

# Review of Transmission Planning Assumptions and Methods *Wind Generation*



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*Planning Advisory Committee Meeting*

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# Purpose

- Review the assumption for dispatch of wind generation to be used in long-term transmission planning studies



# Background

- In the comments on the Transmission Planning Technical Guide, stakeholders requested that ISO review assumptions for the dispatch of wind generation in transmission planning Needs Assessments and Solution Studies
- ISO only models generators which have a Capacity Supply Obligation or other similar contract, per Attachment K, in Needs Analyses and Solutions Studies
- The Technical Guide states that on-shore wind generation will be modeled at 5% of nameplate, and off-shore wind will be modeled at 20% of nameplate for Needs Assessments and Solutions Studies
- If a wind farm's Qualified Capacity is lower than the above value, the Qualified Capacity will be used in Needs Assessments and Solutions Studies

# Background, cont.

- To review the planning assumptions, on-shore wind output data was analyzed for the last four years of summer peak periods in 2010 through 2013
  - Analyzed hours 9:00-20:00 in July and August 2010-2013
  - Reviewed data from the 15 large wind farms that were in service in 2013
- Review focused on data from 2013 because all 15 large wind farms were not in service in all years
  - Four in service in 2010
  - Six in service in 2011
  - Ten in 2012
- Details on the wind farms are included in the appendix
- New England has no existing off-shore wind farms

# Wind Farm Summary

State	Number of Wind Farms in Study	Total Network Resource Capability (NRC)*	NRC with Capacity Supply Obligation (CSO)	NRC without CSO
CT	0	0	0	0
MA	2	43.5	15.0	28.5
ME	7	384	202.6	181.4
NH	3	166.5	166.5	0
RI	0	0	0	0
VT	3	113.7	113.7	0
Total	15	707.7	497.8	209.9

\* NRC is the similar to the nameplate capability of the wind plant

# Wind Farm Output Distribution in 2013

- To evaluate the value of wind farm output to be used in transmission planning studies, the ISO calculated the percentage of time that the output of large wind projects was at different levels for hours 9:00 through 20:00 during July and August in 2013
- ISO's analysis indicates that during these hours, wind farms spent a significant percentage of the time at low MW outputs



# Wind Farm Output Distribution in 2013

- To determine the distribution of wind farm performance during summer hours, ISO calculated the average performance of the 15 wind farms in 2013
- To ensure that the average performance was not skewed by the performance of a few wind farms, ISO also calculated the range of performance of the 15 wind farms in 2013

	Percentage of hours with output at zero	Percentage of hours with output less than or equal to 2% of NRC value	Percentage of hours with output less than or equal to 5% of NRC value	Percentage of hours with output less than or equal to 10% of NRC value
Average	17.3%	27.2%	36.8%	48.9%
Range	7.9%-25.9%	13.6%-33.4%	17.7%-49.9%	23.4%-61.6%

# CONCLUSIONS



# On-shore Wind

- Results of ISO's analysis indicate that wind farm output is less than 2% of its NRC rating more than one quarter of summer hours 9-20
- Results of ISO's analysis indicate that wind farm output is less than 5% of its NRC rating more than one third of summer hours 9-20
- Results of ISO's analysis suggest that no more than 5% of wind farm NRC rating should be used in for Needs Assessments and Solutions Studies
- Since using 5% of wind farm NRC rating currently results in modeling only 25 MW of wind generation in Needs Assessments and Solutions Studies, ISO does not propose to reduce the 5% value at this time
- ISO will continue to monitor actual wind performance and will propose changes to the modeling of on-shore wind farms when appropriate

# Off-shore Wind

- New England has no existing off-shore wind farms
- ISO will continue to model off-shore wind farms which have a Capacity Supply Obligation or other similar contract, per Attachment K, at 20% of their NRC ratings in Needs Analyses and Solutions Studies\*
- If a wind farm's Qualified Capacity is lower than the above value, the Qualified Capacity will be used in Needs Assessments and Solutions Studies
- ISO will monitor actual wind performance when it becomes available, will track data from other sources, and will propose changes to the modeling of off-shore wind farms when appropriate

\*Based on the wind analysis performed in the New England Wind Integration Study

[http://www.iso-ne.com/static-assets/documents/committees/comm\\_wkgrps/prtcpnts\\_comm/pac/reports/2010/newis\\_report.pdf](http://www.iso-ne.com/static-assets/documents/committees/comm_wkgrps/prtcpnts_comm/pac/reports/2010/newis_report.pdf),

[http://www.iso-ne.com/staticassets/documents/committees/comm\\_wkgrps/prtcpnts\\_comm/pac/mtrls/2011/sep212011/strat\\_trans\\_plng\\_analysis.pdf](http://www.iso-ne.com/staticassets/documents/committees/comm_wkgrps/prtcpnts_comm/pac/mtrls/2011/sep212011/strat_trans_plng_analysis.pdf)



# APPENDIX

# Wind Farm Data

Wind Farm	Resource ID	CSO	State	NR Capacity	In-Service Date
Berkshire - Phase 1	16614	Yes	MA	15.0	5/28/2011
Berkshire - Phase 2				4.8	Future
Bull Hill	40343	No	ME	34.5	12/27/2012
Georgia Mountain (GMCW)	35555	Yes	VT	9.9	12/31/2012
Granite	14595	Yes	NH	94.5	2/15/2012
Groton	37050	Yes	NH	48.0	12/28/2012
Hoosac	12529	No	MA	28.5	12/27/2012
Kibby - Phase 1	12551	Yes	ME	66	9/16/2009
Kibby - Phase 2				66	10/26/2010

# Wind Farm Data, cont.

Wind Farm	Resource ID	CSO	State	NR Capacity	In-Service Date
Kingdom Community	35979	Yes	VT	64.6	11/16/2012
Lempster	15115	Yes	NH	24.0	9/28/2008
Record Hill	14665	Yes	ME	50.6	1/31/2012
Rollins	37175	No	ME	61.2	7/26/2011
Sheffield	12530	Yes	VT	39.2	10/19/2011
Spruce Mountain	35693	Yes	ME	20.0 (from Queue)	12/21/2011
Stetson I	15464	No	ME	59.7	12/08/2009
Stetson II	16612	No	ME	26.0	3/12/2010