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businesses running
and communities strong

2016 Economic Planning Study Kickoff

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Introduction

- Process Overview and Timeline
- 2016 Futures Development
 - Historical Process
 - Proposed Process
 - Matching ATC Study Timeline to MISO Timeline
- Next Steps

2016 Futures Development

- Utilize the MISO MTEP models and futures
- Review MISO models and provide updates as necessary
- Ensures greater alignment with MISO stakeholder process

ATC Process Overview and Timeline

- ATC Economic Project Planning – Per ATC Tariff
 - **During February**, we hold an initial stakeholder meeting to review the market congestion summary and potential fixes and to discuss economic study scenarios, drivers, ranges, and assumptions.
 - **By March 1**, we work with stakeholders to request and prioritize new/other economic studies and recommend study assumptions.
 - **By April 15** – we identify preliminary areas of economic study, study assumptions and models and solicit further comments from stakeholders.
 - **By May 15** – we finalize areas of economic study, study assumptions and models to be used in analysis.
 - **By November 15** – we provide a summary of the results of the economic analyses to our stakeholders.

ATC and MISO Study Timelines Not Aligned in 2015

- ATC process designed for model release in late spring/early summer
- MISO process becoming more detailed, causing delays in model release
- MTEP16 models released in December 2015, well after November 15th results deadline

MISO Process Overview and Timeline

- **MISO Timeline for MTEP17 Development**
 - Feb-May 2016 – Develop MTEP17 Futures Narratives/Variables
 - March-July 2016 – Develop more detailed generation siting methodology
 - May 2016 – Present finalized futures
 - Sept 2016 – Present finalized generation siting
 - Nov-Dec 2016 – Anticipated PROMOD MTEP17 model release

Proposed New ATC model process

- Use MTEP16 modeling in 2016 to realign with MISO modeling process
 - Use MTEP16 models for the ATC 2016 Economic Planning Study
 - ATC 2016 Economic Planning Study will use 2025 and 2030
 - Provides additional time for review of models
 - Have prepared materials more in advance of meetings
 - Allows for more time for stakeholder review
- MTEP17 models expected to be released Q4
 - Allows for review of base models prior to start of 2017 study

Stakeholder and Customer Feedback

- ATC is soliciting stakeholders and customers for new/other economic studies, recommended study assumptions changes, and study areas for our 2016 study
- ATC also requests feedback in areas where Public Policy Requirements may drive transmission needs.
 - Public Policy Requirements are enacted statutes (i.e., passed by the legislature and signed by the executive) and regulations promulgated by a relevant jurisdiction, whether within a state or at the federal level, including duly enacted laws or regulations passed by a local governmental entity, such as a municipal or county government. Stakeholders are encouraged to provide ATC with Public Policy Requirements. ATC utilizes transmission needs driven by Public Policy Requirements in its assumptions when performing economic analysis of study areas. The transmission needs driven by Public Policy Requirements that will be included in ATC's finalized assumptions will be posted prior to May 15th.

Next Steps

- **Project / Analysis Development**
 - Review of Congestion
 - Stakeholder Feedback
- **2016 Futures Development**
 - Continued Review of MISO MTEP16 Development
 - Review of MISO PROMOD Models
- **Analysis of Projects**
 - Study Years – 2025 and 2030
 - Futures – All MISO MTEP16 Futures
- **Timelines**
 - April 15: Define Preliminary Assumptions
 - May 15: Finalize Assumptions
 - November 15: Provide Analysis Update

Questions?

- ATC Economic Planning
- Dale Burmester
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Thank You For Your Time!



