunswick is interconnected to neighboring power systems in Quebec, New England, Nova Scotia, Prince Edward Island, Northern Maine, and Eastern Maine. The two interconnections with Quebec are through High Voltage Direct Current (HVDC) stations and there is the ability at each to radially connect a portion of the New Brunswick load directly to the Québec system. This enables increased transfer capability from Québec to New Brunswick. All other interconnections are synchronous AC transmission lines and they connect the Maritimes Area systems as part of the very large

Eastern Interconnection of North America. The Maritimes Area consists of two balancing areas, Nova Scotia and New Brunswick.

Northern and Eastern Maine as well as Prince Edward Island are part of the New Brunswick System Operator (NBSO) "Balancing Area".

Northern and Eastern Maine are not directly connected to the rest of the United States portion of the Eastern Interconnection (EI), but are connected to the EI indirectly through New Brunswick. The Transmission Provider for Northern and Eastern Maine is the Northern Maine Independent System Administrator (NMISA). Transmission Planning and Resource Adequacy assessments are carried out by the NMISA. Adequacy plans are submitted to NBSO to be included in the evaluation for the NBSO Planning Coordinator Area.

Similarly, Maritime Electric (MECL) plans transmission and resource needs for Prince Edward Island and submits data to the NBSO in the evaluation for the NBSO Planning Coordinator Area.

2.0 Maritimes Area Registrations (with NERC and NPCC)

2.1 Current Registry

For the purpose of compliance monitoring by NERC and NPCC, entities must register with NPCC and NERC for the functions described in the NERC Functional Model.

The current entities defined in the Functional Model are:

- Reliability Coordinator (RC)
- Transmission Operator (TOP)
- Balancing Authority (BA)

- Transmission Service Provider (TSP)
- Planning Coordinator (PC)
- Resource Planner (RP)
- Reserve Sharing Group (RSP)
- Generator Owner (GO)
- Generator Operator (GOP)
- Distribution Provider (DP)
- Transmission Owner (TO)
- Transmission Planner (TP)

In the Maritimes Area, New Brunswick and Nova Scotia are the only Balancing Areas with bulk transmission. NBSO, New Brunswick Power Transmission (NBPT) and Nova Scotia Power Inc (NSPI) are therefore the only entities registered with NERC.

NBSO is currently registered as:

- Reliability Coordinator (RC) for the Maritimes Area;
- Balancing Authority (BA) for New Brunswick, PEI and Northern and Eastern Maine;
- Transmission System Provider (TSP) for New Brunswick;
- Transmission Operator (TOP) for New Brunswick;
- Planning Coordinator (PC) for New Brunswick;
- Reserve Sharing Group (RSP) member in the Maritimes Area; and
- Resource Planner (RP) for New Brunswick.

Other entities are currently registered as shown:

	RC	**TOP**	**BA**	**TSP**	**PC**	**RP**	**RSG**	**GO**	**GOP**	**DP**	**TO**	**TP**
NBSO	x	x	x	x	x	x	x					
NSPI		x	x	x	x	x	x	x	x	x	x	x
NBP TRANSCO											x	x
MECL												
NMISA												

2.2 Reliability Compliance Program New Brunswick

In Canada the responsibility for the reliability of bulk power systems resides with the individual provinces. New Brunswick regulates the reliability of bulk power systems under the Electricity Act by assigning the NBSO the authority to set and enforce reliability standards under the Market Rules, subject to oversight by the Energy and Utilities Board (EUB).

The NBSO Reliability Compliance Program, as described in NBSO Market Procedure MP-08 is coordinated with the US based NERC and NPCC reliability programs according to the arrangement established under a:

- Memorandum of Understanding between the Province of New Brunswick (Minister of Energy) and the New Brunswick System Operator and the North American Electric Reliability Corporation; and
- Memorandum of Understanding Between the New Brunswick System Operator and the Northeast Power Coordinating Council Inc. and the North American Electric Reliability Corporation.

These memorandums were signed on April 2, 2009.

Going forward, the NBSO will be the only New Brunswick entity to register with NERC and NPCC. For all other New Brunswick entities, NBSO will establish and maintain a registry of NB entities that are subject to compliance with Reliability Standards. NBSO will identify entities for registration based on criteria set out in *NERC Rules of Procedure, Section 500 - Organization Registration and Certification* and *NPCC Criteria A-10, Classification of Bulk Power System Elements.*

3.0 Planning Responsibilities

3.1 NBSO as Planning Coordinator

The New Brunswick System Operator (NBSO) is to undertake and coordinate power system planning and development responsibilities to maintain and ensure the adequacy and reliability of the integrated electricity system for present and future needs and for the efficient operation of a competitive market (New Brunswick Market Rules and Electricity Act).

NBSO monitors the implementation of the transmission and resource plans, including the tracking of generating capacity, demand program, and transmission in-service dates. It also evaluates the impact of revised transmission and generator in-service dates on transmission and resource adequacy. In its evaluation of resource plans, NBSO reviews the conversion of various resource adequacy requirements and methodologies into equivalent resource capacity (or reserve) margins (or requirements) for use within New Brunswick.

NBSO:

- undertakes and coordinates Long Range Planning;
- carries out Short Range Planning;
- provides for the tracking of capacity and demand program in-service dates;
- provides an evaluation of revised transmission and generation in-service dates on resource adequacy;
- enters into Coordination Agreements with adjacent Areas to coordinate planning of interconnections; and
- submits Interim and Comprehensive Reports on behalf of the Maritimes Area.

