

North Country Wind Plants and Transmission Security





Background

- The ISO agreed to evaluate North Country wind generating capability as a possible resource for meeting transmission reliability criteria in the short-term [day-ahead] operational planning process at the October 5, 2009 MIWG meeting.
- The ISO requested AWS Truewind to evaluate confidence intervals of actual wind plant generation in real time operations as a percentage of day ahead generation forecasts using historical day ahead wind forecasts and historical actual wind generation from June – October 2009 and presented these results at the January 5, 2010 MIWG.
- The ISO has repeated the analysis with November 2009 April 2010 wind data.



Transmission Security

NERC Standard IRO-004-1 – Operations Planning

R1. Each Reliability Coordinator shall conduct next-day reliability analyses for its Reliability Coordinator Area to ensure that the Bulk Electric System can be operated reliably in anticipated normal and Contingency event conditions. The Reliability Coordinator shall conduct Contingency analysis studies to identify potential interface and other SOL and IROL violations, including overloaded transmission lines and transformers, voltage and stability limits, etc.

Emergency Operations Manual - Section 4.1.1

- Actual power flows must be reduced, using all operating actions including load relief in the following time frames:
 - Power flows over normal ratings must be reduced in less than four hours.
 - Power flows over LTE ratings must be reduced within fifteen minutes
 - Power flows over STE ratings must be reduced within five minutes.
- The ISO needs a high level of confidence that any generation counted in its next day reliability analyses will be realized in real-time operations.



North Country Wind Study Parameters / Assumptions

- The updated historical evaluation time frame was November 1 April 30, 2010.
- The study compared the lowest 5-minute integrated interval for each hour to the corresponding day ahead hourly forecast.
- The study developed confidence intervals of the actual wind generation relative to the day ahead forecasts for the four wind plants in the North Country; Altona, Chateaugay, Clinton, and Ellenburg and in aggregate.
- The study excluded hours with a "zero" day-ahead forecast.
- The study excluded hours with ISO directed curtailments.
- If a particular five-minute interval was under forecast, it was counted as "100% of the forecast was actually realized".



Previous North Country Wind Results

<u>June 2009 – October 2009</u>

- Actual, lowest 5-minute integrated interval for each hour realized as a percent of day ahead wind plant hourly forecasts
- "NY Aggregate" lowest 5-minute integrated interval results are not relevant for securing North County transmission

	# Samples	Percentage of Available Hours	Mean Forecast % Realized	Standard Deviation	84% Confidence Interval	97.5% Confidence Interval	99.5% Confidence Interval
NY Aggregate	3630	98.9	65.9	34.8	31.2	0	0
North Country Aggregate	3639	99.1	52.7	40.9	11.8	0	0
Altona	3544	96.5	45.0	43.2	1.74	0	0
Chateaugay	3373	91.9	47.4	42.3	5.03	0	0
Clinton	3471	94.5	47.4	42.3	5.13	0	0
Ellenburg	3404	92.7	49.6	41.4	8.17	0	0

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Updated North Country Wind Results

<u>November 2009 – April 2010</u>

- Actual, lowest 5-minute integrated interval for each hour realized as a percent of day ahead wind plant hourly forecasts
- "NY Aggregate" lowest 5-minute integrated interval results are not relevant for securing North County transmission

	# Samples	Percentage of Available Hours	Mean Forecast % Realized	Standard Deviation	84% Confidence Interval	97.5% Confidence Interval	99.5% Confidence Interval
NY Aggregate	4339	99.9	69.9	32.2	37.7	5.4	0
North Country Aggregate	4303	99.1	59.3	39.8	19.6	0	0
Altona	4063	93.5	55.2	41.6	13.6	0	0
Chateaugay	3917	90.2	53.9	41.9	12.0	0	0
Clinton	3909	90.0	54.4	42.1	12.2	0	0
Ellenburg	3956	91.1	54.3	41.4	12.9	0	0

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North Country Wind Study Conclusions

 Based on historical 2009-10 winter data, the analysis performed by AWS indicates that, for the North Country wind units, the Day-Ahead wind generation forecast cannot be expected to meet normal transmission security needs.



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