

**NORTHERN MAINE INDEPENDENT SYSTEM  
ADMINISTRATOR**

**SEVEN-YEAR OUTLOOK:**

**AN ASSESSMENT OF THE ADEQUACY OF  
GENERATION AND TRANSMISSION FACILITIES  
ON THE NORTHERN MAINE  
TRANSMISSION SYSTEM**

**April, 2009**

## INTRODUCTION

The Northern Maine Independent System Administrator (“NMISA”) was created in 1999 in response to the mandate of the legislature of the State of Maine that effective retail electric competition be available to all of Maine’s electricity consumers by March 1, 2000.<sup>1</sup> The NMISA’s size, scope, purpose and electricity market were designed to facilitate the development and implementation of retail electric competition and foster regional reliability efforts in the electrically isolated area of the state in portions of Aroostook, Washington and Penobscot Counties. Northern Maine is characterized by low population density and a very low electric demand in comparison with other electricity markets.

The dominant characteristics of the Northern Maine Market are its electrical isolation, large geographic size, small electric demand, and modest population. The electric system in Northern Maine is not directly interconnected with the rest of New England, including any other Maine utility or any other domestic electric system. NMISA participants, therefore, are not participants in the New England Power Pool and are not subject to the control of ISO New England (“ISO-NE”). The region’s only access to the electric system that serves the remainder of Maine and the rest of New England is through the transmission facilities of New Brunswick Power (“NB Power”).<sup>2</sup> The New Brunswick System Operator (“NBSO”) is the Balancing Authority and Reliability Coordinator (“RC”) for the Balancing Authority Area that includes the Northern Maine and Maritimes regions.

The maximum peak demand for the NMISA region in 2008 was 131 MW, with a projected annual peak load growth of less than .5%. The 2008 energy consumed was 789,396 MWh. There are approximately 90,000 residents and approximately 42,000 electricity consumers in Northern Maine.

The NMISA is a Federal Energy Regulatory Commission (“FERC”)-approved independent system administrator and regional transmission group that encompass the transmission systems of all FERC-jurisdictional and non-jurisdictional utilities in Northern Maine. The NMISA operates as an independent, objective and non-discriminatory administrator of transmission access, transmission information access, and related functions, and monitors and operates the electricity markets in Northern Maine for energy, ancillary services, and other services. The NMISA is governed by a seven member stakeholder Board of Directors comprising representatives of MPS and Eastern Maine Electric Cooperative (“EMEC”), municipal utilities (Houlton Water Company (“HWC”) and Van Buren Light & Power District (“VBL&P”)), large customers, generators, Competitive Electricity Providers (“CEPs”), and the Maine Public Advocate as representative of all other retail electric consumers.

---

<sup>1</sup> P.L. 1997ch.316, 35-A M.R.S.A. §§ 3201, *et seq.*

<sup>2</sup> The NB Power transmission system connects to two 345 kV transmission lines one of which is owned and operated by Maine Electric Power Company (“MEPCO”). MEPCO is jointly owned by Central Maine Power Company (“CMP”), Bangor Hydro Electric Company (“BHE”), and Maine Public Service Company (“MPS”).

A Tariff and the Northern Maine Market Rules (“NMMRs”) govern the NMISA. NMMR 9, System Planning, sets forth provisions relating to the responsibilities for the NMISA, the Transmission Owners (“TOs”), the Demand-Side Management (“DSM”) program operators/providers, and the Generators in relation to the adequacy and reliability of the Northern Maine Transmission System (“NMTS”). NMMR 9.2, Long-Term System Planning, states that the NMISA will prepare a Base Case for the planned development of the NMTS for the following seven years, beginning April 1 of each year. The Base Case comprises four sections: Load Forecast, Generation Resources, Resource Adequacy, and Transmission Planning.

**LOAD FORECAST**

The load forecast for the region includes the combined loads of MPS, EMEC, HWC, and VBL&P. The average annual load growth for energy (MWh) from 2001 to 2008 was 0.05%. The peak demand (MW) annual load growth for same period was 0.10%. Both exclude the Perth Andover load in New Brunswick that is fed from the NMTS. Perth Andover was part of the NMISA system until January 1, 2005 when the NBSO assumed responsibility.

The forecast used in the Base Case includes an annual load growth of .5% resulting in 2009 projected energy load of 793,343 MWh. The remainder of the period was simply escalated by .5% per year, consistent with the growth for the past seven years. The peak load for each year was calculated using the seven-year average load factor of 67.27%.

