

2011 ATC Futures for the 2020¹ Study Year

Date: 5-16-11

Drivers ²	Load Growth within ATC ³	Energy Growth within ATC ³	Load Growth outside ATC ⁴	Energy Growth outside ATC ⁴	Total Coal Retirements (or conversions to natural gas) Within ATC ⁵	Generator Additions Within ATC ⁶	Total Percent Energy from Renewables for ATC	Natural Gas Price Forecast	Coal Price Forecast for New Units ⁷	Environmental Regulations ⁸	Renewable Portfolio Standards (RPSs) and Wind Power Zones	Transmission Overlay Outside ATC	Generation Portfolio Outside ATC
Bounds	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
Lower	0.00%	0.00%	0.03%	0.05%	453 MW	Planned Wind, Plus required expansion generation (Wind / Fossil)	10%	- 50% (2020 Price = \$3.29 / MMBtu)	- 10%	\$0/ton for CO ₂ , 0% higher mercury costs	WI 10% RPS and Current State RPSs for all MISO States with an RPS (for 2020) and Allocation to RGOS Wind Zones Proportion to Associated Cap. Factors as utilized in MISO's MTEP 11 PROMOD analysis ¹²	MISO MVP Starter Projects	MISO MTEP 11 Carbon Constraint ¹⁴
Mid	0.90%	0.90%	0.78%	0.79%	907 MW	Planned Wind, Plus required expansion generation (Wind / Fossil)	15%	NYMEX forecast ¹¹ (2020 Price = \$6.58 / MMBtu)	Mid (Actual - Projected)	\$25/ton for CO ₂ , 25% higher mercury costs	WI 15% RPS and Current State RPSs for all MISO States with an RPS (for 2020) and Allocation to RGOS Wind Zones Proportion to Associated Cap. Factors as utilized in MISO's MTEP 11 PROMOD analysis ¹²	MISO MVP Starter Projects Enhanced ¹³	MISO MTEP 11 Business as Usual ¹⁵
Upper	1.70%	1.70%	1.28%	1.42%	1,521 MW	Planned Wind, DRG ⁹ , Plus required expansion generation (Wind / Fossil)	25% ¹⁰	+ 50% (2020 Price = \$9.87 / MMBtu)	+ 20%	\$45/ton for CO ₂ , 25% higher mercury costs	WI 25% RPS and Current State RPSs for all MISO States with an RPS (for 2020) and Allocation to RGOS Wind Zones Proportion to Associated Cap. Factors as utilized in MISO's MTEP 11 PROMOD analysis ¹²	MISO RGOS Native Voltage Overlay	MISO MTEP 11 Business as Usual - High D&E ¹⁶
2020 Futures Descriptions¹⁷													
Aggressive Energy Efficiency	Lower	Lower	Lower	Lower	Mid	Lower	Lower	Lower	Mid	Mid	Lower	Lower	Upper
Cautious Investment	Mid	Mid	Mid	Mid	Lower	Mid	Mid	Mid	Upper	Lower	Mid	Mid	Mid
Clean Robust Economy	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Lower	Upper	Upper	Upper	Lower

Notes :