3.1.1 NBSO Planning Coordination for Resource Adequacy

The NBSO:

- collects and develops related resource information for planning purposes from other, including:
    - demand and energy end-use customer forecasts from the Load-Serving Entities. These forecast take into account demand management data and programs, and any reductions in load due to conservation efforts as forecasted by Efficiency New Brunswick;
    - generator unit performance characteristics and capabilities from Generator Owners and others; and
    - information on existing and proposed new capacity purchases and sales.
- identifies those resources that may be considered firm resources (e.g., under contract, under construction, or environmental permits in place);
- verifies that resource plans meet adequacy resource requirements or identify resource deficiencies;
- identifies potential alternative solutions to meet resource requirements should the resource plans be deficient;
- coordinates the resource models;
- applies methodologies and tools for the analysis and development of resource adequacy plans;
- coordinates with Transmission Owners and Transmission Planners on the deliverability of resource;
- coordinates with Transmission Planners, Transmission Service Providers, Reliability Coordinators, and other Planning Coordinators on resource adequacy plans;
- coordinates with other Resource Planners within the Planning Coordinator Area to avoid the double-counting of resources; and
- works with the Stakeholders and Transmission Planners to identify potential alternative transmission solutions to meet Resource Planner plans.

3.1.2 NBSO Planning Coordination for Transmission

The NBSO:

- evaluates, develops, documents, and reports on resource and transmission expansion plans for the Transmission Planner Area. The NBSO verifies that the integrated plan meets Reliability Standards, and, if not, reports on potential transmission system deficiencies and provide potential alternative transmission solutions to mitigate identified deficiencies;
- evaluates the plans that are in response to long-term (generally one year and beyond) customer requests for transmission service;
- evaluates and plans for all requests required to integrate new (End-use Customer, generation, and transmission) facilities into the bulk power system;
- determines transfer capability values (generally one year and beyond) as appropriate;
- monitors, evaluates and reports on transmission expansion plan and resource plan implementation;
- coordinates projects requiring transmission outages that can impact reliability and firm transactions;
- notifies Generation Owners and Transmission Owners of any planned transmission changes that may impact their facilities;
- is involved with defining special protection systems (remedial action schemes), to meet Reliability Standards;
- determines bulk power transmission elements either through it's own studies or assessing submitted studies;
- determines Total Transfer Capabilities;
- carries out System Impact Studies; and
- ensures Facility Studies are carried out.

3.1.3 NBSO Planning Coordination for Transmission System Enhancement and Expansion

The NBSO carries out planning studies for system enhancement and expansion studies as described in section 7.0 of this document. The NBSO initiates system enhancement and expansion studies if:

- required to address a need identified in its on-going evaluation of the Transmission System's economic and operational adequacy and performance; and
- required as result of assessment of the Transmission System's compliance with NERC and/or NPCC reliability requirements, or constraints or available transfer capability shortages are identified, possibly as a result of generation additions or retirements, or evaluation of load forecasts.

3.1.4 NBSO Planning Coordinator Reports

The NBSO:

- publishes assessed system development trends (demands, transmission, and resources) in the time frame of generally one year and beyond (Ten Year Assessment); and
- provides reports and data, as requested or required, to the Standards Developer, Compliance Monitor, Regional Councils, NERC, regulatory authorities, and governmental agencies.

3.2 Load Serving Entities

Part of the Resource Planner function requires development of resource plans (generally one year and beyond) for the resource adequacy of its specific loads (end-use Customer demand and energy requirements). The New Brunswick Market Rules require Load Serving Entities, such as NB Power Distribution and Customer Service, to plan and obtain adequate power and energy, including reserves and submit balanced schedules to the NBSO on a seasonal basis.

The LSE as Resource Planners are responsible to:

- Consider generation capacity from resources both within and outside of New Brunswick
- Monitor and report, as appropriate, on its resource plan implementation
- Maintain resource (demand and capacity) models to evaluate resource adequacy
- Collect or develop information required for resource adequacy purposes, including:
  - demand and energy forecasts, capacity resources, and demand response programs,
  - and long-term capacity purchases and sales
- Evaluate, develop, document, and report on a resource adequacy plan
- Assist in the evaluation of the deliverability of resources.
- Report its resource plan to the Planning Coordinator for evaluation and compliance with Reliability Standards and Markets Rules.

NB Power Distribution and Customer, as the major Load Serving Entity for New Brunswick, have long-term contracts for the generation it requires to meet the needs of its provincial customers from the Heritage Pool (existing NB Power generating resources).

NB Power Distribution and Customer Service submit data, including long term forecast (see Appendix 1), required by the NBSO to develop the “Ten-Year Assessment”.

Within the Maritimes Area, Northern Maine ISA, Prince Edward Island and Nova Scotia carry out their own resource planning. The resources plans for NMISA and PEI are incorporated by the NBSO in its assessments for New Brunswick Balancing Area.

3.3 Transmission Planners

Under the New Brunswick Electricity Market Rules Transmitters are responsible for advising the NBSO of their plans for the development of the Transmission System and of changes to major components thereof, and for assisting the NBSO in planning the long-term development of the NBSO-controlled Grid.

Therefore, Transmission Planning in New Brunswick is a coordinated function carried out by both the NBSO and Transmission Planners.

Transmission Planners develop a plan (generally one year and beyond) for the reliability of the interconnected bulk power system within the Transmission Planner Area. They ensure 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. Transmission Planner also ensures that the plan meets the Reliability Standards.

Transmission Planners:

- 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;
- Define, consolidate and collect or develop, in cooperation with adjacent and overlapping Transmission Planners, information required for planning purposes including:

  - transmission facility characteristics and ratings
  - demand and energy forecasts, capacity resources, and demand response programs
  - generator unit performance characteristics and capabilities
  - long-term capacity purchases and sales
- maintain transmission system models (steady state, dynamics, and short circuit) to evaluate bulk power system performance; and
  - 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.

The Transmission Planner submits a ten year transmission plan to the NBSO for use in developing the "Ten-Year Assessment".

