

ATC Futures for the 2020 Study Year

Date: 4-27-11

Drivers	Load Growth within ATC	Energy Growth within ATC	Load Growth outside ATC ²	Energy Growth outside ATC ²	Total Small Capacity Coal Retirements (or conversions to natural gas) Within ATC ³	Generator Additions Within ATC ⁴	Total Percent Energy from Renewables for ATC & Inside/Outside Percent ⁷	Natural Gas Price Forecast	Coal Price Forecast for New Units ⁹	Environmental Regulations ¹¹	Renewable Portfolio Standards (RPSs) and Wind Power Zones	Transmission Overlay Outside ATC ¹⁶	Generation Portfolio Outside ATC ¹⁷
Bounds	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
Lower	0.2%	0.1%	0.3%	0.3%	907 MW	Planned Wind ⁵ Plus Wind Specified Below	10/7.4/2.6%	-40%	-10%	\$0/ton for CO ₂ , 0% higher mercury costs	Current State RPSs for MN, IA & WI (for 2020) and Allocation to Wind Zones located only in the UMTDI States in Proportion to Associated Cap. Factors ¹²	Overlay Light-CAPX, Corridor & RIGO Projects	See Below
Mid¹	1.40%	1.10%	0.75%	1.00%	453 MW	Planned Wind ⁵ Plus Wind Specified Below	20/10.5/9.5% ⁸	NYMEX for as many years as available followed by EIA esc. rate (2020 Avg: \$8.06/MMBtu)	MISO Central & West \$2.07 & \$1.74 per MMBTU, respectively, for 2020. ¹⁰	\$25/ton for CO ₂ , 25% higher mercury costs	WI 20% ¹³ RPS & MN, IA & IL RPSs (for 2020) and Allocation to RGOS I Wind Zones in Proportion to Associated Capacity Factors ¹⁴	15 GW RGOS I Overlay	See Below
Upper	2.5%	2.2%	1.6%	2.19%	Announced (289 MW)	Fossil ⁶ & Planned Wind ⁵ Plus Wind Specified Below	25/13/12% ⁸	50%	20%	\$44/ton for CO ₂ , 25% higher mercury costs	WI 25% ¹³ & All MISO States with an RPS (for 2020) and Allocation to RGOS I Wind Zones in Proportion to Associated Capacity Factors ¹⁵	25 GW RGOS I Overlay	See Below

2020 Futures Descriptions													
Robust Economy	2.50%	2.2%	1.6%	2.19%	Upper	+1,176 MW ATC Wind ⁶	20/9.8/10.2% ⁸	Mid-Upper +25% (2020 Avg: \$8.23/MMBtu ²⁴)	Upper	Low	Mid (Existing + ~9.2 GW) ²²	15 GW-765kV Overlay	Reference
Green Economy	1.4% ¹⁸	2.2% ¹⁸	0.75%	2.19%	Lower	+1,823 MW ATC Wind & DRG ²⁰	25/12.5/12.5% ⁸	Upper (2020 Avg: \$12.09/MMBtu)	Mid	Upper	Upper (Existing + ~20.7 GW) ²²	25 GW-345kV Overlay	Gas-only
Slow Growth	0.2%	0.1%	0.3%	0.3%	Mid	+31 MW ATC Wind	10/7.4/2.6%	Lower (2020 Avg: \$3.95/MMBtu ²⁴)	Mid	Low	Low (Existing + ~3.2 GW) ²²	Overlay Light	Reference
Regional Wind	1.70%	1.4%	1.6%	1.32%	Lower	+918 MW ATC Wind ⁶	20/9.7/10.3% ⁸	Mid (2020 Avg: \$8.06/MMBtu)	Lower	Mid	Upper-20% WI (Existing + ~17.5 GW) ²²	25 GW-765kV Overlay	Reference
Limited Investment	1.0%	0.7%	0.75%	1.0%	Mid	+113 MW ATC Wind	10/7.2/2.8%	Mid-Upper +25% (2020 Avg: \$10.08/MMBtu)	Upper	Mid	Low (Existing + ~3.8 GW) ²²	Overlay Light	Gas-only
Carbon Constrained	0.2% ¹⁹	0.1% ¹⁹	0.3%	0.3%	Lower	+1,047 MW ATC Wind & DRG ²⁰	25/12.4/12.6% ⁸	Mid (2020 Avg: \$8.06/MMBtu)	Lower	Mid ²¹	Mid-25% WI ²³ (Existing + ~7.3 GW) ²²	15 GW-345kV Overlay	Gas-only

Notes:

- For ATC, the Mid load and energy growth rates are based on 2009 customer-supplied forecasts.
- Outside ATC is defined as all of MISO, the Non-MISO Midwest Reliability Organization (MRO) Areas and Commonwealth Edison excluding the ATC utilities (e.g. Alliant, MG&E, We Energies, WPPI, and WPS). Load and energy growth rates are those from the Organization of MISO States (OMS) Cost Allocation and Regional Planning (CARP) planning study. For reference, MISO's 15 GW Reference PROMOD model has MISO on peak load and energy growth rates of 1.21% and 1.07%, respectively, and Outside ATC rates of 1.31% and 1.15%, respectively.
- Some small coal-fired retirements have been publicly announced and/or have recently occurred and are included as basecase assumptions. Conversion of Blount 6 & 7 from coal to natural gas at the end of 2011 is included in the "Announced" coal-fired retirements total. Other announced retirements include Blount units 3, 4 & 5 (totaling ~90 MW) by the end of 2013. Presque Isle Units 3 & 4 (116 MWs) and Pulliam units 3 & 4 (~55 MW) were already retired.
- The uprate of Point Beach is a basecase assumption.
- 439 MW of wind are expected to be in-service by the end of 2009 within ATC. An additional 539 MW of "planned" wind have signed Interconnection Agreements (IAs) that are not in suspension as of June 30, 2009. These total 978 MW.
- Generator Additions Within ATC from MISO's Expansion Plans:

