



NPCC 2011 Summer Reliability Assessment Summary Report

Adequate Summer Electricity Supplies Projected

Summer 2011 Reliability Assessment Overview

The comprehensive reliability assessment conducted by the Northeast Power Coordinating Council, Inc. (NPCC) projects that the region will have an adequate supply of electricity this summer.

A wide range of assumptions were analyzed, including extreme weather conditions derived through over 40 years of experience, unexpected plant outages, transmission constraints between and within regions, implementation of operating procedures and estimated impact of demand response programs.

The assessments indicate that the NPCC geographic area (consisting of the six New England states, the State of New York, Ontario, Québec and the Canadian Maritime Provinces of New Brunswick and Nova Scotia) will have a sufficient supply of electricity even during periods of extreme weather or severe system conditions.

Extreme weather conditions are considered to be wide-spread and prolonged heat waves with high humidity and near record temperatures.

Severe system conditions considered in this assessment included in-service delays of planned units and transmission facilities, extended unit maintenance, higher than expected unit outages, reductions in the success of demand-response programs and operating limitations assumed in neighboring regions.

Only under the unusual situation where this severe set of system conditions occur coincidentally with extreme weather conditions would the implementation of a limited number of operating procedures and programs be anticipated in the New York City vicinity and New England to keep electricity supplies and demand in balance.

Summary of Key Findings

3,483 MW of new capacity since last summer, plus another 1,218 MW is scheduled to be in service over the course of the summer period for a total of 4,701 MW. No delays to the in-service dates of new generating capacity are anticipated.

For New York City and throughout New York State, an adequate supply of electricity is forecast this summer. Since the summer of 2010, 1,328 MW of additional resources have been added or are scheduled to be added to the New York system. There were four retirements in New York during the winter of 2010-2011; Greenidge 4 (106 MW), Westover 8 (81 MW), Norcon - Energy Systems North East (79 MW) and Project Orange 1&2 (40 MW) for a total of 306 MW of retirements.



NPCC 2011 Summer Reliability Assessment Summary Report

Ontario is projected to have a sufficient supply of electricity this summer. Since the summer of 2010, 1,112 MW of additional resources have been added or are scheduled to be added to the Ontario system. Four coal units were retired, representing a total of 1,950 MW. By the end of the summer period, the installed capacity will increase by 390 MW. This increase consists of 2 MW from a new pollution control plant, 15 MW from a new biomass co-generation facility and 373 MW (nameplate) of new wind facilities. Any delays to the scheduled start of new generation in Ontario are not expected to significantly impact the province's capacity outlook for the summer period.

New England expects to have a sufficient supply of electricity this summer under normal weather conditions. Since the summer of 2010, 836 MW of new generating capacity has been added to the New England system; 60 MW of additional generation is expected over the summer.

Québec and the Canadian Maritime Provinces have more than an adequate supply of electricity forecast for the summer period. Both of these areas are winter peaking. Normal hydro conditions are expected for the 2011 summer period.

Hydro-Québec Production will be commissioning three Eastmain-1-A 256 MW units, one each in June, July and August, totaling 768 MW. Finally, Unit A-4 (150 MW) at Tracy oil-fired generating station has been retired. Tracy's installed capacity is now 450 MW.

The Maritimes experienced a net increase of 207 MW of nameplate installed wind generation since the summer of 2010. Since last summer, a coal fired plant (57 MW) has been retired and a 96 MW oil- fired unit is scheduled to be retired on May 31, 2011. The Pt. Lepreau nuclear unit remains on scheduled outage through October 1, 2012.

Projected NPCC Load

The non-coincident (sum of the individual NPCC area) forecast peak demand for NPCC during the summer of 2011 is 110,668 MW (June – September period). The forecast coincident peak demand for NPCC for the summer of 2011 of 108,446 MW is expected to occur during July. This forecast is 515 MW (~ 0.5%) higher than last year's forecast coincident NPCC peak demand of 107,931 MW. Several factors drive the summer peak demand forecast. The forecast reflects the gradual economic recovery that is underway combined with the continuing beneficial reliability impact of conservation, efficiency and demand response programs.

Nevertheless, ambient weather conditions remain the dominant variable in forecasting peak demand during the summer months. Historically, the peak loads and temperatures between New England and New York have a high correlation due to the relative locations



NPCC 2011 Summer Reliability Assessment Summary Report

of their respective load centers. Depending upon the extent and duration of a summer weather system, there is a potential for the Ontario summer peak demand to be coincident with New England and New York.