In reporting its transmission expansion plan to the NBSO, Transmission Planners are expected to verify that its plans for new or reinforced facilities meet reliability standards or identify the transmission deficiencies. Transmission Planners work with the NBSO to identify potential alternative solutions, including solutions proposed by stakeholders, to meet interconnected bulk electric system requirements.

Transmission Planners work with the NBSO to:

- determine bulk power transmission elements
- determine Total Transfer Capabilities
- carry out Feasibility Reviews (**)
- carry out System Impact Studies (**)
- carry out Facility Studies

** NBSO may also have Feasibility Reviews and System Impact Studies completed internally or by qualified third parties.

3.4 Maritimes Area Technical Planning Committee (MATPC)

In developing baseline transmission plans, Transmission Planners must take into account the plans of neighbouring entities. The “Maritimes Area Technical Planning Committee” was formed as a method of achieving this. NBSO chairs the “Maritimes Area Technical Planning Committee” in order to, along with NBPT Planners, coordinate and jointly plan with other Transmission Planners, as appropriate, to ensure new facilities are coordinated and do not adversely affect the reliability of neighbouring transmission systems.

3.5 Generator Owners

The Generator Owner owns and maintains its generation facilities. It also specifies equipment operating limits, and supplies this information to the Generator Operator, Reliability Coordinator, Transmission Planner, and Planning Coordinator.

In the NB Market, any generator registered as a Market Participant, including External Dispatch Facilities located outside of New Brunswick is required to provide this data.

Generator Owners in New Brunswick are required to have interconnection agreements with the Transmission Owner that details the terms of the interconnection between these parties.

3.6 Transmission Owners

Transmission Owners own and maintain transmission facilities within New Brunswick. Transmission Owners specify equipment operating limits, and supply this information to NBSO.

Transmission Owners enter into Interconnection Agreements with generators or other transmission customers detailing the terms of the interconnection between the owners and customers.

4.0 Assessments of the Capacity and Adequacy

NBSO produces and publishes energy and demand forecasts for New Brunswick and assessments of the Capacity and Adequacy of the Integrated Electricity System.

The key assessments for long term planning is the "Ten Year Assessment". The Ten Year Assessment is published **annually**, by the end of March, and contains assessments for the following ten years, starting with the current year and covering ten 12-month periods, each commencing on April 1st. In addition, NBSO conducts assessments semi annually for the Winter Capability Period (November to March) and the Summer Capability Period (April to October).

Market participants, Transmitters and Connection Applicants are responsible to submit information required by the NBSO in accordance with Market Procedure 10.0 and within timelines established in the *New Brunswick Electricity Market Calendar* describing data submission dates and publication timelines. The calendar is published on the NBSO Website under Operations/Market/News/Calendar.

Submissions:

- to support the Ten Year Assessment are due by January 31st each year; and
- to support the semi-annual assessments are due semi annually, two months before each capability period (August 31st and January 31st).

The Transmission Plan is an essential element for these forecast and assessment. The Transmission Plan is submitted to the NBSO by January 31st each year and updates submitted by August 31st each year.

The semi-annual and 10-year assessments use forecasts submitted by Load Serving Entities such as NB Power Distribution and Customer Service (See Appendix 1). Each forecast uses the expected load mix based on the aggregate mix of industrial, commercial and residential load and looks out 10 years. The forecast data is submitted to the NBSO in accordance with Market Procedure 10.

In performing each 10-year forecast and assessment, NBSO determines the expected requirement for capacity for the Balancing Area in order to maintain the Adequacy of the Integrated Electricity System for each year covered by the forecast and assessment.

NBSO initially defines and publishes the *Capability Periods* for each year of a four-year period. Thereafter, NBSO, in association with each 10-year forecast and assessment, defines and publishes the Capability Periods for one additional year such that at any given time *Capability Periods* have been defined for each year of a four-year period.

In association with the most recent semi-annual forecast and assessment that is available six months prior to the commencement of a given Capability Period, NBSO determines the capacity required for Adequacy of the Integrated Electricity System for that Capability Period and allocates the capacity obligation.

Accredited Market Participants must submit evidence to the NBSO that they are able to meet their obligations at least 4 months prior to the start of a capability period. A list of accredited market participants is available on the NBSO website under the Market section.

New Brunswick Wholesale Customers and Large Industry are customers of NB Distribution and Customer Service and are included in the forecast submitted to the NBSO.

Prince Edward Island and Northern Maine each do their own resource planning and submit their plans to the NBSO for inclusion in the evaluation of the Planning Coordinator Area.

"Capability Periods" are published on the NBSO website (operations-news-market calendar)

Sample:

Calendar of Capability Period Dates

Winter 08/09	Nov. 1, 2008	Mar. 31, 2009
Summer 09	Apr. 1, 2009	Oct. 31, 2009
Winter 09/10	Nov. 1, 2009	Mar. 31, 2010
Summer 10	Apr. 1, 2010	Oct. 31, 2010

On a semi-annual basis, an assessment of seasonal forecast is conducted of all Operating Authorities within the Maritimes *Area*. The semi-annual assessment is conducted in accordance with NPCC Procedure C-13 "Operations Planning Coordination". Any outage affecting a TTC is posted.

Short term transmission planning (next 18 months) is carried out through the Outage Coordination process in accordance with NBSO standard operating practice "SOP-T0007 Outage Coordination". All Category 1 and Category 2 elements are identified and posted accordingly.

Category 1 Elements

Elements or combination of elements, that, when out of service, impose limits on interconnection interfaces. Proposed outage dates must be posted on the NBSO web site.

Planned outages will be identified in the long-term outage plan (rolling 18 months period) and the monthly plan (rolling 28 days period). The NBSO Transmission Outage Planning Coordinator is advised of any outage requirement known to be coming in the next 24 months.

