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# 2017 Economic Planning Study Results

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# Introduction

- Process Overview and Timeline
- Quick MTEP17 Futures Refresh
- Study Results
- Next Steps

# 2017 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.

# MISO MTEP17 Futures

- Existing Fleet – (EF)
- Policy Regulations – (PR)
- Accelerated Alternative Technologies – (AAT)

# Existing Fleet

- Largely unchanged generation fleet
- Lower demand and energy growth rates
- No carbon emission regulations
- Age related coal retirements
- Renewable investment based on RPS and economics
- Lower fuel costs

# Policy Regulations

- Policy/Regulation targeting reduction in CO<sup>2</sup> emissions
- CO<sup>2</sup> reduction goal set at 25% lower than 2005 levels
- Mid level demand and energy growth rates
- Return to mid level fuel prices
- Increased retirement of coal to meet CO<sup>2</sup> target
- Assume decreasing capital costs of renewables

# Accelerated Alternative Technologies

- Policy/Regulation targeting reduction in CO<sup>2</sup> emissions
- CO<sup>2</sup> reduction goal set at 35% lower than 2005 levels
- Increased demand on NG drives prices higher
- Increased retirement of coal to meet CO<sup>2</sup> target
- Robust economy drives more technology advancement, resulting in more energy efficiency, distributed generation, and demand response
- Higher gross demand and energy, offset by tech advancement

# MISO MTEP17 Key Assumptions

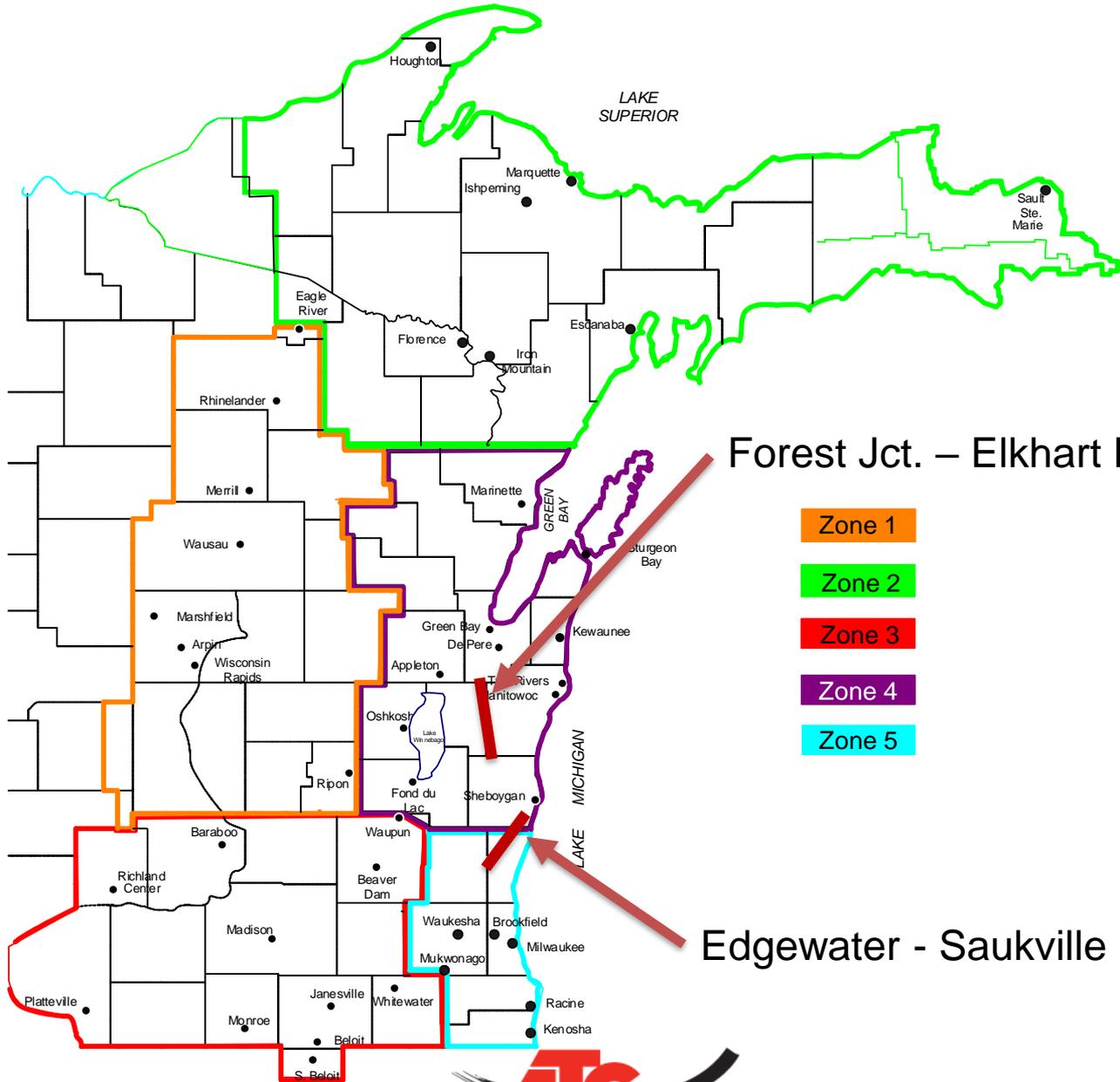
Future	Existing Fleet	Policy Regulations	Accelerated Alternative Technologies
<b>Net Demand &amp; Energy Growth Rates</b>	Demand: 0.4% <sup>1</sup> Energy: 0.4% <sup>1</sup>	Demand: 0.5% <sup>1</sup> Energy: 0.5% <sup>1</sup>	Demand: 0.6% <sup>1</sup> Energy: 0.6% <sup>1</sup>
<b>Natural Gas Price Forecast</b>	Low	Mid	High
<b>Max DR/EE/DG Tech Potential</b>	DR: 8 GW EE: 9.6 GW DG: 2.3 GW	DR: 9 GW EE: 10.8 GW DG: 2.8 GW	DR: 12.1 GW EE: 25.6 GW DG: 6.4 GW
<b>Retirement</b>	Coal: 9 GW Gas/Oil: 17 GW Total by 2031: 25 GW	Coal: 16 GW Gas/Oil: 17 GW Total by 2031: 33 GW	Coal: 24 GW Gas/Oil: 17 GW Total by 2031: 41 GW
<b>Renewables</b>	Mandates + Goals	Mandates + Goals + maturity cost curve	Mandates + Goals + maturity cost curve
<b>MISO System CO2 Reduction Target</b>	N/A	25% of 2005 levels	35% of 2005 levels