Table 1 reflects the seven-year load forecast

**Table 1**  
**NMISA 7-Year Load Forecast**

<b>Year</b>	<b>MWh</b>	<b>Peak</b>
2009	793,343	134.6
2010	797,310	135.3
2011	801,296	136.0
2012	805,303	136.7
2013	809,329	137.3
2014	813,376	138.0
2015	817,443	138.7

**GENERATION RESOURCES**

**A. CURRENT RESOURCES**

Table 2 (below) lists the generation resources located on the NMTS. Northern Maine is unique in that it receives most of its generation from renewable resources. The majority of the generation consists of three biomass plants and several hydropower facilities. However, for one

of the biomass plants, Boralex Sherman, the PURPA contract with MPS terminated December 31, 2006, and thus, as discussed later, it is not considered a resource after that date.

In the EMEC region a 54 MW wind project became operational in January 2009. The project is not interconnected with the NMTS, and is instead connected directly to the Bangor Hydro non-PTF transmission system by a distribution line that follows an existing right of way.

**Table 2: NMISA Generation Resources**

<b>Plant</b>	<b>Capacity (MW)</b>	<b>Type</b>	<b>Notes</b>
<b>Tinker Station</b>			
Hydro #1	4.00	Hydro	
Hydro #2	1.80	Hydro	
Hydro #3	1.80	Hydro	
Hydro #4	4.00	Hydro	
Hydro #5	23.00	Hydro	
Diesel	1.00	Diesel	
<b>Flo's Inn</b>			
Diesel #1	1.40	Diesel	
Diesel #2	1.40	Diesel	
Diesel #3	1.40	Diesel	
<b>Caribou Station</b>			
Steam #1	9.00	Oil	
Steam #2	14.00	Oil	
Diesel #2	2.50	Diesel	
Diesel #3	2.50	Diesel	
Diesel #4	1.00	Diesel	
Diesel #5	1.00	Diesel	
Hydro #1	0.45	Hydro	
Hydro #2	0.45	Hydro	
<b>Loring</b>			
Diesel #1	1.00	Diesel	
Diesel #2	1.00	Diesel	
Diesel #3	1.00	Diesel	
Diesel #5	2.10	Diesel	
<b>Squa Pan Hydro</b>	1.40	Hydro	
<b>Other Resources</b>			
Boralex - Fort Fairfield	33.00	Biomass	
Boralex - Ashland	37.00	Biomass	
Evergreen Wind	42.00	Wind	
Boralex - Sherman	19	Biomass	Mothballed
<b>Total Capacity</b>	208.2		

## **B. PROPOSED RESOURCE ADDITIONS**

There are two proposed projects under study through MPS's Large Generation Interconnect Procedure consisting of two wind projects at 800 MW and 50 MW. For more information see the following link:

<http://www.mainepublicservice.com/electricity-supply/transmission/generation-interconnection-requests.aspx>

## RESOURCE ADEQUACY

The purpose of the Base Case is to provide information to Market Participants and potential Market Participants of any forecasted long-term deficiency. The calculation by which the NMISA ensures resource adequacy is based upon the Northeast Power Coordinating Council's ("NPCC's") Document C-13, "18-month Load and Capacity Assessment". The C-13 process determines Gross Margin and Net Margins weekly for the 18-month period. The analysis is conducted twice a year, in the spring and fall, for the coming capability periods. Essentially, the analysis compares the load forecast to net resources plus operating reserve. Net resources are the installed capacity adjusted for firm sales, demand response, forced and unplanned outages, and unit deratings. Weekly, the information from the C-13 for the coming week is updated with current information and provided to the NBSO, RC for the Balancing Authority, in preparation for the NPCC-wide conference call. The C-13 is published in the Documents section of the NMISA web site.

The NMISA is part of NPCC's Maritimes Balancing Authority Area, with NBSO acting as the Balancing Authority as well as the RC. NMISA's Operating Reserve requirement is its proportionate share of the Maritimes Area Operating Reserve requirement. The NBSO calculates the Operating Reserve requirement for the region by maintaining adequate Operating Reserve capacity to cover 100% of the single largest contingency plus 50% of the second largest contingency. The NMISA's responsibility is based upon its monthly non-coincident peak share of the total Maritimes Area load. The average annual Operating Reserve responsibility is approximately 14 MW.

