

The Green Line Project



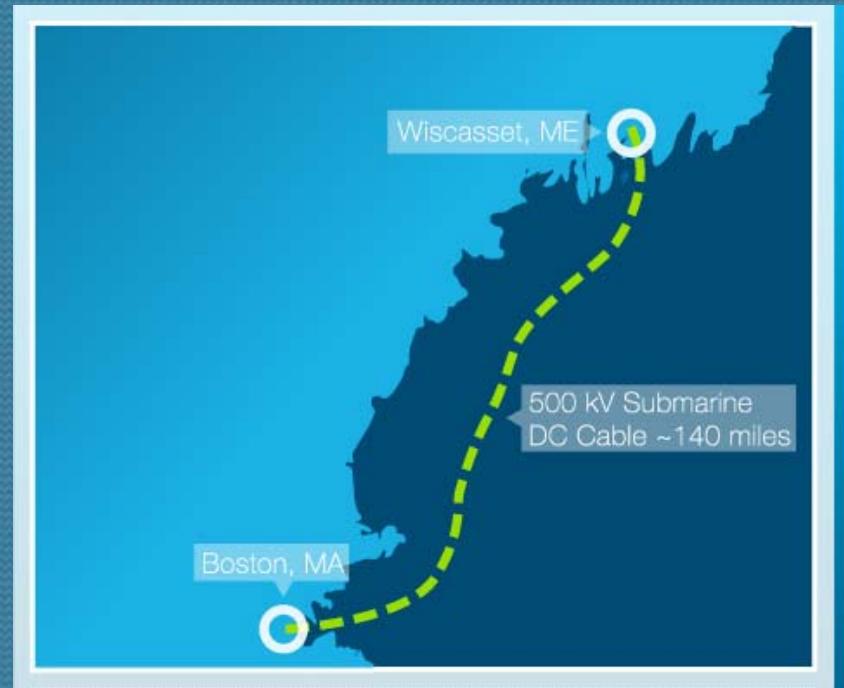
Economic Study Request Presentation to the ISO-NE Planning Advisory Committee

New England Independent Transmission Company, LLC

April 30, 2008

The Green Line Project

- 500 kV DC transmission system with transfer capability of 660 MW or more (e.g., 1200 MW)
- Manageable distance (~ 140 miles submarine cable , 1 foot in diameter)
- Interconnected between Maine Yankee Substation in Maine and K Street Substation in South Boston at 345 kV with Option to interconnect to locations south of Boston



Sub sea HVDC Systems are well-suited to deliver energy and capacity from renewables centers into urban markets like Boston

Introduction – The Green Line Study

- ❑ Green Line has been part of the collaborative process for transmission planning in ISO-NE
- ❑ Green Line covers broad range of stakeholder interests
- ❑ Green Line achieves regional planning objectives and complements other reliability projects and Attachment K proposals
- NEITC Has Requested ISO-NE Study Green Line:
 - ❑ Main Drivers
 - ❑ Scope
 - ❑ New Transmission and Resource Parameter Assumptions
 - ❑ Cost Recovery
 - ❑ Specific Upgrades
 - ❑ Other Criteria

Green Line and Regional Planning

- ISO-NE Strategic Direction – April 2008
 - Tier One: Reliability Projects – MPRP
 - Tier Two: Integration of New England renewables
 - Maine Power Connection (MPC)
 - New Hampshire Northern Loop
 - Offshore wind
 - Tier Three: Integration of external resources
 - Stronger Coordination with New Brunswick

Green Line and Regional Planning

- State of Maine's Proactive Wind Policy
 - April 18, 2008: Governor Baldacci signs legislation to fast track development of 2,500 MW of wind by 2015 and 3,000 MW by 2020. *Bill passed unanimously in the Maine House and Senate.*
- MPRP "Sensitivity to Green Line"
 - "Contingency Analysis of a limited number of conditions showed *NO violations of thermal or low voltage reliability criteria in any of the Alternatives*" PAC 27, 1/17/08 *Emphasis added.*
- Maine Power Connection
 - Attachment N economic study commencing

Green Line Satisfies Objectives Pursued By Other Attachment K Requests

- NSTAR Request ...
 - “As you are aware, the Boston area is the load center of New England. As such, it only makes sense that the system’s *ability to import power to its load center should be increased*. An injection point located in the heart of Boston will certainly *increase area reliability* and reduce future congestion costs.” - Economic Study Request, 3/31/08. *Emphasis added*
- UI, CMEEC & MMWEC Request ...
 - Submarine HVDC cable with a jump off point along the Maine coast
 - Boston injection point desirable
 - Modeling shows K-Street can take 600 MW injection
- BHE/National Grid Request ...
 - Termination points in Boston and/or SEMA

