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Economic Transmission in New England

For the VSPC
March 11, 2009

Outline

- Reasons for economic transmission projects
- Tariff considerations in New England
- Options discussed in New England
 - Projects discussed at “DC day”
 - Maine Power Connector
 - New Hampshire renewables
 - Hydro Quebec / Northeast Utilities / NStar Project
- Questions

Reasons for Economic Transmission

- Transmission infrastructure can:
 - Deliver desired generation to a set of customers
 - Provide access to renewable energy sources
 - Allow access to electricity markets not connected to your system (example – Quebec and the United States)
 - Reduce the cost of electricity in a market by gaining access to lower cost energy supplies
 - Reduce system losses
- Economic transmission projects can be built for one or more of these reasons

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Tariff Considerations in New England

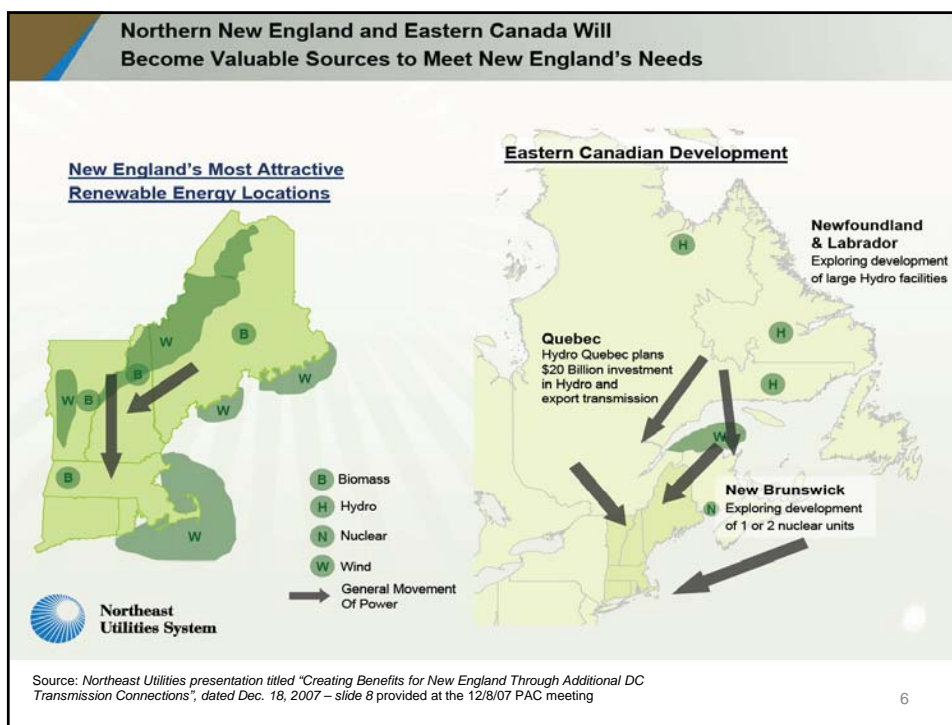
- The tariff for ISO-NE has two provisions that speak to “economic transmission projects”
 - Attachment K allows regional stakeholders to request up to three different economic studies be undertaken by the ISO each year
 - Attachment N allows for regional cost support for **Market Efficiency Transmission Upgrades or METU** that “provide a net reduction in total production cost to supply the system load”¹.
- ISO-NE began examinations under attachment K in 2008 and has a few projects requesting consideration under attachment N

Note 1 : from ISO New England Inc., FERC Elective Tariff No. 3, Open Access Tariff, Section II – Attachment N – Procedures for Regional System Plan Upgrades Original Sheet No. 6619

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Potential Economic Projects for New England

- Many first mentioned at an ISO-NE sponsored Planning Advisory Committee meeting on Dec. 18, 2007 (known as “DC Day”)
 - Materials for the day located at:
 - http://www.nepool.com/committees/comm_wkgrps/prtcpnts_comm/pac/mtrls/2007/dec182007/index.html
 - Conceptual projects, potential energy sources and assisting technologies were all described that day
 - Potential projects described that day included:
 - DC lines linking Maine to Boston (both underwater cable and underground / overland cable)
 - AC/DC overhead transmission with DC station to connect Quebec with New Hampshire



A Set of Complementary Projects with Tangible Benefits for New England

Benefits

- > A solution with real benefits for the region
 - Economic value
 - CO₂ reduction
 - Renewable resource additions
 - Fuel diversity
- > HVDC tie line with Hydro Quebec allows for large import capability into New England
- > Optimizes use of existing and planned bulk power grid -- connects the DC tie line from Hydro Quebec at a good location on the New England AC system
- > Provides a new, strong and separate reliability path from HQ
- > Addition of north-south DC connection allows for enhanced power flows to southern New England load centers

Source: Northeast Utilities presentation titled "Creating Benefits for New England Through Additional DC Transmission Connections", dated Dec. 18, 2007 -- slide 9 provided at the 12/8/07 PAC meeting

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Drivers: Fit Wind into System

Significant wind potential with varying characteristics exists throughout New England

1 meter per second roughly 2.2 mph

↑

MWh

Legend

Class 7	>8.8 (m/s)	●	●
Class 6	8-8.8 (m/s)	●	●
Class 5	7.5-8 (m/s)	●	●
Class 4	7-7.5 (m/s)	●	●
Class 3	6.4-7 (m/s)	●	●