For the Base Case, a 20% planning reserve criterion was used. The difference between planning reserve and Operating Reserve is that planning reserve projects over a long-term horizon while Operating Reserve plans for actual requirements in the near term to operate the system. The NBSO also determines the planning reserve. The amount is based upon NPCC generation reliability criterion that a loss of load expectation shall be, on average, no more than 0.1 days per year. NMISA also participates in the NBSO's *Maritimes Area Comprehensive Review of Resource Adequacy*. In the latest study, 2007, it was determined that the 20% planning reserve margin is adequate for the Maritimes Area.

The Load and Resources Review attempts to determine if adequate resources will be available over the long run to meet the projected annual peak plus a planning reserve of 20%. The resources are the sum of the installed capacity plus firm purchases less firm sales. A positive number indicates resources are adequate and a negative indicates a deficiency. Also, transfer capacity is included to show the system's capability to import resources to relieve any deficits. Similarly, the projected surplus or deficit New Brunswick is included in Table 3 below to show the potential availability of excess capacity within the Maritimes Balancing Authority.

In all years, the Base Case for the NMISA system shows a deficit. Based upon the expiration of Boralex Sherman's long-term contract with MPS effective December 31, 2006, this unit is shown in the Base Case as providing zero capacity during the planning period. However, the unit operated at various intervals through 2007 and 2008 under short-term contracts. In addition, as discussed earlier, additional generation projects are proposed. These projects may become available during the planning period. Given the uncertainty of the ultimate construction of such projects or the execution by Boralex Sherman of a new long-term power supply contract, none of these are included in this analysis. Table 3 reflects the NMISA's Load and Resources Review from 2009 to 2015.

**Table 3**  
**Load and Resources Review (MW)**

Year	2009	2010	2011	2012	2013	2014	2015
<b>Peak</b>	134.6	135.3	136.0	136.7	137.3	138.0	138.7
<b>+Reserve 20%</b>	161.5	162.4	163.2	164.0	164.8	165.6	166.4
<b>Capacity</b>							
<b>Boralex Ashland</b>	37	37	37	37	37	37	37
<b>Boralex Fort Fairfield</b>	33	33	33	33	33	33	33
<b>Boralex Sherman</b>	0	0	0	0	0	0	0
<b>Tinker Hydro</b>	35	35	35	35	35	35	35
<b>Caribou Steam</b>	23	23	23	23	23	23	23
<b>Diesel</b>	17	17	17	17	17	17	17
<b>Mars Hill Wind</b>	13.0	13.0	13.0	13.0	13.0	13.0	13.0
<b>Firm Purchases</b>	35.0	35.0	5.0	5.0	5.0	5.0	5.0
<b>Firm Sales</b>	-44.0	-44.0	-44.0	-44.0	-44.0	-44.0	-44.0
<b>Total</b>	148.9	148.9	118.9	118.9	118.9	118.9	118.9
<b>Deficiency (+/-)</b>	-12.6	-13.5	-44.3	-45.1	-45.9	-46.7	-47.5
<b>Transfer Capacity</b>	110	110	110	110	110	110	110

The NMISA believes that the projected deficiency in Northern Maine can be satisfied from off system purchases or from the construction or reactivation of generation resources not included in the Base Case.

## DEMAND SIDE MANAGEMENT

There are no major DSM projects on the NMTS. Most DSM projects are on the local level through the Efficiency Maine program that each utility supports. For more information, the website can be found at the following link: <http://www.energymaine.com/>.

## **TRANSMISSION PLANNING**

### **Transmission System**

The NMTS consists of two independent transmission systems, MPS in Aroostook County and EMEC in portions of Washington County and Penobscot County. The two systems are interconnected only through the NB Power transmission system.

A summary description of the MPS transmission system prepared by MPS's Engineering Department is attached hereto as Exhibit 1 and is incorporated herein by reference.

The MPS system is interconnected with New Brunswick via three transmission lines, a 100 MVA import rated interconnection from Flo's Inn to Beechwood, a 64 MVA import rated interconnection at Tinker Station, and a 56 MVA import rated interconnection from Iroquois to Madawaska. The Total Transfer Capability ("TTC") between the NB Power system and the MPS system is 90 MW for imports to Northern Maine and 100 MW for exports to New Brunswick. The TTC calculation for the MPS-New Brunswick interface assumes a single contingency loss of the Flo's Inn to Beechwood transmission line. MPS is investigating adding Special Protection Schemes to increase the export capability of the interface.

