2012 Economic Planning Study Kickoff

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Preliminary

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Introduction

- Process Overview and Timeline
- 2012 Futures Development
  - Historical Process
  - Proposed Process
- MISO MTEP 12 Futures Assumptions
- Next Steps

Process Overview and Timeline

ATC Economic Project Planning:

- 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.

2012 Futures Development

- ATC Historical Process
  - Develop ATC specific Futures Matrix
  - Modify MISO PROMOD models to match ATC assumptions
  - Process originated prior to expanded stakeholder involvement in development of MISO MTEP models
- 2012 Proposed Process
  - Do not create an ATC specific Futures Matrix
  - Utilize the MISO MTEP 12 models and Futures
  - Review MISO models and provide updates as necessary
  - Ensures greater alignment with MISO process

MISO MTEP 12 Futures Definitions

Future	Definition
Business as Usual	Business As Usual (BAU) considers the status-quo with the current economic conditions within current policy frame-work to continue throughout the study period as reflected in the key variable assumptions. This will be considered as the reference future with base parameters and the other futures' parameters will be varied with respect to this future.
Historical Growth	Historic growth future considers quick recovery from the current economic conditions and assumes a higher demand and energy growth rates as seen in the past for the entire study period. This will be considered as the high side variation of the BAU future.
Limited Growth	Limited growth future considers very low growth rate with EPA regulations, and no carbon cost. This can be considered as the low side variation of the BAU future.
Combined Policy	Combined Policy future studies the impact from multiple policy drivers such as Federal RPS, EPA regulations, Smart Grid, and Electric vehicles.
MISO-SPP Joint Future	This future is a placeholder for the MISO-SPP joint future development.

Source: MISO 12-15-2011 PAC Meeting (https://www.midwestiso.org/Events/Pages/PAC20111215.aspx)

MISO MTEP 12 Futures Definitions

Demand Response Program	Description
Commercial and industrial (C&I) curtailable/interruptible tariffs	Curtailable programs are those in which a customer commits to curtailing a certain amount of load whenever an event is called in exchange for lower energy price. Interruptible programs are programs in which a customer agrees to be interrupted in exchange for a fixed reduction in the monthly demand billing rate. If a customer does not reduce their load per their commitment, the utility may levy a penalty.
C&I direct load control (DLC)	These programs are where the C&I customer agrees to allow the utility to directly control equipment such as an air conditioner or hot water heater during events in exchange for a payment of some type (a flat fee per year or season and/or a per-event payment). A controlling device such as a switch or programmable thermostat is required.
C&I dynamic pricing	Dynamic pricing programs are structured so that customers have an incentive to reduce their usage during times of high energy demand or high wholesale energy prices. Under a critical peak pricing program, the customer pays a higher electricity rate during critical peak periods and pays a lower rate during off-peak periods. Often times, a critical peak pricing rate is combined with a time-of-use rate. Under a peak-time rebate program, the customer receives an incentive for reducing load during critical peak periods, and there is no penalty if the customer chooses not to participate.
Residential DLC	These programs are where the residential customer agrees to allow the utility to directly control equipment such as an air conditioner or hot water heater during events in exchange for a payment of some type (a flat fee per year or season and/or a per-event payment). A controlling device such as a switch or programmable thermostat is required.
Residential dynamic pricing	Dynamic pricing programs are structured so that customers have an incentive to reduce their usage during times of high energy demand or high wholesale energy prices. Under a critical peak pricing program, the customer pays a higher electricity rate during critical peak periods and pays a lower rate during off-peak periods. Often times, a critical peak pricing rate is combined with a time-of-use rate. Under a peak-time rebate program, the customer receives an incentive for reducing load during critical peak periods, and there is no penalty if the customer chooses not to participate.

Source: MISO 12-15-2011 PAC Meeting (https://www.midwestiso.org/Events/Pages/PAC20111215.aspx)

MISO MTEP 12 Futures Definitions

Energy Efficiency Program	Description
Residential Energy Efficiency Programs*	Appliance incentives/rebates; Appliance recycling; Lighting initiatives; Low income programs; Multifamily programs; New construction programs; Whole home audit programs; All other residential programs
Commercial and Industrial Energy Efficiency Programs*	Lighting programs; Prescriptive rebates; Custom incentives; New construction programs; Retrocommissioning programs; All other C&I programs

* Note: Both Residential and Commercial & Industrial EE programs are split into low and high cost blocks for EGEAS modeling purposes; the cutoff is $1,000/kW

Source: MISO 12-15-2011 PAC Meeting (https://www.midwestiso.org/Events/Pages/PAC20111215.aspx)

