



**Moving Toward More
Wind Power:
Will the Lights Stay On?**

Discussion



New England Wind Conference
June 7, 2011

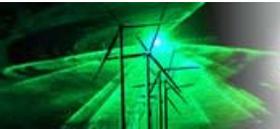
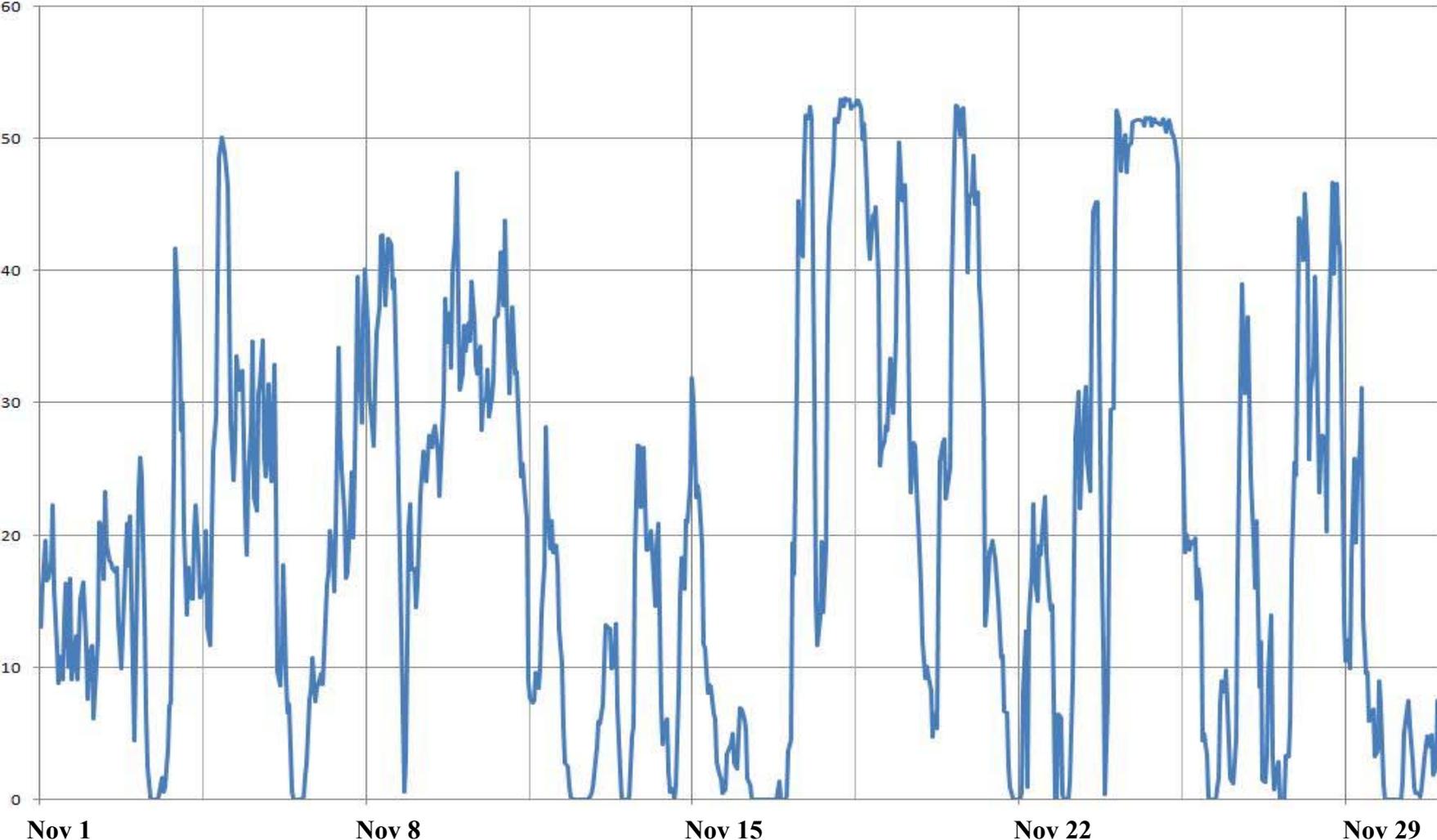
What about variability?

- From the NEWIS report:

A substantial smoothing resulting from averaging over a large number of hours disguises many of the important operational challenges that may be imposed by wind generation.



Stetson I -- November 2010 (36.3% CF)



What about cost (transmission)?

Transmission Project plans	Cost Range	
ISO-NE RSP Transmission Projects	\$4.3 billion	\$6.4 billion
NEWIS 20% scenario	\$10.7 billion	\$14.3 billion
Total range:	\$15.0 billion	\$20.7 billion

- ...for transmission:

Percent penetration: 20% scenario

Nameplate: 9.78 GW

Capacity factor: 34%

Transmission: 4 GW overlay from ISO Governors' study

Miles: 3695 - 4096 miles of new lines, 40+ substations



... and energy price suppression?

- From the NEWIS report:

Integrating up to the 24% wind may reduce average system-wide variable operating costs (i.e., fuel, O&M) by \$50 to \$54 per MWh of wind energy.

- ...NEWIS assumes *market value* PPAs.

Compare to onshore wind pricing (\$96 - \$110 per MWh)

Compare to offshore wind (\$187 - \$224 per MWh)

Prices include RECs and capacity; Exclude annual escalators, utility incentives, other costs.



What about the environmental benefit?

From the NEWIS report:

- CO2 reduced ~12,000,000 tons yearly, (25% reduction)
- Wind primarily displaces natural gas in New England
- 20% wind energy penetration.

- Carbon cost:
- @ \$1.89/ton (RGGI) = \$22.7 M/year (\$454 M for 20 years)
- @ \$60/ton for transmission alone¹ = \$715 M/year²

¹Does not include above market energy pricing

²Calculation: (\$14.3 B / 20 year)