Category 2 Elements

Elements when out of service:

- Require specific generators on or off-line; and
- Restrict generator output or restricts a generators ability to provide ancillary services (Reserve, Automatic Generation Control, voltage support, generation rejection, etc).

Proposed outage dates must be posted on the NBSO web site.

5.0 Resource Adequacy Evaluation Process for the Maritimes Area

Resource adequacy evaluations for the *Maritimes Area* are performed in accordance with guidelines outlined in NPCC Document B-8 "Guidelines for Area Review of Resource Adequacy." Those responsible for performing the studies are the Maritimes Area representatives (including one from NBSO and one from Nova Scotia) on the NPCC CP-8 Working Committee – Review of Resource and Transmission Adequacy.

The types of studies performed include a full comprehensive review called the Triennial Review of Resource Adequacy. This review is performed every three years. An "Interim Review of Resource Adequacy" is performed in each year that there is not a Triennial Review, and it covers, at a minimum, the remaining years of the most recent Triennial Review.

6. 0 Transmission Plan

6.1 General

To comply with the Market Rules, Transmission Planners must create a 10 year plan to be submitted to the NBSO by January 31st of each year. The "Transmission Plan" is incorporated in the NBSO annually published "Ten Year Assessment" which is subject to the governance of the Planning Advisory Committee (PAC as discussed in section 9.0).

The first five years of the Transmission Plan complies with NPCC Criteria requiring an annual transmission review as well as a comprehensive review (including dynamics) every five years. Any major transmission or generation projects in either the NBSO footprint or in the adjacent Reliability Coordinator areas will trigger a specific study (load-flow, dynamics, and SPS actions) to verify that there will not be detrimental effects on the power system.

6.2 Scope of the Transmission Plan

The Transmission Plan shall provide an assessment of the Transmission System needs in a consolidated manner, and is designed to maintain the reliability of the Transmission System in an economic and environmentally acceptable manner. The Transmission Plan will be developed to meet the specific service requests of Transmission Customers and otherwise treat similarly situated customers comparably in transmission system planning.

6.3 Contents of the Transmission Plan

The Plan shall utilize at least a ten year planning horizon, and reflect at least ten year capacity and load forecasts. The Plan will be published as part of the "Ten Year Assessment" and be subject to consultation with all stakeholders (see Planning Advisory Committee Section 9.0).

The Transmission Plan shall reflect transmission enhancements and expansions, load and energy forecasts, including expected demand response, and generation additions and retirements for at least the ensuing ten years. The Transmission Plan shall identify, based on the results of the planning studies a list of proposed transmission enhancements and expansions for at least each of the ensuing ten years that are determined to be appropriate at the time of the issuance of the Transmission Plan. The Transmission Plan also shall include a list of transmission enhancements and expansions identified in the prior Transmission Plan that have not been completed at that time.

6.4 Transmission Studies

Transmission Planners shall conduct studies for the development of the New Brunswick Transmission Plan.

System studies are carried out by Transmission Planners in accordance with NPCC Criteria and the NERC Standards. An annual intermediate transmission review is carried out and a comprehensive review (including dynamics) is carried out every five years.

Required studies, assumptions and methodology are contained in document TPR-001.1 "Transmission Planning Performance Requirements".

The NBSO shall identify on its website an individual or individuals to be the technical point of contact regarding questions about the modeling criteria, assumptions, and data underlying the Transmission Plan contained in the "Ten Year Assessment".

6.5 Other Principles

The Transmission Plan shall be designed and implemented to:

- avoid unnecessary duplication of facilities;
- avoid the imposition of unreasonable costs upon the Transmission Provider and customers; and
- take into account the legal and contractual rights and obligations of the Transmission Provider and the transmission-related legal and contractual rights and obligations of any other entity; and provide for coordination with existing transmission systems and with appropriate interregional and local expansion plans**.**

6.6 Status of Identified Upgrades or Alternatives

The status of upgrades or alternatives identified in the Transmission Plan shall be reflected in future plans. NBSO will post annually, as part of the "Ten-Year Assessment" the status of upgrades and alternatives identified in the Transmission Plan on the NBSO internet website. The "Ten-Year Assessment" is published annually and includes this information.

Transmission Planners will provide such notification of updated status only to the extent there are upgrades or other alternatives identified by a Transmission Plan for which notification of in-service status has not previously been provided. The status of identified upgrades or alternatives will be reflected in future plan development (i.e., whether the upgrade or alternative is in-service, under construction, planned or proposed).

6.7 Procedures for Interim Modification to the Plan

The Transmission Planner may modify the Transmission Plan on an interim basis, as necessary, to reflect additions or removal of transmission upgrades. NBSO will notify the Planning Advisory Committee (see section 8.0) of major changes.

6.8 Coordination of Transmission Plans

6.8.1 Coordination Committees

The Transmission Plan shall be developed in coordination with other Maritimes Area Transmission plans, ISO-NE and Quebec regional transmission plans. Representatives of such entities shall have the opportunity to participate in the Planning Advisory Committee and be invited to attend PAC meetings and the NBSO Energy Conference.

NBSO will chair a "Maritimes Area Technical Planning Committee" to specifically share area transmission plans. The committee will have representation from the NBSO, NBPT, NSPI, MECL and Northern Maine. The committee shall meet as required, prior to their own annual review, to ensure transfer limits are as expected (See NBSO-TPR-001.2 Maritimes Area Technical Planning Committee). The "Maritimes Area Technical Planning Committee" reviews any constraints that have been identified by their internal Transmission Studies and can recommend joint studies for projects impacting transfer capabilities.