The EMEC transmission system consists of a radial 69 kV transmission line that originates at Oak Bay, NB substation and terminates at Topsfield, ME substation and is approximately 40 miles long. There are five load substations that are connected by this line, including Domtar Paper Company, which is also a generator. Other than at Oak Bay, there is one transmission circuit breaker (CM-1) located in St. Stephen, NB, before the line crosses the border to Maine. There are three sectionalizing switches (air break) in the line headed to Topsfield. The majority of the line is 266.8 ACSR Partridge conductor, and there is a five-mile section of 1/0 AAAC between Woodland and Princeton. The EMEC system has a TTC of 15 MW for both imports from and exports to New Brunswick.

### **Potential Transmission Upgrades**

A series of capitalized maintenance projects is planned by MPS. A summary of these projects is included as Exhibit 2, and incorporated by reference. The effect of such capitalized maintenance projects is expected to be the reduction in transmission Operations and Maintenance ("O&M") expenses, reduced probability of outages along these segments, and the extension of the useful lives of these facilities. These projects are not expected to increase the TTC of the system.

In the EMEC region, an additional 54 MW of wind generation became operational in January 2009. However, this project is not interconnected with the NMTS. Rather, it is connected by a generator lead to the Bangor Hydro-Electric (BHE) local network via an existing right of way between EMEC and BHE. The transmission line runs from Stetson Mountain in EMEC's franchise area to BHE's Chester substation. The developer is proposing to increase the

capacity of the facility. Currently, there are no plans to ingrate this site into the NMTS. Pursuant to NMMR 8, NMISA did not evaluate this project for reliability impacts because it is not interconnected with the NMTS.

On February 27, 2008, MPS requested to join ISO-NE, integrating the northern NMTS and New England's Pool Transmission Facilities (PTF) with the construction of a 345kV line known as the Maine Power Connection project. In July of 2008 MPS filed a Certificate of Public Convenience and Necessity for the project with the Maine PUC. Pursuant to NMMR 8, the NMISA evaluated the project for reliability impacts and, under its market monitoring obligations, evaluated the impact on the wholesale electric market in northern Maine. The study is posted on the NMISA website at the following url: [http://www.nmisa.com/docs/NES\\_MPC\\_Report.pdf](http://www.nmisa.com/docs/NES_MPC_Report.pdf). On February 5, 2009, the MPUC dismissed the petition without prejudice, citing further analysis is required. NMISA understands that MPS is considering alternative versions of the Maine Power Connection. MPS is evaluating an alternative, scaled-down means of connecting its system with ISO-NE. The alternative project would consist of a 345kV transmission line, but the transfer capability of the line would be significantly reduced (to 300 MW) from that of the original proposal (800 MW). The NMISA will evaluate the new project at such time as MPS may propose to pursue it.

On January 7, 2009 First Wind submitted to the MPUC in Docket No. 2008-104 a plan to develop 106.5 MW of wind in Oakfield, consisting of two phases. Phase I is a 49.5 MW located in Oakfield and Phase II is a 57 MW expansion of Phase I located in areas in and around Oakfield. The NMISA will evaluate the project pursuant to NMMR 8.

Various other opportunities for enhancement of interconnections with non-NMTS systems have been studied over the past few years. In 2004, MPS proposed the construction of a fourth transmission interconnection between the NMTS and the NB Power system. By order dated October 21, 2005, the MPUC declined to grant MPS a Certificate of Public Convenience and Necessity to construct that proposed line. As part of that investigation, an upgrade to the transformation equipment at Tinker Station was explored as an alternative manner in which to increase transfer capability between the MPS and NB Power systems.

### **Potential Transmission Deficiencies**

As with generation resources, the purpose of the Base Case is to provide information to Market Participants, including the TOs, and potential Market Participants of any forecasted transmission deficiencies to allow such Market Participants to bring forward proposals to address potential deficiencies. Pursuant to NMMR 9.3.2, NMISA is required to analyze whether any potential investments in the transmission system are necessary to maintain reliability in accordance with NMISA Reliability Standards (see NMMR 8), which include NPCC Reliability Standards, improve the performance of the Northern Maine Market, or reduce the cost of congestion constraints. Pursuant to NMMR 9.3.5, where the Base Case identifies that action is or will be required to alleviate an existing or emerging transmission constraint, the NMISA is directed to take the actions described in NMMR 9.4.1 when, in the NMISA's independent judgment, no adequate proposal exists to address the problem. Pursuant to NMMR 9.3.7, a transmission constraint is considered "emerging" if the NMISA identifies it to be likely to occur

within one to five years, and it is considered “potential” if the NMISA identifies it to be likely to occur within six to seven years.

