Renewable Investment Benefit (RIB)

Chris Hagman

January 24, 2011

Background —Wind Generation and RPS

- Renewable Portfolio Standards (RPS) are expressed in terms of the percent of renewable energy that must be produced
- For wind production, capacity factors vary widely across the Midwest
  - The differential in wind capacity factors between, for example, WI and ND can be as high as 10-15%
  - This translates into a significant increase in number of wind turbines needed to produce the same amount of energy

Measuring Future Value —the Renewable Investment Benefit

- Renewable Investment Benefit (RIB) concept introduced at the May 2010 ATC Stakeholder meeting
- Attempts to capture the value of higher wind output in states west of Wisconsin
  - Stronger and more consistent winds
- Creates the opportunity for significant savings for Wisconsin customers when meeting renewable or carbon mandates

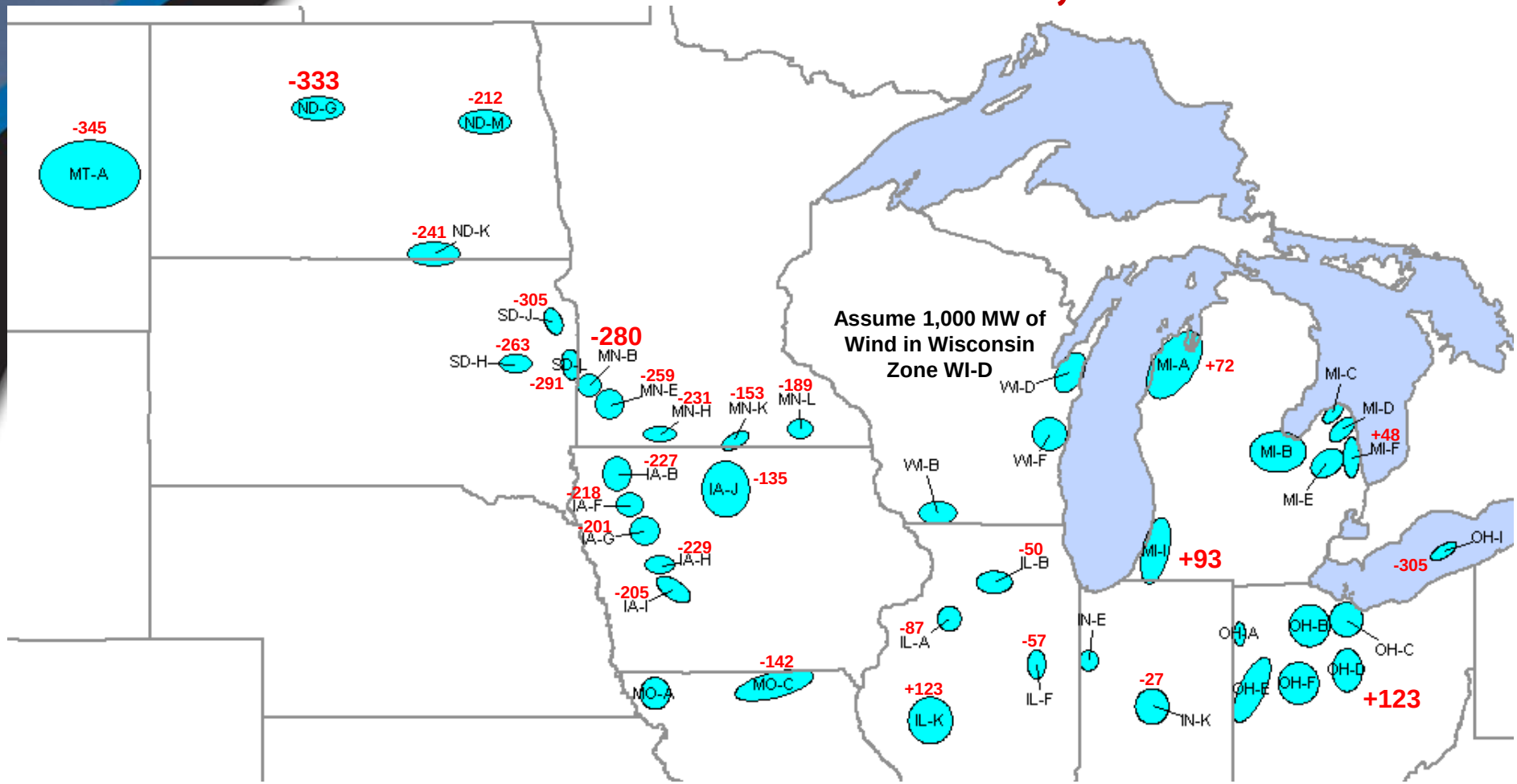
Preliminary Results

Renewable Investment Benefit

- Definition
  - Value created by constructing wind generation in higher capacity wind production areas when there is sufficient transmission to move wind energy to load centers
- Metric
  - The capital cost savings due to building fewer wind generators to produce the same amount of energy, adjusted for the increase in transfer capacity as a result of the transmission project, and reduced by the “delivery cost” of the outside wind