New England

The Independent System Operator of New England's (ISO-NE's) forecast summer 2011 peak demand is 27,550 MW, assuming historically-based expected summer peak weather conditions. The 2011 forecast of peak demand is 360 MW (~ 1.3 %) higher than the 2010 forecast of 27,190 MW.

New York

The forecast peak load for summer 2011 by the New York Independent System Operator (NYISO) is 32,712 MW, which is 313 MW (~ 1.0 %) lower than the forecast of 33,025 MW of summer 2010.

Ontario

The 2011 summer peak Ontario demand forecast by the Ontario Independent Electricity System Operator (the IESO) for 'weather normal' conditions is 23,561 MW, and includes the reductions associated with planned conservation. The forecast is essentially the same as last summer's forecast 'weather normal' peak demand of 23,556 MW.

Québec

The forecast 2011 summer peak load for Québec is 21,283 MW for the week beginning August 7, 2011. The Québec overall June to September 2011 forecast is approximately 616 MW higher (~ 3.0 %) than the corresponding summer 2010 forecast of 20,667 MW. It should be noted, however, that Hydro-Québec's system is winter peaking. Since some heating load remains on the system in early May and picks up again in late September, the summer peak for Québec may occur around those times.

Maritime Provinces

A 2011 summer peak load of 3,553 MW is forecast for the Maritime Provinces for the week beginning September 25, 2011. The 2011 forecast peak is 57 MW (~1.6 %) lower than last year's corresponding (June to September) forecast summer peak of 3,610 MW. The Maritime Provinces are a winter-peaking area; forecast peaks for the shoulder months are normally higher than the summer period.



NPCC 2011 Summer Reliability Assessment Summary Report

Transmission and Resource Adequacy Summary

NPCC 2011 Summary

During the NPCC forecast coincident peak load week (beginning July 17, 2011), the overall spare operable capacity (capacity over and above reserve requirements) for NPCC is estimated to be 16,379 MW. A portion of this spare operable capacity is in the Québec and Maritime Provinces. The transfer capability between the Québec and the Maritimes Provinces to the remainder of NPCC will not permit the usage of all this forecast spare operable capacity. As a result, the spare operable capacity margin is reduced by 575 MW resulting in an adjusted spare operable capacity margin of 15,804 MW.

The week beginning July 10th represents the week with the lowest forecast operable capacity margin (spare operable capacity less transfer capability limitations); 15,455 MW is estimated to be available. This is not the same week of the forecasted NPCC coincident peak demand. By comparison, in last year's assessment, the corresponding amount for the week with the lowest forecast operable capacity margin was 11,256 MW.

The sizeable operable capacity margins forecast for NPCC this summer tend to counteract any negative impacts that delays to the facilities described below could have to the overall NPCC reliability assessment.

New England

Based on the 2011 load forecast (50% chance of being exceeded) and projected available capacity for the summer 2011 period, weekly operable capacity margins ranging from 1,102 MW to 4,316 MW are projected. These margins do not include the short-term capacity and energy purchases from neighboring systems that are anticipated to be available.

Under the extreme demand forecast (10% chance of being exceeded), projected operable capacity margins could be as low as -1,043 MW for the months of July and August. During periods when the operable capacity margins are negative, ISO-NE will have to implement ISO New England Operating Procedure No. 4 – Action during a Capacity Deficiency (OP-4).

Supply-Side Resources

Four projects involving up-rates to existing generation and new generation, totaling 836 MW, are expected to go on line in New England prior to the Summer Operating Period. If this capacity is not operational in time for the peak demand period, it is not expected to have a significant effect on the estimated operable capacity margins.



NPCC 2011 Summer Reliability Assessment Summary Report

ISO New England's total nameplate wind capacity is 224 MW, with 39 MW of that amount counted toward installed capacity. Of that 39 MW, 26 MW will have obligations in the New England Forward Capacity Market (FCM) beginning on June 1st.

Demand Response Resources

New England includes 2,035 MW of demand resources during the peak demand period of June through August. Included in that total are two types of demand resources with obligations in ISO New England's Forward Capacity Market (FCM): Active and Passive.