The NMISA has identified an emerging constraint due to the uncertainty of in-region generation in Northern Maine. None of the three Boralex units (Sherman, Ashland and Fort Fairfield) has a contract that extends through the seven-year period covered by this report. As explained in the 2008 Seven-Year Outlook, in the event that all of these biomass units were mothballed or retired, and new generation capacity added to the system failed to provide an offsetting increase in firm capacity, additional transmission upgrades or other actions could become necessary to ensure compliance with NPCC reliability standards. As discussed below, this event is now likely to occur within the next one to five years, absent corrective action.

In February 2009, the Standard Offer Service for MPS was awarded to New Brunswick Power Generation Corp. Initially, absent purchased power agreements, Boralex notified NMISA that the Sherman and Fort Fairfield units would be terminating operations. As a result of the termination notices, pursuant to NMMR 8, NMISA coordinated with MPS to conduct studies to determine if Reliability Must Run (“RMR”) contracts were necessary. However, in March 2009, NMISA was notified that the Fort Fairfield unit would continue operations serving native load pursuant to two-year power purchase agreement between Boralex and NB Power Generation Corp. Accordingly, the studies were cancelled.

Nevertheless, the situation underscores the lack of certainty with respect to in-region generation in Northern Maine. As indicated, the current transmission system may not be sufficient to provide service alternatives to the Boralex units if there were to all become unavailable at some point. Moreover, it would be untenable – both from a reliability and financial standpoint – for the Northern Maine region to be perpetually subjected to the potential need to resort to RMR agreements. Accordingly, there is an emerging need for transmission system upgrades. The NMISA notes that the time for a major transmission project to proceed from its conception to its in-service date is likely to be approximately four years. Hence, absent corrective action, it is likely that a transmission constraint will emerge within one to five years.

In addition, in recent years the NMISA has experienced more exports on the northern interface, decreasing the ATC. The increased activity is a result of generators qualifying for Renewable Energy Credits in other markets, thus exporting their output. During certain situations, the northern part of the system operates radial with the New Brunswick Transmission System, decreasing the TTC from 90 MW to 64 MW. With a Transmission Reserve Margin of 10 MW and firm reservations of 50 MW, only 4 MW of firm ATC is available. The NMISA considers this circumstance an “emerging constraint” under NMMR 9. However, because the constraint is caused by the export of generation from new Northern Maine generation to other markets, the transmission expansion policy pursuant to MPS’s Open Access Transmission Tariff (“OATT”) requires exporting generators to upgrade the interconnection upon requesting additional transmission transfer capacity beyond the ATC

Finally, in general, the construction of additional transfer capability with neighboring systems may become necessary upon the construction of new generating facilities in Northern Maine requiring additional transfer capability for their output to be exported, or such additional transfer capability may be required if the total generating capacity located in Northern Maine is reduced to a level where a single contingency loss of an existing transmission interconnection would result in the unavailability of sufficient generating capacity to serve Northern Maine's load.

The NMISA is not aware of any planned deactivation, disconnection or retirement of any existing transmission facilities.

### **Conclusion**

The NMISA finds that, absent corrective action, transmission constraints are more likely to occur than not over the next one to five years. Therefore, it is necessary at this time to investigate the actions described in NMMR 9.4.1.

## **SUMMARY OF RESULTS**

### **Load Forecast**

The load forecast for Northern Maine projects an average growth rate of .5% per year over the seven-year planning period covered in the Base Case for both energy and demand.

The anticipated peak hourly demand for Northern Maine is expected to increase from 135 MW in 2009 to 139 MW in 2015, the final year covered in the Base Case.

### **Generation Resources**

NMISA projects that, based upon committed generation resources, the system will be deficient by 12.6 MW in 2009 and that this deficiency will grow to 47.5 MW by 2015.

Based upon the NBSO's 10-Year Outlook for the period 2009-2018, the New Brunswick system is likely to be surplus in all years.

NMISA believes that the projected deficiency in Northern Maine can be satisfied from off system purchases or from the construction or reactivation of generation resources not included in the Base Case.

### **Transmission Planning**

NMISA finds that transmission constraints are more likely to occur than not during the period 2009 to 2015.

