New England Renewable Supply Curve Analysis

New England States Committee on Electricity

Meeting of the New England Governors

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OBJECTIVES

Exploring Coordinated Competitive Procurement

To consider identifying, through joint or separate but coordinated competitive processes, those resources that have the greatest potential to help meet the region's renewable energy goals at the lowest "all-in" delivered cost to consumers – the cost of generation & transmission combined

Supply Curve Analysis

To provide directionally indicative cost analysis about new, on- & off-shore wind resources in 2016 & 2020 to inform policymakers' consideration of issues associated with meeting renewable energy goals

SUPPLY CURVE ANALYSIS APPROACH

- Assess amount of wind resources developable in New England (2016 & 2020) & New York (2020)
- Estimate generation cost for various wind resources in New England & New York
- Estimate indicative transmission costs to integrate wind into regional power supply

Resource Focus - Maine & NH Wind

- Corresponds to predominant resource responding to NESCOE's 2011 renewable RFI & resources in ISO-NE's *2009 New England Governors' Study*
- Does not indicate preference for wind relative to other renewable resources available to help New England meet clean energy objectives

Conservative Assumptions

Generation Cost Estimates

- 15 year contract
- No federal financial incentives
- Interest rates reflecting normal economic conditions
- Historic hub heights

Changing *any* of these assumptions materially affects price in downward direction

Transmission Cost Estimates

- Assumes robust interconnection
- "Order of magnitude"/ISO-NE's PP4 accuracy range of -50% to +200%
- Allocates 50% of costs to the wind resource that benefits from it (indicative, mid-point cost allocation)

Value of Supply Curve Analysis:

Provides Sense of Relative Costs of Various Resources

- **Not actual costs** for specific resources or projects
- **Not a** resource **plan**
- **Not** an indication of **preferred resource** type or location
- **Not an estimate of benefits** of any particular resource

Very conservative study assumptions mean costs that would emerge in a competitive solicitation likely to be materially lower

Supply Curve: Results Overview

- We have more wind potential than we need to meet RPS goals

- In 2016, large (125 MW) on-shore wind in Maine likely to have lowest *generation* costs. Could substantially meet regional needs at least cost assuming no material transmission is needed to integrate into supply mix

- However, the cost & time to plan and build transmission that may be needed to integrate large, on-shore wind could accelerate competitiveness of off-shore wind as likely contributor to meeting RPS goals

- By 2020, off-shore wind competes with imports as marginal resource

THE TRANSMISSION FACTOR

If *no* additional transmission was required to integrate wind

- In 2016, **72%** of incremental regional needs for renewables would be met by **on-shore wind in Maine**. Imports would supply 8%.
- In 2020, **47%** of incremental regional needs for renewables would be met by **on-shore wind in Maine**. Imports would supply 20%.

Including estimated transmission costs shifts to off-shore & imports

- In 2016, **44%** of incremental regional needs for renewables would be met by **off-shore wind & imports**. Maine on-shore wind would meet 36%.
- In 2020, **45%** of incremental regional needs for renewables would be met by **off-shore wind & imports**. Maine on-shore wind would meet 32%.

NEXT STEPS

- ✓ States assess analyses
- ✓ NESCOE assess Supply Curve Analysis together with results of ongoing ISO-NE studies that evaluate renewable benefits, other issues
- ✓ Consider whether further information would be helpful to policymakers
- ✓ If two or more states interested in pursuing coordinated procurement of any resource type anywhere in or proximate to the region, further work on coordination mechanics, procurement details

Background

New England Renewable Supply Mix by State as Illustrated by Supply Curve Analysis

With & Without Assumed Transmission Additions

Illustrative New England Renewable Supply Mix Snapshot by State, Assuming **No** Transmission Additions

	Mix for 2016 (GWh/yr) Only generation costs considered			Mix for 2020 (GWh/yr) Only generation costs considered		
	On-shore	Off-shore	Total	On-shore	Off-shore	Total
CT	0	0	0	0	0	0
MA	346	0	346	936	0	936
ME	5,391	0	5,391	5,743	0	5,743
NH	309	0	309	595	0	595
RI	0	0	0	0	0	0
VT	883	0	883	2,489	0	2,489
New England total	6,929	0	6,929	9,762	0	9,762
NY	571	0	571	2,488	0	2,488
Grand total	7,500	0	7,500	12,250	0	12,250

- Resource mix based on generation costs for 15 year contract term, using baseline assumptions
- Developable NY resources in 2016 = 35% of NY resources developable by 2020
  - NY imports constrained to 1000 MW

Illustrative New England Renewable Supply Mix Snapshot by State, Assuming Transmission Additions

	Mix for 2016 (GWh/yr) Apply 50% of network upgrade costs to on-shore wind in ME, NH, VT & constrain on-shore wind in ME			Mix for 2020 (GWh/yr) Apply 50% of network upgrade costs to on-shore wind in ME, NH, VT & constrain on-shore wind in ME		
	On-shore	Off-shore	Total	On-shore	Off-shore	Total
CT	0	0	0	0	0	0
MA	360	720	1,080	986	2,683	3,669
ME	2,711	59	2,770	3,949	206	4,155
NH	280	0	280	396	0	396
RI	0	0	0	0	76	76
VT	883	0	883	1,467	0	1,467
New England total	4,233	779	5,012	6,798	2,964	9,762
NY	2,488	0	2,488	2,488	0	2,488
Grand total	6,721	779	7,500	9,286	2,964	12,250

- Resource mix based on costs for 15 year contract term, baseline assumptions
- Cost of on-shore generation in NH & ME (and VT) increased to reflect 50% of cost of required network upgrade; (indicative, mid-point cost allocation)
- On-shore generation in ME constrained to limits indicated by transmission analyses
- NY imports limited to 1000 MW