Active Demand Resources, which amount to 1,261 MW, include Real-Time Demand Response and Real-Time Emergency Generation. These active resources reduce load when ISO-NE forecasts and/or implements certain actions of ISO New England Operating Procedure No. 4- Action during a Capacity Deficiency.

The 774 MW of Passive Resources that have FCM obligations include On-Peak and Seasonal Peak Demand Resources, both of which reduce energy demand during peak hours, are non-dispatchable, and include on-peak and seasonal peak resources. On-Peak Demand Resources provide their load reduction during pre-defined peak weekday hours, and consist of measures that may not be weather sensitive such as reductions in lighting and motors. Seasonal Peak Demand Resources must reduce load during weekdays when the load is at least 90 percent of the 50/50 peak load forecast. They consist of non-dispatchable, weather-sensitive measures such as energy-efficient HVAC systems.

In addition to the reliability-based programs, ISO-New England also administers a Real-Time Price Response program. At the time of the 2010 peak demand, about 63 MW was enrolled in that program. Due to its voluntary nature, this program is not counted as capacity for the 2011 summer period.

Transmission

New England's 2010 Regional System Plan (RSP10) Report outlines a number of the ongoing transmission planning studies and projects that are taking place in New England. The report continues to describe the various areas of the region where transmission projects are needed for reliability. ISO-New England continually monitors transmission facility additions and coordinates outages in order to mitigate reliability risks that could be associated with changes in the transmission system.

A new 115 kV line will be installed between the Rumford and Rumford Industrial Park substations in Maine by summer 2011. This is a component of the Rumford-Woodstock-Kimball Road Project and addresses thermal and voltage issues in the Rumford area.



NPCC 2011 Summer Reliability Assessment Summary Report

A new 115 kV line will be installed between the King Street and West Amesbury substations in Massachusetts by summer 2011. This is part of the Merrimack Valley-North Shore Project that addresses various thermal and voltage issues in the northeast Massachusetts area.

Recently, the expansion of the Kent County 345/115 kV substation was completed in Rhode Island. The expansion included installing a second 345/115 kV autotransformer as part of the Greater Rhode Island Transmission Reinforcements that provides additional transformation in the area to address various thermal and voltage issues.

New York

The New York Independent System Operator (ISO) forecasts installed capacity of 40,717 MW for the peak week demand forecast of 32,712 MW. Accounting for purchases, sales, required operating reserve, planned and unplanned outages results in an operable capacity margin of 3,928 MW for the peak week.

These resources represent all generation capability located physically within the New York geographic area that is able to participate in the New York ISO installed capacity market.

Supply-Side Resources

Since the summer of 2010, 1,328 MW of additional resources have been added or are scheduled to be added to the New York system. There is 665 MW of new generation since last summer.

There were four retirements in New York during the winter of 2010-2011; Greenidge 4 (106 MW), Westover 8 (81 MW), Norcon - Energy Systems North East (79 MW) and Project Orange 1&2 (40 MW) for a total of 306 MW of retirements.

New York currently has 1,326 MW of installed nameplate wind capacity, of which 133 MW is assumed available during the summer peak demand period.

Demand Response Resources

The New York ISO has had two load response programs for the New York Market in place since May 2001. The Special Case Resources (SCR) and Emergency Demand Response Program (EDRP) are programs in which customers are paid to reduce their consumption by either interrupting load or switching to emergency standby generation when requested by the New York ISO.



NPCC 2011 Summer Reliability Assessment Summary Report

EDRP participants voluntarily curtail load when requested by the New York ISO. SCR participants must, as part of their agreement, curtail power usage, usually by reducing load when asked by the New York ISO.

Participation in the Emergency Demand Response Program (EDRP) and Special Case Resources (SCR) programs represents an additional 2,053 MW from SCR and 166 MW of EDRP load relief available under peak conditions.

Transmission

Consolidated Edison's M29 project and the NYSEG/RG&E Stony Ridge project are expected to be in-service for the summer 2011 operating period. The M29 project consists of a circuit from Sprain Brook 345 kV substation to a new substation, Academy 345 kV, then to two three-winding 345/138/13.8 transformers and two 138 kV PAR controlled transformers into Sherman Creek 138 kV. The NYSEG/RG&E Stony Ridge Project includes a new Stony Ridge 230 kV substation, which is located between the Canandaigua-Hillside 230 kV line, and a step-down 230/115 kV transformer into a new Sullivan Park 115 kV substation.