The system currently complies with NPCC Reliability Criteria, but due to the uncertainty of in region generation, NMISA identifies an emerging constraint. Routine annual capital projects that are currently projected for the planning period consist of a series of capitalized maintenance projects by MPS that will not increase transmission capacity compared to current levels, but should generally increase system reliability and decrease transmission O&M expenses.

## EXHIBIT 1

## Summary of MPS Transmission Lines

MPS has 377.76 circuit miles and 376.47 pole miles of transmission lines. The difference is a small double circuit section on 6903 and 6908 lines. We serve an area of approximately 3,600 square miles and 36,500 retail customers through transmission and distribution level systems. A breakdown of transmission mileage is as follows:

Voltage	Circuit Miles	Pole Miles
34,500	11.98	11.98
44,000	46.80	46.80
69,000	307.09	305.80
138,000	11.89	11.89

The main trunk portion of Line 3470 has been classified as transmission by FERC. Most of this line mileage is for subtransmission lines, i.e. it serves our 28 distribution substations. Two lines, 6904 and 3855 are true transmission lines that do not serve any distribution stations.

A detailed description of each line follows:

3470 This line was first constructed in 1941 and has been upgraded many times over the years in various sections. It originates in Ashland at Ashland Substation and runs south along Route #11 to Masardis and east to Squa Pan Hydro and consists of 10.48 miles of transmission single pole construction with 3/0 ACSR and 3#6 copper wire. Additional 3470 mileage is classified as distribution line.

4407 This line was rebuilt in sections from 1997 to 2002. It originates in Houlton at the Mullen substation and runs west along the Ludlow Road, then south along Route #2 to Island Falls 27.38 miles. From Island Falls to the Wheelabrator/ Sherman plant in Stacyville 4407 is interrupted by Line 4425 From Stacyville to Sherman sub in Sherman is a short 0.59 mile piece of 4407. The line is constructed mostly of 336.4 ACSR conductors on single pole transmission structures.

4425 This line was built in 1985 and 1986 to serve the Wheelabrator/ Sherman plant in Stacyville. It has since replaced an older section of 4407 and is located in the middle of that line. It starts in Island Falls near the substation of the same name and extends west parallel to Route 159 to Patten, then south parallel to Route #11 to the Wheelabrator/

Sherman plant in Stacyville for 16.39 miles. This line was constructed cross-country with 795 ACSR conductors on two pole “H” frame structures.

6901 This line was built in 1964. It starts at the eastern Canadian border near the Fort Fairfield / Limestone town line and extends south along the border to just south of the Aroostook River then turns southwest to Presque Isle where it terminates at Flo’s Inn substation. Total US line mileage is 11.53 miles. The 1.72 mile eastern end of the line is owned by WPS PDI-Canada Company and begins at their Tinker substation in Aroostook Falls, New Brunswick and extends to the US border. The line is constructed of single and two pole transmission structures with 336.4 ACSR conductors.

6903 This line was constructed in 1961. It starts at the Limestone substation in Limestone and extends westerly along Route #89 then crosses the Aroostook River twice until it terminates in the Caribou Substation in Caribou. This line, through a tap, feeds the former Loring AF Base. The main line is 11.91 miles long and is constructed mostly of single pole transmission conductors with 336.4 ACSR conductors. A short section of the line is two pole “H” frame, double circuit line with 6908, and 2/0 F Copperweld conductors.

6904 This line was built in 1964. It starts at the eastern Canadian border near the Fort Fairfield / Limestone town line and extends north along the border, then turns west to Route #1A in Limestone where it terminates at Limestone substation. Total US line mileage is 9.14 miles. The 1.44 mile eastern end of the line is owned by WPS PDI-Canada Company and begins at their Tinker substation in Aroostook Falls, New Brunswick and extends to the US border. The line is constructed of two pole “H” frame transmission structures with 336.4 ACSR conductors.

6905 This line was constructed in sections from 1964 to 1966. It starts at the northern US border in Madawaska and then east along Route #1A and turns south near the Eastern border with Canada in Hamlin and runs near Route #1A south to Limestone Substation in Limestone. The 1.88 mile northern end of the line is owned by NB Power and begins at their Iroquois substation in Edmundston, New Brunswick and extends south to the US border. The US portion of the line is 41.41 miles of mostly two pole “H” frame structures, with some single pole structure roadside along Route #1A. The line has mostly 336.4 ACSR conductors with a short piece of 3/0 ACSR conductors between Van Buren and Grand Isle. This line feeds the Van Buren municipal load.