MISO MTEP 12 Futures Matrix

	Uncertainties																														
	Capital Costs															Demand and Energy				Fuel Cost				Fuel Escalations				Emission Costs			Economic		Wind	
Future	Coal	CC	CT	Nuclear	Wind Onshore	IGCC	IGCC w/ Carbon Capture & Sequestration	CC w/ Carbon Capture & Sequestration	Pumped Storage Hydro	Compressed Air Energy Storage	Photovoltaic	Biomass	Conventional Hydro	Wind Offshore	Distributive Generation - Peak	Demand Response Level	Energy Efficiency Level	Demand Growth Rate	Energy Growth Rate	Gas	Oil	Coal	Uranium	Gas	Oil	Coal	Uranium	SO_2	NO_x	CO_2	Inflation	EPA Coal Retirement	MISO Wind Penetration Mandate	National Mandate
Business as Usual	M	M	M	M	L	M	N/A	N/A	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	L	L	L	L	M	M	L	L	M	M	L
Historical Growth	M	M	M	M	L	M	M	M	M	M	M	M	M	M	M	M	M	H	H	M	M	M	M	M	M	M	M	M	M	L	M	M	M	L
Limited Growth	H	M	M	M	L	M	N/A	N/A	M	M	M	M	M	M	M	M	M	L	L	M	M	L	H	L	L	L	L	M	M	L	L	M	M	L
Combined Policy	H	H	H	H	L	H	H	H	H	H	H	H	H	M	H	M	M	M	H	H	M	L	H	M	M	M	M	M	M	M	M	H	M	M
MISO-SPP Joint Future																																		

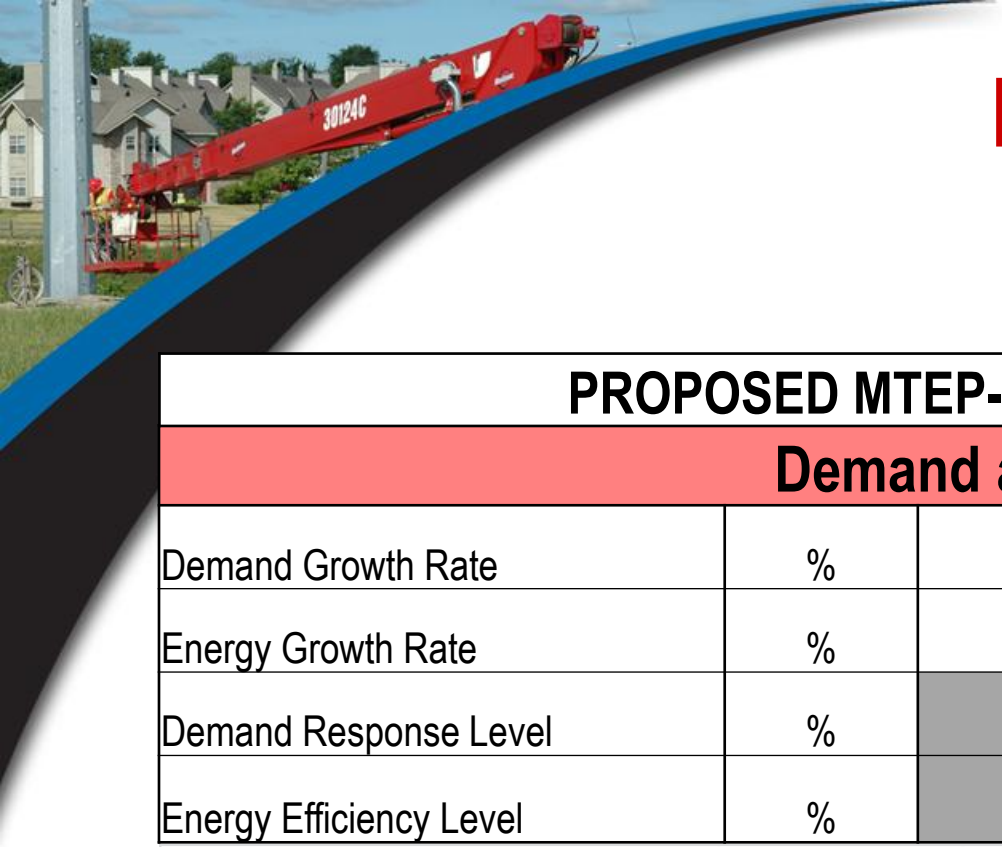
Source: MISO 12-15-2011 PAC Meeting (https://www.midwestiso.org/Events/Pages/PAC20111215.aspx)