Green Line Satisfies Objectives Pursued By Other Attachment K Requests

- NECPUC Request ...
 - Includes study to incorporate *offshore wind in Maine* and renewable *wind and biomass in Coos County, NH*
 - Maine committed to 300 MW of offshore wind – could come to shore at Wiscasset
 - Suggests connecting Coos County loop directly to Rumford, ME – 250 MW injection of wind at Rumford included in MPRP wind sensitivity case
- FPL Energy Request ...
 - Encompasses interconnecting alternative locations in Maine with Boston Import area and optionally to lower Southeast Massachusetts
- Northeast Utilities Request ...
 - Includes HVDC submarine cable with injection point in Boston
 - Includes study of upgrades to northern New Hampshire 115 kV loop (Coos County)

ISO-NE Study Evaluation Criteria Considerations

- Green Line Provides ISO-NE with Project that includes Submarine Cable Installation
 - ❑ Four of the twelve proposals (1/3) specifically include submarine cable installation
 - ❑ Offshore wind studies imply submarine cable
- Provides opportunity for the ISO to examine the relative cost/benefits of off-shore vs. terrestrial power line installations, including:
 - ❑ Cost control
 - ❑ Ability to permit
 - ❑ Adherence to schedule
 - ❑ Long and short-term environmental impacts

Main Drivers of Green Line

- Helps expand fuel diversity options in the region
- Facilitates compliance with RPS and RGGI Goals
- Provides least cost alternative to meet environmental objectives
- Improves outlook for meeting Boston resource needs
- Promotes competitive supply
- Enhance system, Maine, and NEMA reliability
- Can be permitted and constructed in a timely and cost effective manner
- Complements planned upgrades in ISO-NE

Scope of Work

- Study the economic benefits resulting from 660/1200MW of increased transfer capacity between northern Maine and NEMA/SEMA as the Green Line accomplishes the following:
 - ❑ Greater degree of compliance with Regional Portfolio Standards (“RPS”), Regional Greenhouse Gas Initiative (“RGGI”) requirements, and other environmental standards;
 - ❑ Increases diversity of the region’s generation portfolio;
 - ❑ Enhances reliability and improved operations associated with the New England transmission system as described on page 7 of our “HVDC Day” presentation;
 - ❑ Increases competition in the NEMA load area;
 - ❑ Increases access to the substantial amounts of unused summer exports from New Brunswick and Quebec; and
 - ❑ Increases competition in market areas where reliability-must-run contracts have traditionally been needed, or where market concentration is at inadequate levels as deemed by the usual competition metrics.

New Transmission and Resource Assumptions

- New Transmission
 - ❑ Maine Power Reliability Program (MPRP) completed
 - ❑ Maine Power Connection (MPC) completed
- New Resources
 - ❑ 2,000 - 3,000 MW of wind generation in Maine
 - ❑ Ample existing and prospective supply of low/no carbon energy from New Brunswick, Nova Scotia, and Newfoundland and Labrador
 - “Winter peaking” character of Maritimes market enhances economics of additional transmission

Cost Recovery

- NEITC is proposing Green Line Project as a pool transmission facility that would recover its costs through the Regional Network Service rate.
 - ISO and other market participants to determine appropriate cost recovery methods
- Needs assessments performed by ISO-NE through the PAC will specify the many ways the Green Line Project addresses economic and reliability problems

Transmission Upgrade(s) Proposed

- Addition of one or more HVDC lines between Wiscasset, Maine and South Boston
 - Option for including line to location south of Boston
- Improvements to the following interfaces:
 - NB/NE increase due to Green Line
 - Orrington South increase due to Green Line
 - North/South between northern and southern NE – increased by at least 660 MW delivered to the Boston Import Area

Conclusions

- Economic Study of Green Line Is Essential:
 - ❑ Northern Maine has renewable generation; New England as a whole has a need for renewable generation
 - ❑ Maine and Maritimes will have surplus capacity and energy in 2013 that... given Green Line (or similar projects) can economically satisfy southern New England requirements
 - ❑ Green Line complements other transmission proposals
 - ❑ Sub sea HVDC is proven and economic way to substantially expand North-South transmission compared with other approaches