6.8.2 Regional Coordination (NPCC)

The NBSO and Transmission Planners are involved with various NPCC task forces and working committees dealing with resource adequacy and transmission reliability.

NPCC Committee	Function
TFSS - The NPCC Task Force on System Studies	Overall coordination of system studies of the reliability of the interconnected bulk power system
SS37 - Base case Development Working Group (reports to TFSS)	Development of designated power flow base case models including the dynamics data
SS38 - Inter-Area Dynamic Analysis Working Group (reports to TFSS)	Analyze dynamic phenomena which may affect interconnected system reliability
TFCP- Task Force Coordination Planning	Reviews of the *Basic Criteria for the Design and Operation of Interconnected Power Systems* (Directory #1), of other NPCC criteria, guidelines, and procedures related to planning
NPCC CP-8 Working Group - Review of Resource and Transmission Adequacy. (Reports to TFCP)	Comprehensive and Interim Reviews of Resource Adequacy.
NPCC CP-10 Working Group	Study impacts of Transmission Plans
NPCC CP-11 Working Group	Review NPCC A-02 and propose required changes to TFCP
NPCC CO-12 Operations Planning	Carry out NPCC seasonal assessments

7.0 NBSO Planning Studies

7.1 Initiating Studies

The NBSO as Transmission Service Provider shall initiate system enhancement and expansion studies if:

- required to address a need identified by a Transmission Planner in its on-going evaluation of the Transmission System's economic and operational adequacy and performance;
- required as result of Transmission Planners assessment of the Transmission System's compliance with NERC and/or NPCC reliability requirements, or constraints or;
- available Transfer Capability shortages are identified by a Transmission Planner, possibly as a result of generation additions or retirements, or evaluation of load forecasts; and

- a planning study also may be initiated for any other circumstances which may warrant such a study.

7.2 Scope of Studies

In general, enhancement and expansion studies shall include:

- An identification of existing and projected limitation on the Transmission System's physical, economic, and/or operational capability or performance, with accompanying simulations to identify the costs of controlling those limitations.
- Evaluation and analysis of potential enhancements and expansions, including alternatives thereto, needed to mitigate such limitations.
- Identification, evaluation and analysis of potential enhancements and expansions for the purpose of supporting competition on the Transmission System.
- Engineering studies needed to determine the effectiveness and compliance (with reliability and operating criteria) of recommended enhancements and expansions.

7.3 Planning Studies to Evaluate Potential Upgrades or Other Investments

NBSO shall undertake planning studies on behalf of native load or OATT customers. Planning studies shall evaluate potential upgrades or other investments that could reduce congestion or integrate new resources and loads on an aggregated or regional basis. Generally, the studies will be conducted in connection with other planning studies.

Alternatives for each reliability and/or economic driven upgrade will be evaluated using least-cost planning principles. Where several proposals satisfy an identified need, are equal in reliability benefits and cost planning principles, then the choice will be made in accordance with the New Brunswick Electricity Market Rules Chapter 9 section 9.4 "Evaluation of Proposals to Alleviate Transmission Constraints"

Within the budget of the NBSO, NBSO and the PAC, together, shall identify studies, that will be performed on behalf of stakeholders within a calendar year.

7.4 Requests

Stakeholders may submit written requests for planning studies to NBSO. Such requests shall specify in detail the specific proposed project to be the subject of the requested planning study. Requests for such studies to be considered in the development of the current plan must be received by April 1 of the year of the plan. Requests received after that date will be considered for the development of subsequent plans, unless withdrawn by the requester. The requests shall be posted on the NBSO website, subject to the confidentiality provisions. NBSO shall respond within 30 days of receiving the request, to confirm receipt of the request and inform the requester whether the request is deficient.

Stakeholders requesting planning studies shall be responsible for the costs associated the study. A deposit of 25% of the estimated study cost shall be provided by requester prior to initiation of such study. At the completion of the study, Transmission Provider shall either refund the amount of deposit in excess of the costs of the study or collect from the requester the amounts of the study costs in excess of the deposit.

7.5 Clustering of Studies

At the discretion of the NBSO, such studies shall be clustered or batched or incorporated with the other planning studies.

7.6 Data Requirements

Requesting parties with unique economic planning studies shall be required to provide data as required by the NBSO. To the extent NBSO deems appropriate, NBSO shall use generic industry data in place of customer specific data.

8.0 Methodology, Criteria, Process for Developing the "Ten Year Assessment"

8.1 Intent of the Ten Year Assessment

The "Ten-Year Assessment"- an Assessment of the Adequacy of Generation and Transmission Facilities in New Brunswick is produced by the NBSO Power System Engineering department and published on the NBSO Website under "Public and Media-Recent announcements". The intent of the "Ten-Year Assessment" is to inform stakeholders of the current and future outlook for the market and for the adequacy of the electricity system. The report forms a baseline plan using committed supply resources and recommended transmission plans for new projects and transmission upgrades that may be required. With this information, Market Participants will be able to assess potential market opportunities for themselves and their customers from a common base.

The preparation and publication of these forecasts and assessments also fulfils the NBSO obligations in this respect arising from its participation in NPCC and NERC.

The timely and accurate inputs by Market Participants, Transmitters and Connection Applicants are essential to NBSO timely preparation of accurate forecasts and assessments, and therefore to the economical maintenance of the Reliability of the Integrated Electricity System.

The "Ten-Year Assessment" shall identify economically justified enhancements, expansions, or system reinforcements that relieve transmission constraints. The evaluation shall be premised on the goals of maintaining reliability and reducing congestion where economically justified. This evaluation will be carried out with participation of Market Participants via a Planning Advisory Committee (PAC) as outlined in section 8.0.

A consultation meeting of the PAC will be held to present the "Ten Year Assessment". Such meeting may be held in person, or via teleconference, electronic mail, or other written means, at the discretion of NBSO.