MISO MTEP 12 Futures Uncertainty Variables

PROPOSED MTEP-12 FUTURES MATRIX				
Uncertainty	**Unit**	**Low (L)**	**Mid (M)**	**High (H)**
Alternative Capital Costs[1]				
Coal	($/KW)	2,560	2,844	3,555
CC	($/KW)	903	1,003	1,254
CT	($/KW)	599	665	831
Nuclear	($/KW)	4,802	5,335	6,669
Wind-Onshore	($/KW)	2,194	2,438	3,048
IGCC	($/KW)	2,899	3,221	4,026
IGCC w/ CCS	($/KW)	4,813	5,348	6,685
CC w/ CCS	($/KW)	1,854	2,060	2,575
Pumped Storage Hydro	($/KW)	5,036	5,595	6,994
Compressed Air Energy Storage	($/KW)	1,125	1,250	1,563
Photovoltaic	($/KW)	4,863	5,403	6,754
Biomass	($/KW)	3,474	3,860	4,825
Conventional Hydro	($/KW)	2,768	3,076	3,845
Wind-Offshore	($/KW)	5,378	5,975	7,469
Distributive Generation-Peak	($/KW)	1,578	1,753	2,191

1 All costs are in Quarter 4, 2010 dollars

Source: MISO 12-15-2011 PAC Meeting (https://www.midwestiso.org/Events/Pages/PAC20111215.aspx)



MISO MTEP 12 Futures Uncertainty Variables

PROPOSED MTEP-12 FUTURES MATRIX				
Demand and Energy				
Demand Growth Rate	%	0.71%	1.41%[2]	2.12%
Energy Growth Rate	%	0.84%	1.67%[3]	2.51%
Demand Response Level	%		GEP Estimates[4]	
Energy Efficiency Level	%		GEP Estimates[4]	

2 Mid value for demand growth rate is the Module-E 50/50 load forcast' growth rate (0.91%) + 0.5% to account for embedded DSM programs

3 Mid value for energy growth rate is the Module-E energy forcast' growth rate (1.17%) + 0.5% to account for embedded DSM programs

4 GEP provided estimates for each of the scenarios on an individual basis, based on each scenario's definition

Source: MISO 12-15-2011 PAC Meeting (https://www.midwestiso.org/Events/Pages/PAC20111215.aspx)

MISO MTEP 12 Futures Uncertainty Variables

PROPOSED MTEP-12 FUTURES MATRIX				
Fuel Prices (Starting Values)				
Gas	($/MMBtu)	3.50	4.25	8.00
Oil	($/MMBtu)	Powerbase default - 20%	Powerbase default[5]	Powerbase default + 20%
Coal	($/MMBtu)	Powerbase default - 20%	Powerbase default[5]	Powerbase default + 20%
Uranium	($/MMBtu)	0.92	1.14	1.36
Fuel Prices (Escalation Rates)				
Gas	%	1.74	2.91	4.00
Oil	%	1.74	2.91	4.00
Coal	%	1.74	2.91	
Uranium	%	1.74	2.91	

5 Powerbase default for oil is $19.39 and coal is $1.69 (both MISO averages in $/MMBtu)

Source: MISO 12-15-2011 PAC Meeting (https://www.midwestiso.org/Events/Pages/PAC20111215.aspx)

MISO MTEP 12 Futures Uncertainty Variables

PROPOSED MTEP-12 FUTURES MATRIX				
Emission Costs				
SO_2	($/ton)		Will be modeled based on EPA study results to comply with CASPR regulation[6]	
NOx	($/ton)		Will be modeled based on EPA study results to comply with CASPR regulation[6]	
CO_2 Cost	($/ton)	0	50	100
HG	($/ton)			

6 Emission costs for SOx and NOx will be modeled to comply with CSAPR regulations

Source: MISO 12-15-2011 PAC Meeting (https://www.midwestiso.org/Events/Pages/PAC20111215.aspx)

MISO MTEP 12 Futures Uncertainty Variables

PROPOSED MTEP-12 FUTURES MATRIX				
Economic Variables				
Inflation Rate	%	1.74	2.91	4.00

Source: MISO 12-15-2011 PAC Meeting (https://www.midwestiso.org/Events/Pages/PAC20111215.aspx)

MISO MTEP 12 Futures Uncertainty Variables

PROPOSED MTEP-12 FUTURES MATRIX				
Renewable Penetration as a Percentage of Total Energy Delivered[5]				
State mandates	%		Use existing state mandates	Use both exisiting state mandates and pending proposals / goals
National	%	0	20% by 2025	30% by 2030
Forced Coal Retirements				
Forced Coal Retirements (from MISO's EPA Regulation Impact Analysis Study)	%	6,600 MW	12,600 MW	23,000 MW

Source: MISO 12-15-2011 PAC Meeting (https://www.midwestiso.org/Events/Pages/PAC20111215.aspx)

Next Steps

- Project / Analysis Development
  - Review of Congestion
  - Stakeholder Feedback
- 2012 Futures Development
  - Continued Review of MISO MTEP 12 Development
  - Review of MISO PROMOD Models
- Analysis of Projects
  - Study Years
  - Futures
- Timelines
  - April 15, 2012: Define Preliminary Assumptions
  - May 15, 2012: Finalize Assumptions
  - November 15, 2012: Provide Analysis Update

Questions?

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