40 Miles

230 kV

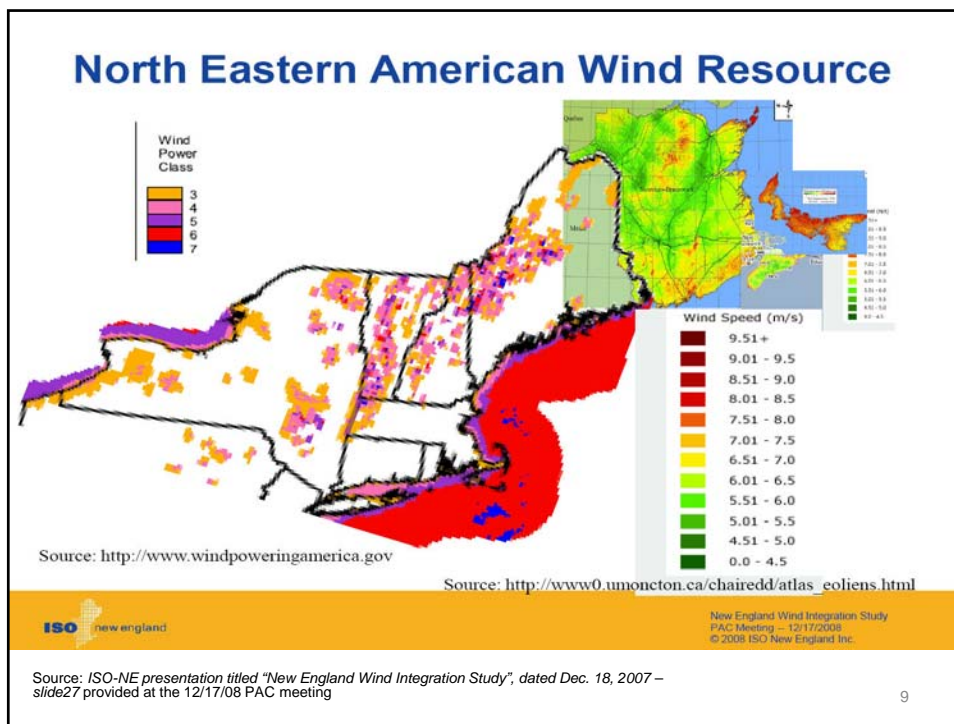
345 kV

Source: Levitan Phase II Wind Study for ISO New England

New England Wind Integration Study
PAC Meeting -- 12/17/2008
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Source: ISO-NE presentation titled "New England Wind Integration Study", dated Dec. 18, 2007 -- slide 4 provided at the 12/17/08 PAC meeting

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Energy Sources in New England

Load = Generation + Net Interchange - Pumping Load

Data is not available for the amount of generation by individual fuels in dual fuel units such as oil/gas.

	GWh	% of Total
2007 TOTAL GENERATION	130,721	
Gas	39,367	29.3%
Nuclear	36,972	27.5%
Coal	16,063	11.9%
Oil/Gas	15,790	11.7%
Wood/Refuse	4,514	3.4%
Hydro/ Run of River	3,997	3.0%
Coal/Oil	3,706	2.8%
Refuse	2,708	2.0%
Oil	2,687	2.0%
Hydro/ Pondage	2,386	1.8%
Hydro/ Pump Storage	1,744	1.3%
Small Generation	450	0.3%
Diesel Oil	159	0.1%
Other Renewables	147	0.1%
Jet Fuel	31	0.0%
TOTAL NET FLOW	6,118	-4.6%
New Brunswick	869	
New York	-2,478	
Hydro Quebec	7,727	
TOTAL IMPORTS	12,255	
New Brunswick	1,159	
New York	2,759	
Hydro Quebec	8,337	
TOTAL EXPORTS	-6,136	
New Brunswick	-290	
New York	-5,237	
Hydro Quebec	-609	
PUMPING LOAD	2,403	-1.8%
Losses	-2,152	
LOAD (GWh)	134,436	100.0%

*Data may be revised in May 2008, after ISO-NE has completed the 90-day resettlement process.

Source : ISO-NE website - http://www.nepool.com/nwssis/grid_mkts/engry_srcs/index.html
3/5/09

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Economic Transmission Projects

- ISO-NE has received two requests for consideration of economic transmission projects under attachment N
 - The “Maine Power Connection”
 - Website : <http://www.mainepowerconnection.com/>
 - Project was for a new 200 mile 345 kV line to connect approximately 800 MW of wind resources from northeastern Maine to New England
 - New Hampshire renewables
 - Approximately 400 MW of wind and biomass (wood) generation projects are proposed in northern NH
 - Transmission reinforcements are needed to deliver this generation to New England

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Economic Transmission Projects (cont).

- Hydro Quebec, Northeast Utilities and NStar have proposed an economic transmission project outside of the options described in the ISO-NE tariff
 - This project (1200 to 1500 MW) would construct new transmission lines in NH to import power from Quebec into New England
 - Depending on the termination location in NH, transmission into other states (VT and MA?) may be necessary
 - The cost of the project would be borne by the project proponents and eventually the purchasers of power from the project
 - The project proponents have made a filing to FERC
- Any of these projects would have to demonstrate “no adverse impact” on the reliability of the transmission system in New England
 - This demonstration has to occur before ISO-NE gives approval for construction
 - Until project details are known, this analysis cannot be performed (and all of these projects are at the conceptual stages and therefore do not have the necessary detail for the “no adverse impact” analysis)

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