PowerBase In-Service Date	Regional Wind	Location	Robust Economy	Location
1/1/2013	600 MW CT	699785_ROCKY RN (WPS) (S. of Weston)	600 MW CT	699119_ROE 345 (WPL) (Rockdale)
1/1/2016	-----	-----	600 MW Coal	699157_COL 345 (WPL) (Columbia)
1/1/2020	-----	-----	600 MW CT	699785_ROCKY RN (WPS) (South of Weston)

- 2,080 MW of new Manitoba Hydro generation is a basecase assumption in MISO's PROMOD models, however, it does not qualify under the current Renewable Portfolio Standard (RPS) for WI, but would under the WI Governor's Global Warming Task Force (GWTF) recommended RPS.
- The new Manitoba Hydro (MH) generation for WPS and WPPI, which totals 600 MW, is estimated to provide approximately 3,504 GWh of energy to meet the WI GWTF RPS recommended renewable percentages.
- Most existing coal-fired generators have unit specific coal price forecasts from Ventyx (formerly NewEnergy Associates).
- Use "MISO Central" coal costs for MISO expansion plan generators added within ATC.
- The generation expansion plan comes from MISO so the CO₂ tax only affects generation dispatch in ATC's PROMOD model. CAIR's and CAMR's status is uncertain, but other air pollution regulations have a similar impact to these regulations.
- The RPS requirements for Illinois, Michigan, Ohio-Pennsylvania & Missouri are assumed to be met internally. UMTDI is the Upper Midwest Transmission Development Initiative and includes wind zones in SD, ND, MN, IA & WI to primarily serve the RPS requirements for MN, IA & WI.
- Based on the Wisconsin Governor's Task Force on Global Warming (GWTF) recommendation of 20% by 2020 and 25% by 2025.
- RGOS is MISO's Regional Generator Outlet Study. The RGOS I wind zones include the UMTDI wind zones plus zones in Illinois. The RPS requirements for the RGOS II states (including MI, OH-PA & MO) are assumed to be met internally.
- Sufficient wind power is added so that all of the Load Serving Entities (LSEs) within MISO that have state RPS requirements can meet them from wind power coming from the RGOS I wind zones. However, the wind power to meet Michigan's RPS must be met by in-state resources and therefore does not come from the RGOS I wind zones. States without RPS requirements as of 9/15/09 with MISO LSEs include Indiana and Kentucky. North and South Dakota have renewable goals, rather than mandates, and are therefore not included in the requirements.
- CAPX Group 1 and the Minnesota "Corridor" and "RIGO" projects are assumed in place by 2020. The transmission overlays are designed to move wind generation to load centers. However, transmission was not added to deliver the expansion plan generation (mainly fossil) added by MISO to maintain adequate reserve margins in 2020.
- Reference and Gas-Only refer to separate MISO generation expansion plans and futures.
- A lower peak load growth rate relative to energy growth rate was selected for the Green Economy future due to increased Demand Side Management and Smart Grid, not because of low economic growth.
- The low peak demand and energy growth rates are assumed to result from increased demand-side management (DSM) and energy efficiency.
- Distributed Renewable Generation (DRG) provides 0.5% of the energy subject to the WI RPS in 2020 and includes Solar PV, Biogas, and Wind. Depending on the assumed energy growth rate, this percentage results in up to 67 MW of DRG. PSC Staff assumed 80 MW of DRG in its ratepayer impact scenario in its 5/20/09 Advanced Renewable Tariff (ART) Memo.
- The Mid carbon-tax value is used to serve as a proxy for having to purchase a moderate level of allowances. It is unlikely that 100% of allowances will be allocated, some will have to be purchased. The significant amounts of renewables and DSM available and in use in this future would probably help moderate allowance costs and therefore it makes sense to use the "Mid" value.
- The "existing" renewables are from MISO's PowerBase database. For MN, IA and WI the existing renewables total 4.4 GW, of which 0.9 GW is hydro and biomass. For MN, IA, WI and IL the existing renewables total 4.8 GW, of which 0.9 GW is hydro and biomass. The incremental GWs of wind needed to meet the specified "Lower", "Mid" and "Upper" RPS requirements are provided for information purposes and are approximate. The wind power to meet Michigan's RPS must be met by in-state resources and therefore does not come from the RGOS I wind zones and is not included in the total.
- Consistent with a lower amount of additional transmission.
- Natural Gas price assumptions for the Robust Economy and Slow Growth Futures were updated to reflect changes in natural gas futures including the impact of Shale Gas. The average 2020 mid-level price used to determine the updated values for Robust Economy and Slow Growth is \$6.58/MMBtu