



Helping to keep the lights on,
businesses running
and communities strong

2017 Economic Planning Study Assumptions

Erik Winsand, ATC Economic Planning

April 27, 2017

Introduction

- Process Overview and Timeline
- Quick MTEP17 Futures Refresh
- Breakdown of Modeling Futures Generation
- 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 CO² emissions
- CO² 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 CO² target
- Assume decreasing capital costs of renewables

Accelerated Alternative Technologies

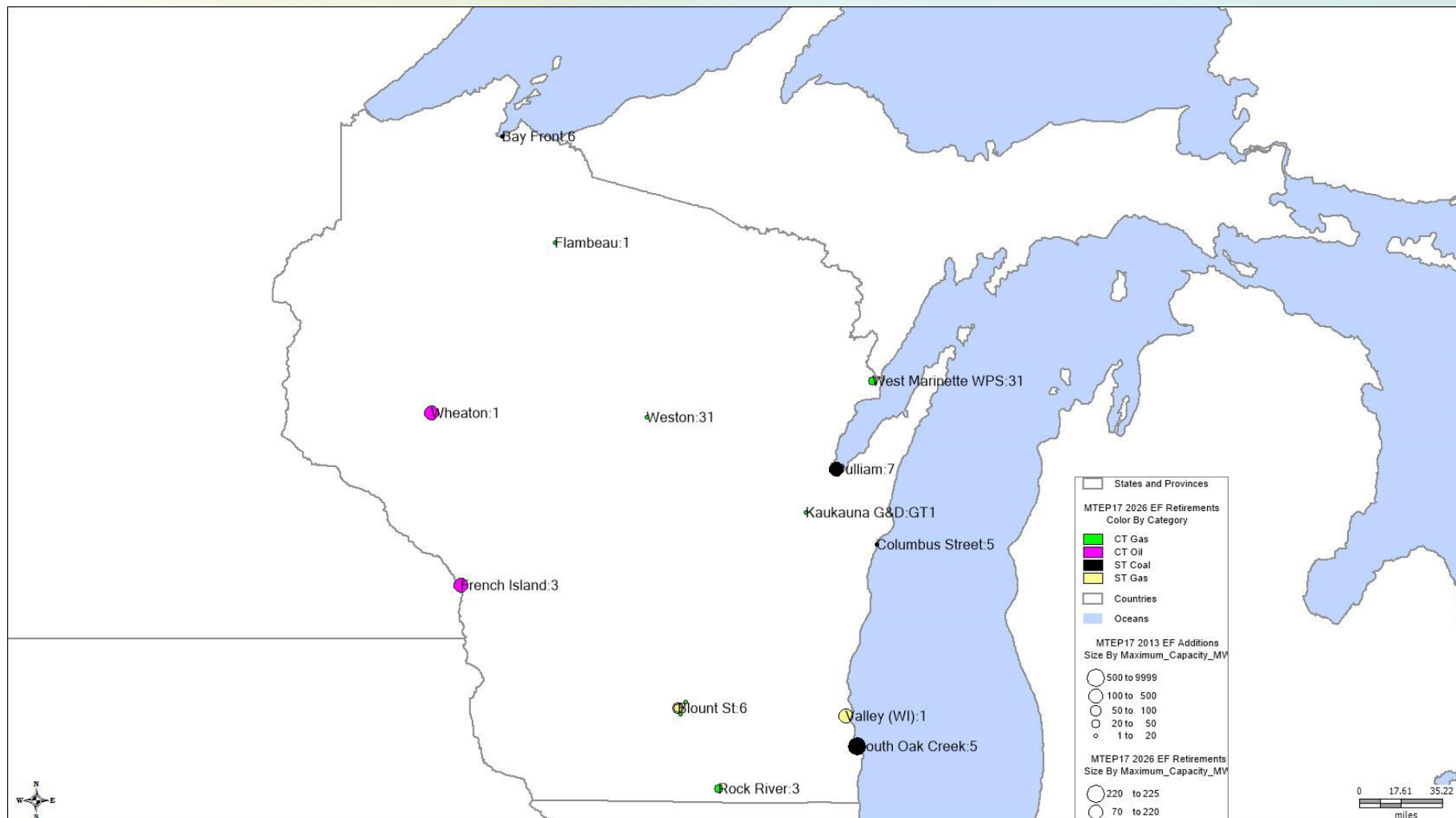
- Policy/Regulation targeting reduction in CO² emissions
- CO² reduction goal set at 35% lower than 2005 levels
- Increased demand on NG drives prices higher
- Increased retirement of coal to meet CO² target
- Robust economy drives more technology advancement, resulting in more energy efficiency, distributed generation, and demand response
- Higher gross demand and energy, offset by tech advancement