1. Net Demand and Energy Growth Rates Economic Development of Potential DR/EE/DG Tech. Gross Growth Rates are 0.4%, 0.6% and 0.9%



# Notable MTEP17 Congestion

- Paddock – NW Beloit 138 kV (Riverside 2 Projects)
- Forest Junction – Elkhart Lake 138 kV
- Petenwell – Saratoga 138 kV (Special Protection Scheme)
- Townline – Bass Creek 138 kV
- Edgewater – Saukville 345 kV
- Shoto – Northeast 69 kV



Forest Jct. – Elkhart Lake

- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 5

Edgewater - Saukville

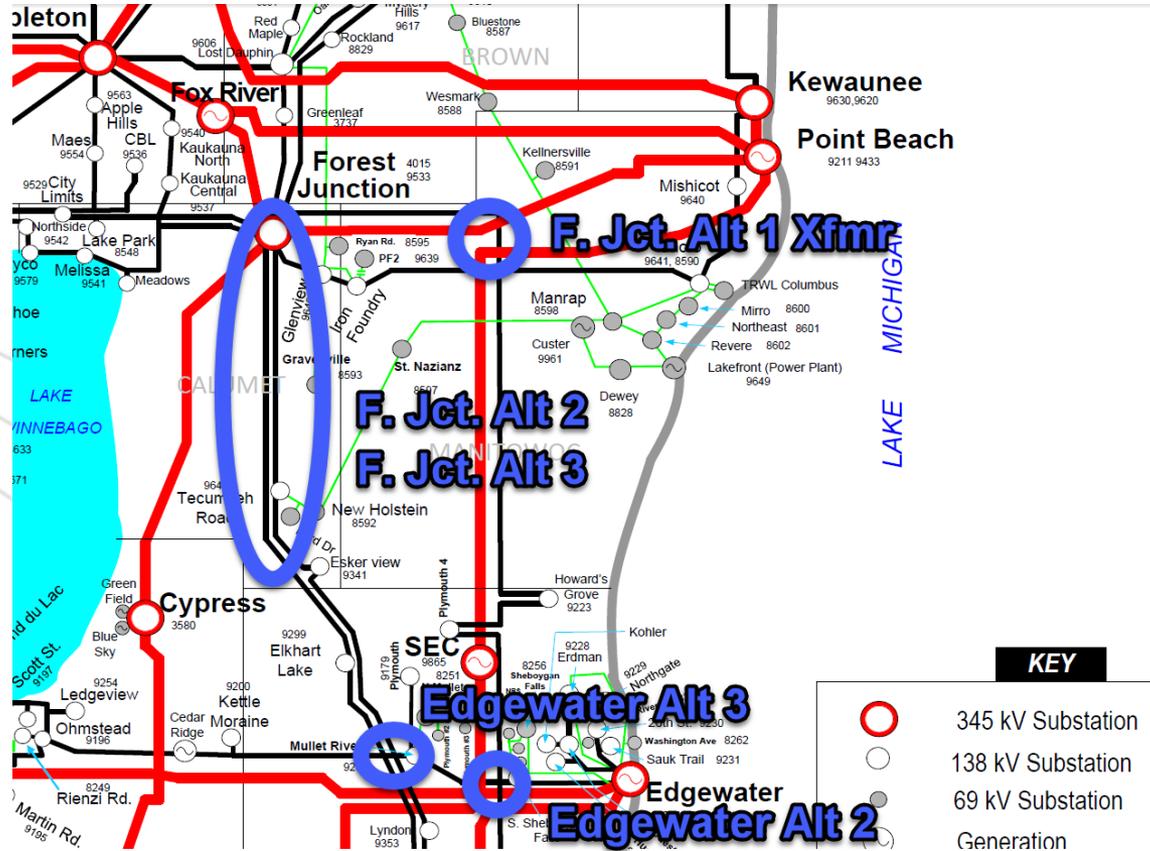
# Study Area Alternatives

- Edgewater Alt. 1 – Uprate Edgewater-Saukville 345kV
- Edgewater Alt. 2 – Connect Plymouth-Holland 138 kV and S. Sheboygan Falls-Mullet River 138 kV lines
- Edgewater Alt. 3 – Tap Forest Jct.-Saukville 138kV lines to Mullet River sub

# Study Area Alternatives

- Forest Jct. Alt 1 Xfmr – Add Branch River 345/138 kV and tap Forest Jct.-Howards Grove 138 kV
- Forest Jct. Alt 2 – Uprate Forest Jct.-Elkhart-Saukville 138 kV line
- Forest Jct. Alt 3 – Uprate both Forest Jct.-Saukville 138 kV lines
- Forest Jct. Alt 4 – Connect Cypress-Arcadian and SEC-Granville 345 kV lines with new sub
- Forest Jct. Alt 5 – Connect Cypress-Arcadian and Granville-Arcadian 345 kV lines

# Study Area Alternatives





# Study Results

		MISO MTEP17 Planning Futures		
		EF	PR	AAT
Alternatives	Edgewater Alt1	\$1,622,068.89	\$4,885,762.87	(\$2,784,177.76)
	Edgewater Alt2	\$3,501,768.78	\$5,724,755.28	(\$5,111,642.18)
