

# The Green Line Project



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

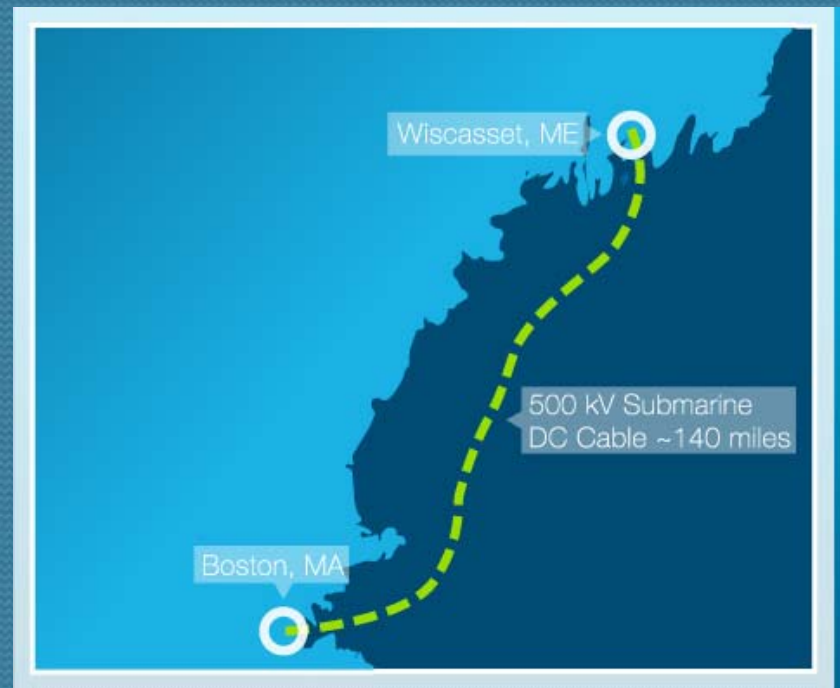
*New England Independent Transmission Company, LLC*

*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

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- ❑ 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

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- 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

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- 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

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- 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

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- 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

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- 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

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- 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

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- 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

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- 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

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- 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