8.2 Process Diagram

The flow chart provided in Appendix 1 summarizes the steps for producing the Ten-Year Assessment.

8.3 Development of the Ten Year Assessment

NBSO shall be responsible for the development of the "Ten-Year Assessment" in accordance with Market Procedure MP-10 and for seeking expressions of interest for alternate proposals or request for proposals in accordance with Market Procedure MP-22.

The PAC shall provide input and review drafts. NBSO will give final approval to the "Ten-Year Assessment".

9.0 Planning Advisory Committee (PAC) for New Brunswick

9.1 Proposals to Address System Adequacy Issues

The 'Ten-Year Assessment" includes an assessment of the potential need for investments in transmission facilities and other actions that may be required to maintain reliability of the grid, to improve performance of the market, and to reduce the costs associated with transmission constraints on the transmission system. Under Market Rule 9.4, and Market Procedure MP-22 "Proposals to Address System Adequacy Issues" third parties may contact NBSO to indicate interest on the projects identified in this report, or they may

propose alternative solutions to these projects that may include, but are not limited to, transmission, generation, distribution, and energy efficiency projects.

Where NBSO has identified in an annual assessment a need to alleviate an existing or emerging Transmission constraint it shall develop, in consultation with Transmitters and Market Participants, and interested parties, as appropriate, technically feasible options for alleviating the Transmission constraint and commence a process to satisfy that need by issuing a request for proposals to implement one or more technically feasible options for alleviating the existing or emerging constraint in accordance with the New Brunswick Electricity Market Rules Chapter 9.0 "Transmission System Planning, Investment and Operations" and Market Procedure MP-22 "Proposals to Address System Adequacy Issues".

9.2 Role of PAC

The PAC role is to provide input and feedback to the NBSO during the development of the "Ten Year Assessment". This input and feedback shall be provided through meetings, which may include meetings held via email or through other written means.

9.3 Establishment of the PAC

NBSO shall solicit Market Participants, Transmission Customers and other interested parties, including, but not limited to electric utility regulatory agencies, to provide information required by, or anticipated to be useful to, the NBSO in its approval process of the solutions to needs identified in the Ten-Year Assessment. This will be achieved by their participation as PAC members at PAC meetings.

Any of these entities may designate a member to the PAC by providing written notice to NBSO identifying the name of the entity represented by the member, the members name, address, telephone number, facsimile number, and electric mail address. The entity may

remove or replace such a member at any time by written notice to the NBSO. Each entity that participates in the PAC shall have one member of the committee. NBSO shall act as the facilitator of the PAC. Notices to the NBSO pursuant to this section shall be provided to the NBSO representative identified on the NBSO internet website.

Whereas the New Brunswick Market Advisory Committee, as part of it's mandate, is to act in an advisory position for issues pertaining to the functions of the NBSO under the Act, the Market Rules and the Open Access Transmission Tariff (OATT), the Market Advisory Committee members will also be PAC members. The Market Advisory Committee has representation from:

- NB Generation
- NB Power Nuclear
- Independent Generators
- Alternate Energy Suppliers
- Marketers
- Transmission Customers
- Transmitters
- NB Power Distribution and Customer Service
- Non NB Power Distributors
- Large Industry Self Generation
- Environment Interest
- Energy Efficiency & Conservation Agency
- NBSO
- Large Industry

9.4 Meetings

9.4.1 Frequency of Meetings

The PAC, at a minimum, shall hold meetings biennially. Members shall be able to attend meetings in person or via teleconference. To the extent additional meetings may be warranted, such meetings may be held in person, or via telephone conference, electronic mail, or other written means. For example, certain meetings, if appropriate, may consist of NBSO soliciting written comments via email or other written means; and the PAC providing such written comments, if any, to the NBSO.

A meeting shall be held:

- as specified in the development of the preferred transmission plan as described in MP-22;
- when the Transmission Provider deems a meeting is necessary, either upon its own or other entity's request; or
- at the request of a majority of the PAC.

9.4.2 Notice of Meetings

NBSO shall provide notice of the PAC meetings by electronic mail to members of the Planning Advisory Committee and shall post notice on the NBSO internet website under 'News". Such notice shall be provided at a minimum one week prior to the meeting. A calendar of meetings and other significant events in the Transmission Planning Process shall be posted.

9.4.3 Purpose of Meetings

The PAC meetings shall provide an opportunity for the committee members to provide input regarding:

- data gathering and customer input into study development;
- review of study results;
- review of draft transmission plans

9.4.4 Mechanism to Invite Affected Entities to Participate in Meetings

If the NBSO or members of the PAC identifies particular entities that may be affected by the development of potential projects, or other significant events, identified in the planning process, NBSO shall notify the entity and invite them to participate in the related planning meetings.

Additionally, NBSO will present highlights of the "Ten Year Assessment" at the annual NBSO Energy Conference.

10.0 Disclosure of Criteria, Assumptions, and Data

10.1 Availability of Information

NBSO shall make available to the Planning Advisory Committee, subject to applicable confidentiality in accordance with the NBSO Market Rules Chapter 3.0 Market Administration, section 3.7 "Disclosure, Access To and Confidentiality of Information" and Market Procedure MP-06 Confidentiality a description of how its assumptions regarding transmission, generation, and demand resources are developed, including details regarding the types of resource, rating and other operating information. Such information shall be available to customers and other stakeholders at all stages of the planning process.

10.2 Discussion of Assumptions

Members of the PAC shall have the opportunity to question and discuss principal assumptions used in the planning process. The process shall be through meetings of the PAC.

11.0 Cost Allocation of New Facilities

11.1 Economic and Reliability Projects

The costs of reliability projects that are identified in the planning studies shall be allocated to all Transmission Customers consistent with section 19.2 of the NBSO Tariff.