	Edgewater Alt3	(\$23,622.60)	\$2,079,708.00	(\$59,470,806.08)
	FJ Alt1 Xfmr	\$4,650,778.76	\$17,084,872.27	(\$33,774.68)
	FJ Alt2	\$1,891,495.00	\$7,597,284.26	\$11,882,599.62
	FJ Alt3	\$1,891,516.86	\$7,597,291.08	\$11,884,741.00
	FJ Alt4	\$39,770,834.80	\$4,082,061.31	\$48,775,028.87
	FJ Alt5	(\$52,597,116.87)	(\$31,664,089.18)	(\$96,711,759.51)

# Initial Conclusions

- The Forest Junction – Saukville 138 kV lines are very old. Upgrading the line will get some MVA of capacity, but not much.
- A rebuild of that line will be a much higher cost than the benefits.
- Cypress – Arcadian 345 kV has a low rating. F. Jct. Alt 5 too closely ties that line from Granville-Arcadian, causing issues.
- F. Jct. Alt 4 could have similar issues at Alt 5. Further analysis needed.

# Next Steps

- **Continued Analysis of Projects**
  - More detailed review of F. Jct. 5 Alternative
    - Confer with zone planners for reliability impacts
    - Detailed review and verification of economic results
    - Gather cost scope of the project if planning review continues to support the benefits of the project
- **Timelines**
  - February 2018 – Results of more detailed review at 2018 study kickoff

# Detailed MISO Futures Information

- MTEP17 Futures Development Summary
  - [May Planning Advisory Presentation](#)
- MTEP17 Resource Expansion and Siting Results
  - [September Planning Advisory Presentation](#)

# Questions?

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# Thank You For Your Time!