6908 This line was constructed from 1950 to 1951. Since there are no line breakers at Fish River sub, this line is really the southern end of Line 6909, which runs all the way down from Madawaska. Line 6908 originates at the Fish River substation in Fort Kent and runs southerly near Route #161 to Caribou where it terminates at the Caribou substation. It is constructed of two pole “H” frame structures with 2/0F Copperweld conductors.

6909 This line was constructed in sections in 1961, 1966, and 1968. It starts at the northern US border in Madawaska and then westerly, cross country, south of Route #1,

and to Fish River Substation in Fort Kent where it connects with line 6908. The 1.88 mile northern end of the line is owned by NB Power and begins at their Iroquois substation in Edmundston, New Brunswick and extends south to the US border. The US portion of the line is 17.7 miles of two pole “H” frame structures with 336.4 ACSR conductors.

6910 This line was built in 1952 and 1953. It begins at Flo’s Inn Sub in Presque Isle then runs southerly, cross country, along a parallel path to Route #1 to Mullen sub in Houlton, crossing over Route #1 several times. It was constructed of 2/0F Copperweld conductors on two pole “H” frame structures.

6911 This radial line was built in two parts as a tap off line 6912. The original piece fed a processing plant in 1959. An extension was constructed in 1985 to serve a new West Caribou distribution sub. It begins at the Caribou transmission sub and extends westerly 1.67 miles to West Caribou distribution sub. It was constructed of mostly 3/0 ACSR conductors on single pole structures. It was modified in 2005 to feed from either the Caribou transmission bus directly for improved reliability or as a tap off Line 6912.

6912 This line was originally constructed in 1955 with half upgraded in 2005. Half of this line was formerly Line 6906 (recently rebuilt), and the original half replaced by 6906 was reclassified as Line 6930 and is now associated with that line. This causes some confusion with the age and former designation of these lines. Line 6912 begins at Flo’s Inn in Presque Isle and extends northerly on both sides of the Aroostook River until it terminates at the Caribou sub in Caribou. It is 10.47 miles long and consists of 477 ACSR conductors on single pole transmission structures.

6914 This line was constructed in sections in 1963, and 1965. Portions were rebuilt in 1985, 1987, and 1989. This line extends from Flo’s Inn sub in Presque Isle south along Route 167 and State Street, then westerly to Presque Isle switching, where it can be tied to Line 6915, and continues on or parallel to Route #163 to Ashland sub in Ashland. The line is 24.28 miles with 477, 336.4 and 3/0 ACSR conductors supported by various single pole transmission structures.

6915 This line was constructed in sections in 1960, and 1963. This line extends from Flo’s Inn sub in Presque Isle west across the Aroostook River and skirts along the west side of urban Presque Isle to Presque Isle Switching Station, where it can be tied to Line 6914. The line is 5.64 miles with 336.4 ACSR conductors supported by various single and two pole “H” frame transmission structures.

6916 This line was constructed in 2006 to serve the Evergreen wind farm project. This line extends from the Mars Hill Switching Station, on the north side of the Mars Hill urban area, east 3.75 miles to the Evergreen Collector sub also in Mars Hill. The line consists of 336.4 ACSR conductors on single pole transmission structures.

6917 This line was constructed in 1966. It is a radial line from Limestone Switching Station south along Route #1A to Pond Substation, 1.12 miles, all in Limestone. 6917 can

be fed from either 6903 or 6905 by operating switches at Limestone Switching Station. It consists of 3/0 ACSR conductors on single pole structures.

6920 This line was constructed in sections in 1965, from 1967 to 1969, and in 1976. This line runs parallel to, and in close proximity to line 6910. See line 6910 for a route description. This line is constructed of 336.4 ACSR conductors on two pole “H” frame transmission structures. The Evergreen wind farm will be tied to this line near Mars Hill.

6928 This line was constructed in 1992 to feed the Boralex Ashland plant. It feeds from the Ashland substation in Ashland west 2.69 miles to the Ashland Industrial Park just off the Realty Road. The line is constructed of 795 ACSR conductors supported by single pole transmission structures. This is a radial feed.

6930 This line was constructed in 1955, 1969, and from 1974 to 1975. The Caribou end of this line was formerly 6912. This line runs from Caribou Substation in Caribou, south along the Aroostook River, then west cross country to Ashland sub in Ashland. This line consists of 477 and 336.4 ACSR conductors on single and two pole “H” frame transmission structures.