The South Mahwah–Waldwick J3410 line and the Watercure 345/230 kV transformer are also expected to be in-service for the 2011 summer period. The Norwalk Harbor–Northport 138kV 1385 NNC 601 cable is scheduled to return to service on June 30th 2011. The Beck–Packard BP76 circuit is expected to be out-of-service through the summer operating period. The effects of the continuing outage of the New York (Niagara) to Ontario (Beck 2) 230 kV tie line have been taken into account in this assessment.

Ontario

The Independent Electricity System Operator (IESO) of Ontario is anticipating an operable capacity margin of 4,522 MW on the peak week based on the forecast weather normal demands. The lowest operable capacity margin forecast is 4,355 MW for the week beginning July 10, 2011.

Even though the net margins are all positive for the Summer Operating Period, there are risks associated with this analysis. Actual demands may be more than expected due to extreme weather, generators on outage may not return to service as scheduled, or new generations may be delayed coming in service.

This estimate of the operable capacity margin does not consider all the additional off-market control actions available to the IESO. For example, the IESO can institute a 3%



NPCC 2011 Summer Reliability Assessment Summary Report

or 5% voltage reduction. These control actions can have the effect of reducing the demand by approximately 350 MW to 610 MW.

Supply-Side Resources

By the end of the summer period, the Ontario installed capacity will increase by 390 MW. This increase consists of 2 MW from a new pollution control plant, 15 MW from a new biomass co-generation facility and 373 MW (nameplate) of new wind facilities. Any delays to the scheduled start of new generation in Ontario are not expected to significantly impact the province's capacity outlook for the summer period.

Ontario presently has 1,413 MW of wind capacity of which 155 MW is assumed available during the summer peak demand period.

Demand Response Resources

Ontario utilizes demand response initiatives that consist of reliability and real-time price demand response programs. These include the Demand Response 3 (DR 3) program and the Peaksaver program.

The Demand Response 3 (DR3) program was developed in 2008 by the Ontario Power Authority (OPA) to provide an incentive for participants to lower consumption. DR3 is a contract based program where participants are required to reduce load when activated to receive an availability payment and utilization payment. Load reduction activation notices are sent to participants when a price threshold is exceeded and when the supply cushion falls below another threshold. DR-3 activation may not coincide with forecasted adequacy shortfalls. Currently, this program represents 286 MW of available load relief.

Peaksaver is an economic based demand response program created by the OPA to provide customers with an ability to manage demand during the pre-determined scheduled periods noted for high demand and tight supply. It is a voluntary program and does not involve any financial settlements. The program provides for up to 40 hours of Load Control Events (activations) annually for specific hours on business days between May 1 and September 30. Activations last up to four hours but can be longer to address reliability concerns. The program is triggered when the IESO declares any level of Energy Emergency Alert (EEA1, EEA2 or EEA3) and communicates it using the System Status Report. If required, the program can also be triggered by primary demands or temperatures above pre-determined levels, or at the IESO's discretion to deal with emergencies.



NPCC 2011 Summer Reliability Assessment Summary Report

Transmission

For the 2011 summer period, Ontario's transmission system is expected to be adequate. System enhancements planned for this summer include the installation of 230 kV Static Var Compensator (SVCs) at Detweiler Transformer Station (TS) by the end of June and at Nanticoke Thermal Generating Station by the end of September. These initiatives will further increase the reactive capability in southern Ontario to allow higher transfers from the west of the province towards the Greater Toronto Area.

Work at Milton substation to extend the 500 kV bus and add terminal breakers for two future Bruce -Milton 500 kV circuits is expected to be completed by mid May 2011. The new 230 kV Hurontario switching station and expanded 230 kV lines are now in service helping to alleviate loadings in the Greater Toronto Area.

A new SVC at Porcupine TS and series capacitors on the two Essa-Hanmer 500 kV circuits have been installed. The Porcupine SVC will improve the ability to maintain an acceptable voltage profile in the Northeast sub-area of Ontario. The increase in transfer capability between northern and southern Ontario attributed to the new series capacitors is waiting for finalized operating instructions.

As previously mentioned, the effects of the continuing outage of the New York (Niagara) to Ontario (Beck 2) 230 kV tie line have been taken into account in this assessment.