MISO MTEP16 Futures Definitions

Future	Narrative
Business As Usual	<i>The baseline, or Business as Usual, future captures all current policies and trends in place at the time of futures development and assumes they continue, unchanged, throughout the duration of the study period. Demand and energy growth rates are modeled at a level equivalent to the 50/50 forecasts submitted into the Module E Capacity Tracking (MECT) tool. All current state-level Renewable Portfolio Standard (RPS) and Energy Efficiency Resource Standard (EERS) mandates are modeled. All applicable and enforceable EPA regulations governing electric power generation, transmission and distribution (NAICS 2211) are modeled. To capture the expected effects of environmental regulations on the coal fleet, a total of 12.6 GW of coal unit retirements are modeled, including units which have either already retired or publicly announced they will retire.</i>
Low Demand	<i>The Low Demand future is designed to capture the effects of reduced economic growth resulting in lower energy costs and medium – low gas prices. The magnitude of demand and energy growth is determined by using the lower bound of the Load Forecast Uncertainty metric. All current state-level Renewable Portfolio Standard (RPS) and Energy Efficiency Resource Standard (EERS) mandates are modeled. All applicable EPA regulations governing electric power generation, transmission and distribution (NAICS 2211) are modeled. To capture the expected effects of environmental regulations on the coal fleet, 12.6 GW of coal unit retirements are modeled, including units which have either already retired or publicly announced they will retire. Additional, age-related retirements are captured using 60 years of age as a cutoff for non-coal, non-nuclear thermal units and 100 years for conventional hydroelectric.</i>
High Demand	<i>The High Demand future is designed to capture the effects of increased economic growth resulting in higher energy costs and medium – high gas prices. The magnitude of demand and energy growth is determined by using the upper bound of the Load Forecast Uncertainty metric and also includes forecasted load increases in the South region. All current state-level Renewable Portfolio Standard (RPS) and Energy Efficiency Resource Standard (EERS) mandates are modeled. All existing EPA regulations governing electric power generation, transmission and distribution (NAICS 2211) are incorporated. To capture the expected effects of environmental regulations on the coal fleet, 12.6 GW of coal unit retirements are modeled, including units which have either already retired or publicly announced they will retire. Additional, age-related retirements are captured using 60 years of age as a cutoff for non-coal, non-nuclear thermal units and 100 years for conventional hydroelectric.</i>
Regional Clean Power Plan Compliance	<p><i>The Regional Clean Power Plan future focuses on several key items from a footprint wide level which in combination result in significant carbon reductions over the course of the study period. Assumptions are consistent with MISO CPP Phase I & II analyses, and include the following:</i></p> <ul style="list-style-type: none"> <i>• To capture the expected effects of existing environmental regulations on the coal fleet, 12.6 GW of coal unit retirements are modeled, including existing or announced retirements.</i> <i>• 14 GW of additional coal unit retirements, coupled with a \$25/ton carbon cost, state mandates for renewables, and half of the EE annual growth used by the EPA, result in a significant reduction in carbon emissions by 2030.</i> <i>• Additional, age-related retirements are captured using 60 years of age as a cutoff for noncoal, non-nuclear thermal units and 100 years for conventional hydroelectric.</i> <i>• Solar and wind include an economic maturity curve to reflect declining costs over time.</i> <i>• Demand and energy growth rates are modeled at levels as reported in Module E.</i>
Sub-Regional Clean Power Plan Compliance	<p><i>“The Sub-Regional Clean Power Plan future focuses on several key items from a zonal or state level which combine to result in significant carbon reductions over the course of the study period. Assumptions are consistent with MISO CPP Phase I & II analyses, and include the following:</i></p> <ul style="list-style-type: none"> <i>• To capture the expected effects of existing environmental regulations on the coal fleet, 12.6 GW of coal unit retirements are modeled, existing or announced retirements.</i> <i>• 20 GW of additional coal unit retirements, coupled with a \$40/ton carbon cost, state mandates for renewables, and half of the EE annual growth used by the EPA, result in a significant reduction in carbon emissions by 2030.</i> <ul style="list-style-type: none"> <i>• These increased retirements and carbon cost levels from the Regional CPP Future are consistent with regional/subregional CPP assessments performed by MISO and other organizations since the CPP’s introduction</i> <i>• Additional, age-related retirements are captured using 60 years of age as a cutoff for non-coal, nonnuclear thermal units and 100 years for conventional hydroelectric.</i> <i>• Solar and wind include an economic maturity curve to reflect declining costs over time.</i> <i>• Demand and energy growth rates are modeled at levels as reported in Module E.</i>

MISO MTEP16 Future Matrix

Future	Baseline Demand / Energy Growth (20-year)	Retirements Level* (GW)	Natural Gas Price (2015\$/MMBTu)	Incremental Renewables (GW) N/C: North/Central MISO S: South MISO	CO ₂ Cost (2015\$/ton)
Business as Usual	0.75% / 0.82%	No Additional	\$4.11	N/C: 4.2 Wind/ 1.4 Solar S: 0 Wind/ 0 Solar	None
Low Demand	0.11% / 0.19%	Age-Related	\$3.29	N/C: 2.4 Wind/ 1.3 Solar S: 0 Wind/ 0 Solar	None
High Demand	1.55% / 1.61%	Age-Related	\$4.11	N/C: 7.2 Wind/ 1.6 Solar S: 0 Wind/ 0 Solar	None
Regional CPP Compliance	0.75% / 0.82%	14 GW coal + Age-Related	\$4.93	N/C: 4.2 Wind/ 1.4 Solar S: 0 Wind/ 0 Solar + cost maturity curves	\$25 / ton
Sub-Regional CPP Compliance	0.75% / 0.82%	20 GW coal + Age-Related	\$4.93	N/C: 4.2 Wind/ 1.4 Solar S: 0 Wind/ 0 Solar + cost maturity curves	\$40 / ton

**12 GW of MATS related coal-retirements are assumed in all futures
Age-related retirement assumption applies to non-coal generation only*