Preliminary Results

Wind MWs Needed to Match 1,000 MW in WI



Preliminary Results

RIB—Key Assumptions

- Transmission project's ability to import more wind power into the ATC footprint
  - Estimated based on the increase in the First Contingency Incremental Transfer Capability (FCITC)
- Calculate the LMP differentials between outside ATC and inside ATC locations
  - Measure of the "delivery" cost of this energy

Preliminary Results

Range of Wind Farm Cap. Costs

Low, Mid and High Wind Capital Costs[1]

	Low	Mid	High
Wind Capital Cost (2008$/kW)	$2,000	$2,300	$2,500
Futures	Slow Growth, Limited Investment	Regional Wind, Carbon Constrained	Robust Economy, Green Economy

[1] Range based on the actual capital costs for the Glacier Hills, Bent Tree and Crane Creek wind farms.

Preliminary Results

RIB—Key Assumptions
(Continued)

- FCITC or Wisconsin RPS Need (Lesser of the two)
- Wind capacity factor differential
- Capital costs for constructing wind (Range)
- Delivery costs of outside wind (LMP differential)
- Levelized fixed charge rate (25 year wind plant life)
- Inflation and Discount rate
- Robust Economy used for illustrative purposes*

* These are preliminary results as of the date of this presentation. ATC's planning analysis is a continuing process, and ATC will provide updated results for this project as appropriate. ATC may also change its planning assumptions or methodology with respect to this project, and any such change may alter the results of its analysis. ATC's definitive planning analysis will be set forth in its CPCN Application for this project.

Preliminary Results

Calculation Assumptions for Robust Economy for Badger Coulee

First Contingency Incremental Transfer Capability – Increase	658 MW
Wind capacity factor differential	7%
Capital costs for constructing wind	$2,500/kW ($2008)
Delivery costs of the outside wind	PROMOD (2020/2026 est)
Nominal levelized fixed charge rate	13.44% *
Inflation rate	3%
Nominal Discount rate	6.7%

* From detailed revenue requirement analysis.

Preliminary Results

Sample RIB Calculation for Badger Coulee for Robust Economy

1	FCITC Increase Relative to Base Case [or WI RPS Need-Lesser Value] (MW)	658
2	"Outside" Wind Capacity Factor	37.0%
3	Wisconsin Wind Capacity Factor	30.0%

4	% Higher "Outside" Wind Plant Energy Relative to WI	23.3%
5	Wind to Build Inside WI (MW)	812
6	Wind to Build Outside WI (MW)	658
7	Wind Capacity that Would Not Need to be Built in WI (MW)	154

8	Capital Cost Saved (2018$)	$516,153,484
9	Levelized Fixed Charge Rate (from a detailed revenue requirement analysis)	13.44%
10	Annual Capital Savings	$69,362,389
11	Present Value of the Capital Costs (2010$)	$602,063,689

12	Amount of Wind Energy Generated Outside of WI (MWh)	2,134,006
13	Difference in Average ATC and "Outside" LMPs (2020 $/MWh)	($10.49)
14	"Delivery" Cost of the Outside Wind for 2020	($22,385,724)
15	Difference in Average ATC and "Outside" LMPs (2026 $/MWh est.)	($14.74)
16	"Delivery" Cost of the Outside Wind for 2026	($31,455,250)
15	Present Value of the Delivery Costs (2010$)	($335,010,309)
16	Present Value of the RIB (2010$)	$267,053,381

Preliminary Results

Preliminary RIB Calculations

Preliminary Present Value of the Renewable Investment Benefit (2010 M$)

	Low Voltage	NLAX-SPG-CRD	Badger Coulee (NLAX-NMA-CRD)	DBQ-SPG-CRD	NLAX-NMA-CRD + DBQ-SPG-CRD	Genoa-NOM 765kV
Robust Economy	$306	$300	$267	$480	$792	$54
Green Economy	$448	$358	$325	$584	$905	$70
Slow Growth	$47.4	$48.2	$48.3	$48.7	$49.0	$47.8
Regional Wind	$461	$363	$333	$595	$898	$70
Limited Investment	$138	$144	$141	$146	$148	$136
Carbon Constrained	$454	$371	$340	$599	$928	$71

- Slow Growth & Limited Investment uses the wind needed to meet the Wisconsin RPS requirement because it is less than the FCITC.
- Two futures need to be run in PROMOD for 2026. Delivery costs for these futures were estimated for 2026.

Questions

If you have additional questions, please contact:

Chris Hagman (chagman@atcllc.com or 608-877-7134)
Flora Flygt (fflygt@atcllc.com or 608-877-3660)