3855 This line was constructed in 1957. It was upgraded from a 69 kV to a 138 kV transmission line. It starts at the eastern Canadian border near the Easton / Mars Hill town line and extends northwest cross country to Presque Isle where it terminates at Flo’s Inn substation. Total US line mileage is 11.89 miles. The 8.2 mile eastern end of the line is owned by NB Power and begins at their Beechwood substation in New Brunswick and extends to the US border. The line is constructed of two pole “H” frame transmission structures with 266.8, 336.4, and 556.5 ACSR conductors.

## EXHIBIT 2

MAINE PUBLIC SERVICE  
TRANSMISSION  
CAPITAL ADDITIONS

The basis for this Ten-Year Outlook is the Twenty-Year MPS Transmission Asset Management and Capital Expenditure Plan from 2003. It also includes projects identified by the MPC Part A study of existing reliability issues. This discussion will discuss the highlights of the plan and the preliminary schedule of work to accomplish the goals of the plan. This Ten-Year Outlook represents the implementation of MPS's present planning goals and a capital budget summary.

There were four main components of the 2003 Planning study. First, MPS desires to maintain and improve its periodic asset management inspections. The results of these inspections provide valuable condition information which allows engineering to determine whether spot, or wholesale replacement, of structures is more appropriate. Second, MPS desires to replace transmission lines and equipment as they reach their end of life. This can be line or substation equipment. Third, MPS desires to have in place an expansion plan for use as new customers required service and to improve the efficiency of the system for the efficient transfer of energy. Last but not least, MPS desires to construct and maintain a system designed to meet industry accepted reliability standards.

The following bulleted list is our present schedule for capital improvements over the next Ten-Year Outlook period:

- 2009(March) MPS completed construction of the approximately 7 mile line from Flo's Inn to Mars Hill Switching Station on line 6910. Some delays were encountered due to regulatory permitting.
- 2009 MPS will rebuild 3 miles of existing line 6905 between Limestone and Van Buren. This will eliminate a bottle neck of small conductor and increase total line thermal capability.
- 2009 MPS will finish upgrading 5.19 miles of line 6912 from Maysville to Flo's Inn to improve reliability and summer thermal capacity.
- 2010 MPS will rebuild 9.91 miles of line 6908 from Caribou to New Sweden substation. A new tap to New Sweden sub will be constructed.
- 2010 MPS will relocate a 1.56 mile section of 6920 around an IWWH wetland. The ROW was acquired in 2007 for 6910.
- 2011 MPS will rebuild the first half of line 6901, 5.92 miles from Flo's Inn to the Fort Fairfield substation.
- 2012 MPS will rebuild the second half of line 6901, 5.61 miles from Fort Fairfield to the US – Canadian border. MPS will upgrade the interconnection to WPS and NB Power to improve summer thermal ratings and to meet contingency

requirements. Additional work by WPS is required to complete the upgrade of 6901 into Tinker Station in Canada.

- 2013-2014 MPS will begin a two year project to increase the capacity of the 11.89 mile line 3855/1176, Flo's Inn to Beechwood interface with NB Power. This will improve reliability and add additional contingency capacity following a Tinker interface outage. This will require an 8.2 mile matching rebuild on the Canadian side of the border to Beechwood by NB Power.
- 2015-2016 MPS will rebuild Flo's Inn 69 kV sub to a "breaker and a half" scheme and a 138 kV substation with a three breaker ring bus. These changes will eliminate a 69 kV stuck breaker contingency and improve reliability through the newly rebuilt 3855 line to Beechwood by adding a second autotransformer.
- 2017 MPS will rebuild 9.14 miles of line 6904 from Limestone Switching Station to the US Canadian border for improved summer thermal performance and to meet contingency requirements. Additional work by WPS is required to complete the upgrade of 6904 into Tinker Station in Canada.
- 2018-20 MPS will rebuild 8 miles of line per year on line 6910 from Blaine to Mullen substation. This will improve reliability and increase summer thermal ratings to meet growing demand.

This schedule is subject to change for financial reasons, customer additions, new generator integration, or system reliability and stability issues. MPS expects there will be ongoing annual transmission improvements for every year into the foreseeable future.

Other minor projects such as breaker replacements and protection and control upgrades will be completed as necessary.