MISO MTEP17 Key Assumptions

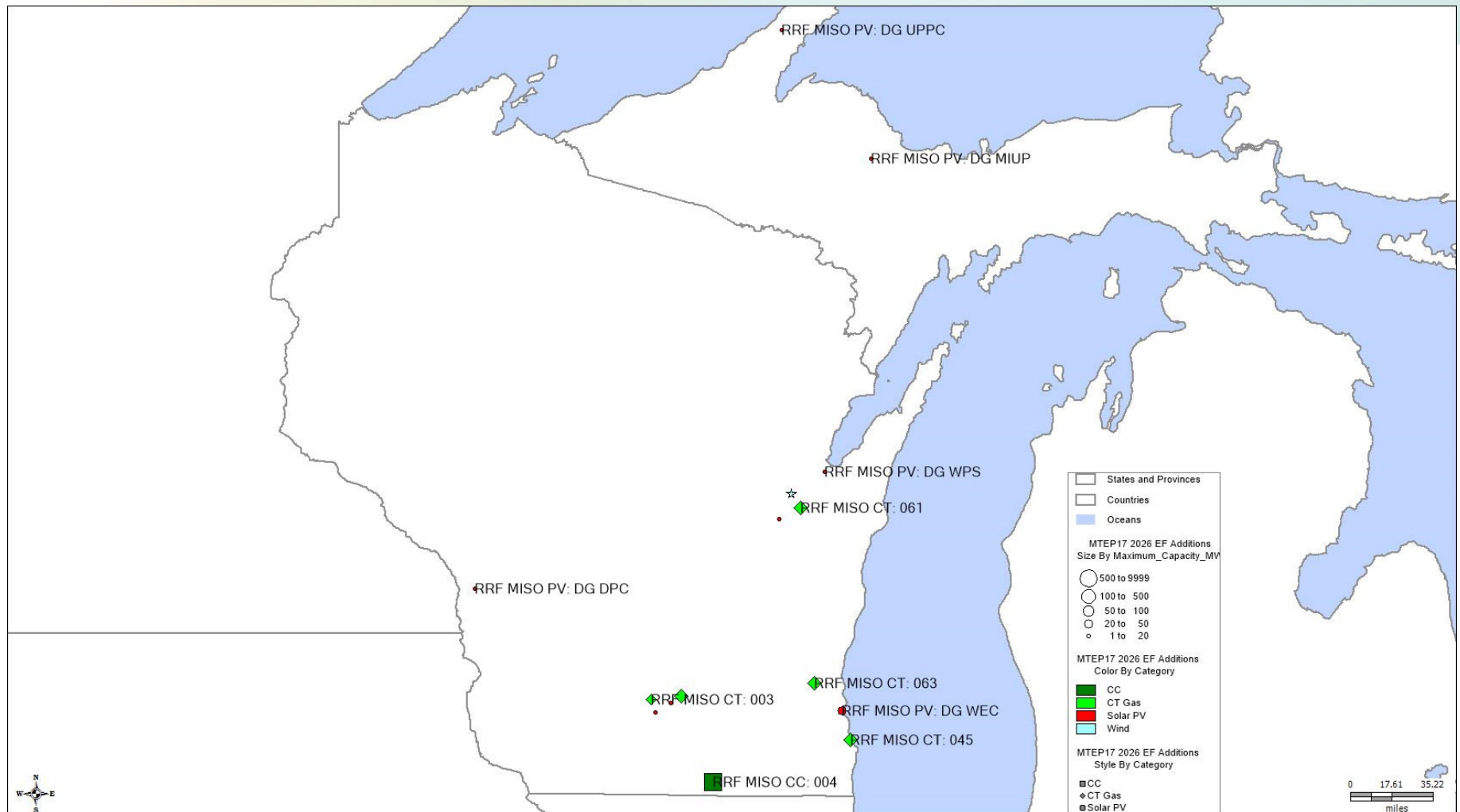
Future	Existing Fleet	Policy Regulations	Accelerated Alternative Technologies
Net Demand & Energy Growth Rates	Demand: 0.4% ¹ Energy: 0.4% ¹	Demand: 0.5% ¹ Energy: 0.5% ¹	Demand: 0.6% ¹ Energy: 0.6% ¹
Natural Gas Price Forecast	Low	Mid	High
Max DR/EE/DG Tech Potential	DR: 8 GW EE: 9.6 GW DG: 2.3 GW	DR: 9 GW EE: 10.8 GW DG: 2.8 GW	DR: 12.1 GW EE: 25.6 GW DG: 6.4 GW
Retirement	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
Renewables	Mandates + Goals	Mandates + Goals + maturity cost curve	Mandates + Goals + maturity cost curve
MISO System CO2 Reduction Target	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%