Phase angle regulators (PARs) are installed on all four of the Ontario – Michigan interconnections. One PAR, on Keith to Waterman 230 kV circuit J5D, has been in service and regulating since 1975. The other three available PARs, on the Lambton to St. Clair 230 kV (circuit L51D), the 345 kV circuit L4D and the Scott-Bunce Creek 230 kV (circuit B3N) remain idle. Although the operating agreements are now ready, the completion of the filing process with FERC and the Department of Energy may delay the in-service date for the remaining PARS until after the summer period. Although they are currently bypassed, these PARs can be placed in service and operated to control flows during emergency conditions.

Québec

The Province of Québec is winter peaking. Adequate resources are forecast to be available to serve summer peak demand and meet operating reserve requirements. Québec is projecting weekly operable capacity margins in the range of 3,073 MW to 5,754 MW for the summer of 2011.



NPCC 2011 Summer Reliability Assessment Summary Report

Supply-Side Resources

For the 2011 summer period, total installed capacity in Québec is expected to be 43,012 MW. Hydro-Québec Production will be commissioning three Eastmain-1-A 256 MW units, one each in June, July and August, for a total 768 MW. Finally, Unit A-4 (150 MW) at Tracy oil-fired generating station has been retired. Tracy's installed capacity is now 450 MW.

All of the wind capacity in Québec is generated by Independent Power Producers. The capacity now in service is 659 MW. This is entirely situated in the Matapédia region of the system — around the Gaspésia peninsula near the Gulf of St-Lawrence.

For this assessment, Québec did not assume any capacity from wind resources - the entire wind generation capacity is derated.

Demand Response Resources

The two interruptible load programs in Québec are available only during the winter period.

Transmission

No new significant transmission is being placed in-service during the 2011 summer period. However, a 1.0 km (0.6 mile) 315 kV double-circuit line to integrate the Eastmain-1-A generating station (768 MW) is expected to be in-service for the summer period along with the Generating Station. Also, a number of wind generation integration projects are presently ongoing for in-service dates around the end of 2011.

Maritimes

The Maritime Provinces are also winter peaking. Adequate resources are forecast to be available to serve summer peak demand and meet operating reserve requirements. The Maritimes forecast net weekly operable capacity margins ranging from between 32% to 47% (representing 1,220 MW to 1,651 MW) over the period May through September 2011.

Supply-Side Resources

The Maritimes experienced a net increase of 207 MW of nameplate installed wind generation since the summer of 2010. Since last summer, a coal-fired plant (57 MW) has been retired and a 96 MW oil-fired unit is scheduled to be retired on May 31, 2011. The Pt. Lepreau nuclear unit remains on scheduled outage through October 1, 2012.



NPCC 2011 Summer Reliability Assessment Summary Report

The Maritimes Area currently has approximately 774 MW of nameplate installed wind capacity. Since the summer 2010 period, there has been an additional 207 MW of new wind generation. After applying derates, the current installed wind capacity is 119 MW.

Demand Response Resources

The Maritimes is a winter peaking area and does not have any summer Demand Response Programs.

Transmission

The Maritimes transmission system is projected to be adequate to supply the demand requirements for the 2011 summer period. No major transmission additions are planned for the 2011 summer period.

Estimated Need for Operating Procedures

A wide range of assumptions were analyzed, including extreme weather conditions derived through over 40 years of experience, unexpected plant outages, transmission constraints between and within regions, implementation of operating procedures and estimated impact of demand response programs.

Figure 1 shows the expected use of the indicated operating procedures under the Severe Case assumptions and the extreme load level (which represents the second to highest load level, having approximately a 6% chance of occurring).