The costs of economic projects that specifically benefit individual customers that are identified in the planning studies shall be allocated to the entities that benefit from the projects.

11.2 New Facilities Identified Through Requests for Service

The costs of new facilities required because of individual requests for service shall be allocated pursuant the applicable Tariff procedures governing such requests for service.

11.3 Stakeholder Involvement in Cost Allocation Process

NBSO shall determine, with input from the Planning Advisory Committee, what projects are reliability and economic projects.

12.0 Recovery of Planning Costs

12.1 Transmission Provider's Planning Costs

NBSO planning costs shall be recovered in accordance with section 19.2 of the NBSO OATT.

13.0 Confidentiality

13.1 Confidential Information

Information disclosed or provided by a Market Participant, a Transmitter or NBSO is to be treated under the rules of confidentiality established in Market Procedure 6.0 "Confidentiality".

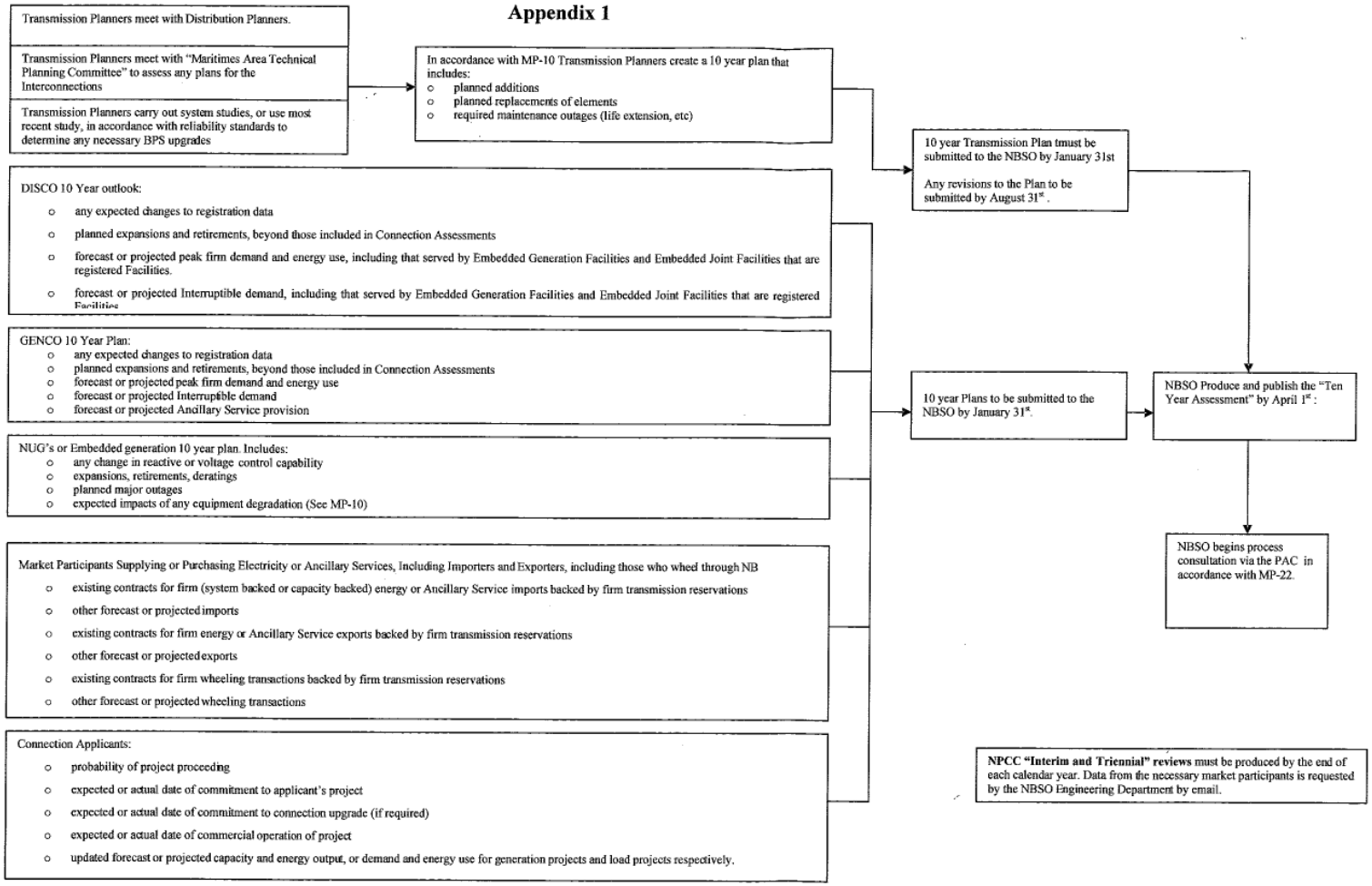
13.2 Disclosure to New Brunswick Energy Utilities Board, its Staff, and Other Authorized Parties

If the EUB or its staff, during the course of an investigation, requests information from NBSO that is otherwise required to be maintained in confidence, the NBSO shall provide the requested information to the EUB or its staff, within the time provided for in the request for information. In providing the information to the EUB or its staff, NBSO must request that the information be treated as confidential and non-public by the EUB and its staff and that the information be withheld from public disclosure. To the extent applicable, NBSO shall provide notice to the party that provided the confidential information to NBSO when it is notified by the EUB or its staff that a request to release confidential information has been received by the EUB. Requests from federal or provincial regulatory bodies conducting a confidential investigation shall be treated in a similar manner, consistent with applicable provincial rules and regulations.