- 1) Study Year will be 2020 for this analysis cycle.
- 2) The use of multiple drivers is based on the strategic flexibility analysis approach and is intended to represent a range of plausible bounds that could exist within a given future.
- 3) Load and Energy Growth assumptions within ATC are based on analysis of expected growth trends in conjunction with input from ATC customers and stakeholders.
- 4) 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 the effective growth rates from the MISO MTEP 11 process as approved by the MISO PAC on 3/23/2011.
- 5) 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 "Lower" level of retirements includes all announced retirements in addition to retirements of older (commissioned prior to ~1965), smaller (less than ~50 MW) coal-fired generators within the ATC footprint. The "Mid" level of retirements includes all announced retirements in addition to retirements of older (commissioned prior to ~1975), smaller (less than ~100 MW) coal-fired generators within the ATC footprint. The "Upper" level of retirements includes all announced retirements in addition to retirements of older (commissioned prior to ~1975), smaller (less than ~150 MW) coal-fired generators within the ATC footprint.
- 6) Actual values and generating units to be included for expansion within ATC to meet appropriate demand levels will be calculated and determined following finalization of the internal Load and Energy growth assumptions within ATC.
- 7) Most existing coal-fired generators have unit specific coal price forecasts from Ventyx.
- 8) The upper CO₂ tax of \$50/ton is consistent with values used by MISO in the MTEP 11 PROMOD analysis. ATC utilizes a slightly lower upper bound price for CO₂ taxes based on stakeholder feedback. The generation expansion plan comes from MISO so the CO₂ tax only affects generation dispatch in ATC's PROMOD model. Current EPA regulations will be reviewed for inclusion within this analysis.
- 9) 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.
- 10) Based on the previously proposed Wisconsin Governor's Task Force on Global Warming (GWTF) recommendation of 20% by 2020 and 25% by 2025.
- 11) NYMEX price forecast for natural gas was taken from published information effective January of 2011.
- 12) The RGOS wind zones are dispersed across the MISO footprint and include wind locations in Montana, North Dakota, South Dakota, Minnesota, Iowa, Missouri, Wisconsin, Illinois, Michigan, Indiana, and Ohio. The utilization of these wind zones and the associated capacity is based on the energy growth assumptions and state RPS needs by 2020 and is consistent with models developed for the MISO MTEP 11 analysis.
- 13) ATC is currently reviewing assumptions and transmission projects that may be utilized in an Enhanced version of the MISO MVP Starter Projects.
- 14) Carbon Constraint refers to a future expansion plan utilized within the MISO MTEP 11 analysis cycle. ATC utilizes the identified generator additions within these expansion plans in order to develop its futures based on changes in peak demand forecasts. For cases where peak demand growth is low, generating units are typically removed from the expansion plan and may not be used at all for significantly low growth rates. For cases where peak demand growth is high, generating units are added to accommodate this growth. For this particular case, expansion which may consist of CT Gas, Combined Cycle, and IGCC as identified in the MISO EGEAS expansion plan modeling from the MTEP 11 planning cycle.
- 15) Business as Usual refers to a future expansion plan utilized within the MISO MTEP 11 analysis cycle. ATC utilizes the identified generator additions within these expansion plans in order to develop its futures based on changes in peak demand forecasts. For cases where peak demand growth is low, generating units are typically removed from the expansion plan and may not be used at all for significantly low growth rates. For cases where peak demand growth is high, generating units are added to accommodate this growth. For this particular case, expansion generation may consist of Coal, Nuclear, CT Gas, Combined Cycle, IGCC, Wind, Biomass, Hydro, Photovoltaic, and Demand Response as identified in the MISO EGEAS expansion plan modeling from the MTEP 11 planning cycle.
- 16) Business as Usual - High D&E (Demand and Energy) refers to a future expansion plan utilized within the MISO MTEP 11 analysis cycle. ATC utilizes the identified generator additions within these expansion plans in order to develop its futures based on changes in peak demand forecasts. For cases where peak demand growth is low, generating units are typically removed from the expansion plan and may not be used at all for significantly low growth rates. For cases where peak demand growth is high, generating units are added to accommodate this growth. For this particular case, expansion may consist of CT Gas, Combined Cycle, Nuclear, IGCC, Wind, Biomass, Hydro, Photovoltaic, and Demand Response as identified in the MISO EGEAS expansion plan modeling from the MTEP 11 planning cycle.
- 17) Three futures as defined will be utilized for this analysis cycle.

These are preliminary assumptions as of the date of this document. ATC's planning analysis is a continuing process, and ATC will provide updates as appropriate. ATC may also change its planning assumptions or methodology with respect to this study and any such change may alter the results of its analysis.