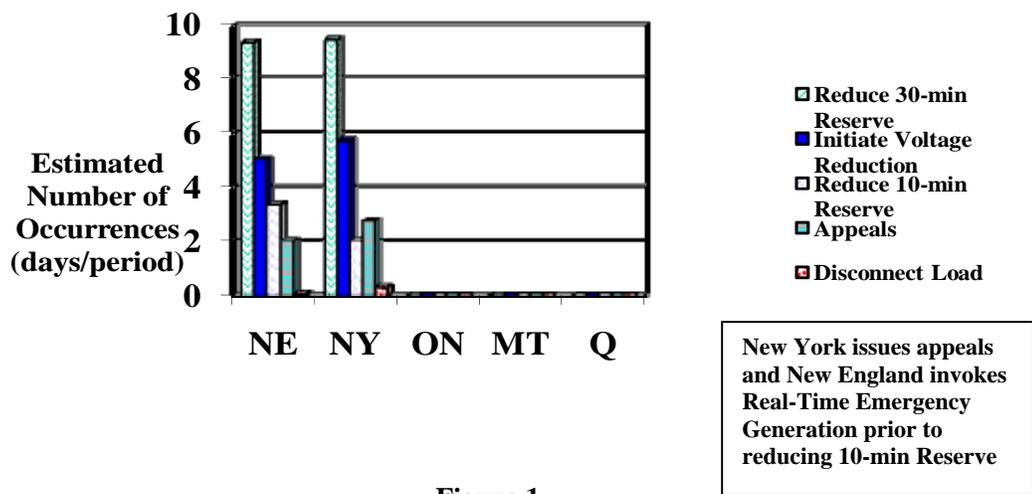


Figure 1
Range of the Expected Use of Indicated Operating Procedures for Summer 2011
Considering Severe Case Assumptions (May – September)
(Extreme Load Forecast)



NPCC 2011 Summer Reliability Assessment Summary Report

In the probabilistic assessment, chronological system histories were developed by combining randomly generated operating histories of the generating units with the inter-area transfer limits and the hourly chronological loads. Consequently, the system was modeled in great detail with accurate recognition of random events, such as equipment failures, peak load forecast uncertainty, as well as the deterministic rules and policies that govern system operation.

As shown in Figure 1, only if the severe set of resource unavailability assumptions used in this analysis all occur coincident with higher than expected loads (such as caused by a wide-spread, prolonged heat wave with high humidity and near record temperatures), would New York and New England experience conditions that could require use of their operating procedures designed to keep electricity supplies and demand in balance. For this unlikely simultaneous combination of extreme weather and severe system conditions, reducing the 30-minute operating reserve and voltage reductions would be more likely in the New York City vicinity and New England.

Operational Readiness

The Resource and Transmission Reliability Adequacy Assessments are key elements in determining NPCC's ability to meet the forecast demands of the summer period. To mitigate the uncertainty surrounding load forecasts, forced outages and other conditions that cannot be controlled or predicted, the NPCC Region is prepared to deal with contingencies in real time.

To be prepared to deal with the constantly changing operating conditions on the power system, as well as contingencies, NPCC routinely conducts daily and week-ahead planning calls between system operators and neighboring regions to coordinate short-term system operations.

NPCC continues to refine and expand its situational awareness capability to include wide-area visual displays of NPCC and its adjacent Regional Entities to further enable NPCC system operators and neighboring regions communicate current operating conditions and facilitate the procurement of assistance under emergency conditions.

Geomagnetic Storms

The Sun is now beginning to enter that period of the solar cycle where sunspot activity ramps up fairly quickly toward a maximum. This is not traditionally the time when the strongest solar flares and coronal mass ejections occur, but the uncertainty concerning space weather stability increases.



NPCC 2011 Summer Reliability Assessment Summary Report

The solar maximum, which is defined as that period of time when sunspot activity reaches a peak, is expected to occur during 2012 to 2013. Although sunspot numbers are correlated with increased solar flare activity, they are not as well correlated with disturbed space weather conditions affecting the Earth.

Past experiences have shown the serious effect that geomagnetic disturbances can have on the NPCC bulk power system. These effects can include transformer failures, and unintentional tripping of transmission lines (outages) due to geomagnetically induced currents (GICs).

NPCC has operating procedures in-place to mitigate the effects of GICs resulting from geomagnetic storms. NPCC system operators receive, on a continual twenty-four hour by seven day basis, the status of solar activity and geomagnetic storm alerts.

After reviewing the available data, the system operator evaluates the situation and enacts appropriate measures designed to protect system elements such as transformers, transmission lines, generators, and other critical facilities.

NPCC

NPCC is one of eight Regional Entities located throughout the United States, Canada and portions of Mexico. NPCC's geographic area includes the State of New York, the six New England states, Ontario, Québec, and the Canadian Maritime Provinces of New Brunswick and Nova Scotia.¹

NPCC coordinates international electric power grid reliability for Northeastern North America. NPCC annually performs comprehensive seasonal assessments of electricity supply and demand reliability for eastern Canada, New England and the City and State of New York. These assessments require months of detailed preparation and are performed with the participation of regional electricity power grid operators and planners.

Additional information regarding NPCC is available at: www.npcc.org.

¹ Includes the connected part of northern and eastern Maine.