14.0 Retention of Documentation

The Planning Authority, Transmission Planner, Generator Owner, Transmission Owner, Load- Serving Entity, and Distribution Provider shall each retain its documentation (of its evaluation of the reliability impact of the new facilities and their connections on the interconnected transmission systems) for three years and shall provide the documentation to the Regional Reliability Organization(s) and NERC on request (within 30 calendar days).

APPENDIX 1
Planning Flow Diagram



APPENDIX 2
LOAD FORECASTING

NBSO Load Forecast

NBSO uses MetrixND models to forecast average and peak hourly residential load for the province. The industrial load is forecasted separately because it is not affected by weather. Four separate MetrixND models are used for short term load forecasting – average and peak day ahead model and average and peak hour ahead model.

Day Ahead

The day ahead models are used to forecast from the next day to 28 days out from the current day. Each day a five day forecast is run and a 28 day forecast is run and published weekly. Day ahead models are trained on 5 years of load and weather history data and consist of a daily energy neural net model and 24 hourly regression models. The average and peak models are the same but are trained on average or peak data. The peak data is then compared to the average data in order to create a peak delta that determines the peak value when adjustments to the average forecast are complete. These models take into account dry bulb temperature, dew point temperature, opacity, wind speed, day of the week, season, holidays, sunrise and sunset. Weather actual is received hourly from a weather service and a 3 day "hourly weather forecast" is received twice daily. The day ahead models are run and adjusted by the Power System Operations group in the morning on business days.

Hour Ahead

The hour ahead models are automatically run each hour at 23 minutes past the hour and forecast 4 hours at a time. Like the day ahead models, the peak and average models are the same models

trained on different data. This allows calculation of the peak delta which is used to calculate the peak forecast when adjustments to the average forecast are complete. The hour ahead models are very similar to the day ahead models with 2 exceptions:

1. The hour ahead models do not use a daily energy model (just 24 regression models – 1 for each hour)
2. The hour ahead models use lag load data. They use actual load values from previous hours in their calculations

The output from these models is adjusted hourly, as required, by the NBSO Energy Coordinator.

New Brunswick Power Distribution and Customer Service Corporation Forecast Methodology

DISCO currently serve 99.8% of New Brunswick customer load, except for Perth Andover whose 0.2% of New Brunswick load is served by WPS Energy Services Inc. in Maine. Each year DISCO prepares a load forecast that represents the long term projection of in-province customer requirements for demand and energy.

Disco's load forecast is prepared based on a cause and effect analysis of past loads and trends. The cause and effect analysis is combined with data gathered through customer surveys and assessments of economic, demographic, technological and other factors that will affect the utilization of electrical energy.

Energy requirements and the peak hour demand are primarily affected by weather conditions, the most significant being temperature, and industrial customer operations. The energy forecast is based on 30-year average temperatures (1971-2000). The annual demand forecast is based on the historical weighted average temperature at time of peak (-24°C). A customer-by-customer forecast of some 40 industrial transmission customers over the forecast period allows for the inclusion of major industrial load additions and closures in the forecast.

For forecasting purposes, New Brunswick's electrical requirements are divided into three main groups: residential, general service, and industrial. The residential classification includes year-round and seasonal households, churches, and farms. The general service classification comprises mostly commercial and institutional establishments. The industrial classification is for customers involved in the extraction of raw materials or in the manufacturing and processing of goods.

The residential, general service and industrial forecasts are separated into six customer classifications - Residential, General Service, Street Lighting, Industrial Distribution, Industrial Transmission, and Wholesale (includes the sales to the preceding five classifications by municipal utilities in the cities of Saint John and Edmundston).

Residential Forecast

The forecast for the total residential class is based upon an end use model that requires identification of the various applications of electricity. These applications include space heating, water heating and other household appliances. The penetration (saturation) level and the average use for each household application provide the basis for average use per customer. The number of customers is based on an analysis of population trends and historical growth in the number of customers.

General Service Forecast

The general service econometric model relates changes in the level of sales to changes in the provincial GDP, the number of heating degree days, the real price of electricity, and the previous year's level of sales.

A forecast of gross domestic product growth is prepared, based on a review of publicly available forecasts by major financial institutions. Heating degree days is based on the weighted average

provincial total for the 30-year period 1971 to 2000. Price effects are based on anticipated real price increases in general service rates over the forecast period and historical price elasticity of the class.

Industrial Forecast

Industrial electric energy requirements are based on a forecast of goods producing gross domestic provincial product and its historical relationship with electricity requirements. The Industrial Transmission forecast also incorporates known load additions and closures based on a customer-by-customer forecast of some 40 customers served at transmission voltages.

Both firm sales and non-firm sales are forecasted. While non-firm energy and demand are included in the forecast of in-province requirements, they are excluded for capacity planning purposes.

Forecast Adjustments

The load forecast provides for the effect of natural gas (first available in 2001), energy efficiency and price elasticity that is not included in historical sales and the models.

Specific estimates for natural gas are included for each sector. The estimates are based on analyses of the proposed pipeline routes, the population densities along those routes, and the characteristics of the electric sales in each sector with respect to the potential for replacement by another fuel (fuel switching).

The forecast also includes estimates of energy efficiency measures. The impact of improving construction standards in the residential sector is expected to increase the thermal shell efficiency of homes in the province.

In the general service sector, reductions are also made to reflect the effect of economically attractive energy efficiency initiatives. Savings from Efficiency NB programs are included in the General Service and Industrial forecasts.

The forecast includes estimates of the effect of changes in price for both residential and general service. The price elasticity adjustment is based on anticipated real price increases in rates over the forecast period.

System Losses

Energy losses on the transmission system are forecast based on the Open Access Transmission Tariff (OATT) being applied to the total amount of energy delivered in-province over the system.

Distribution losses are forecast based an analysis of the energy supplied over the distribution system compared to the billed distribution sales.