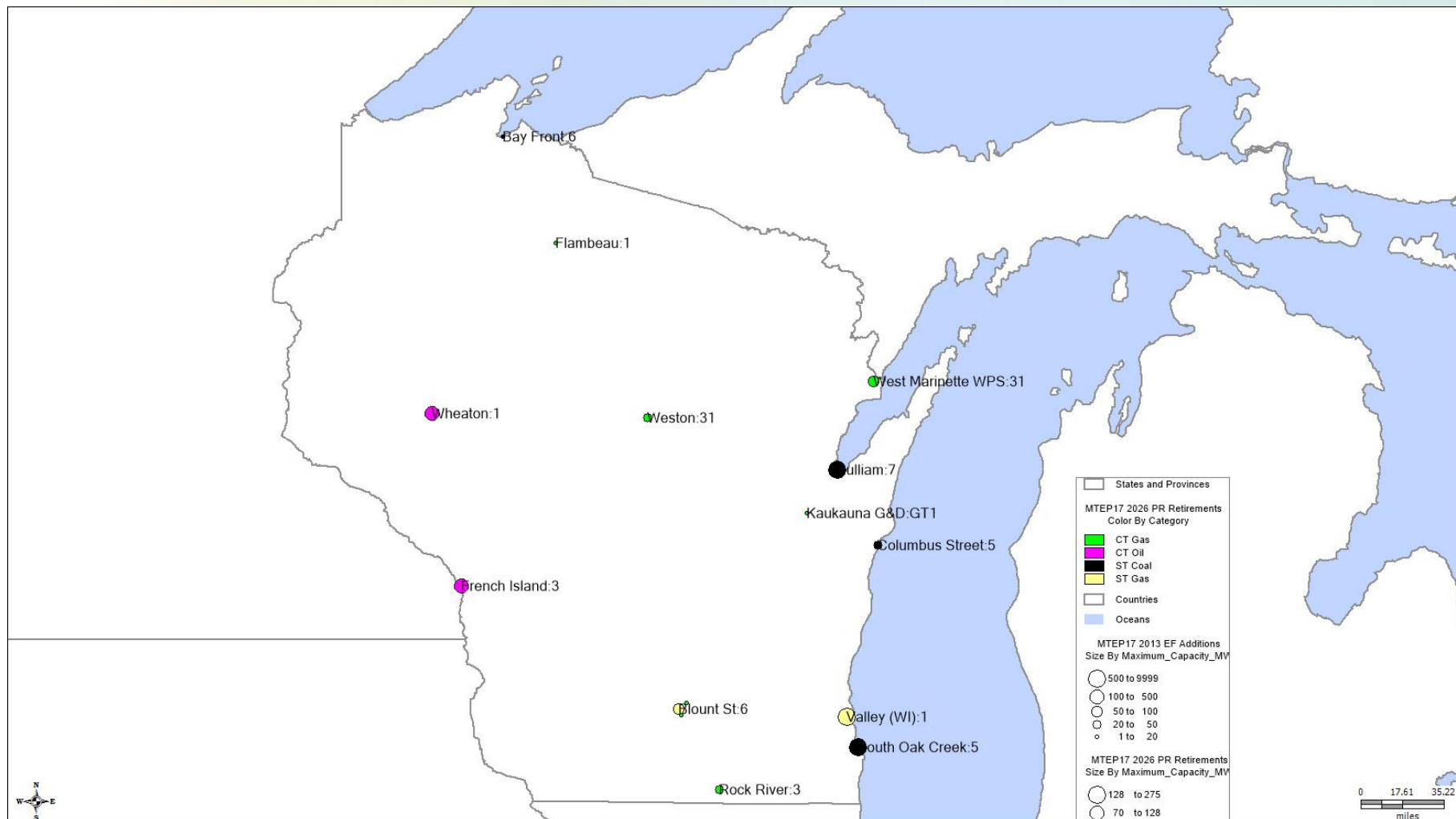
MTEP17 EF Future 2026 Retirements



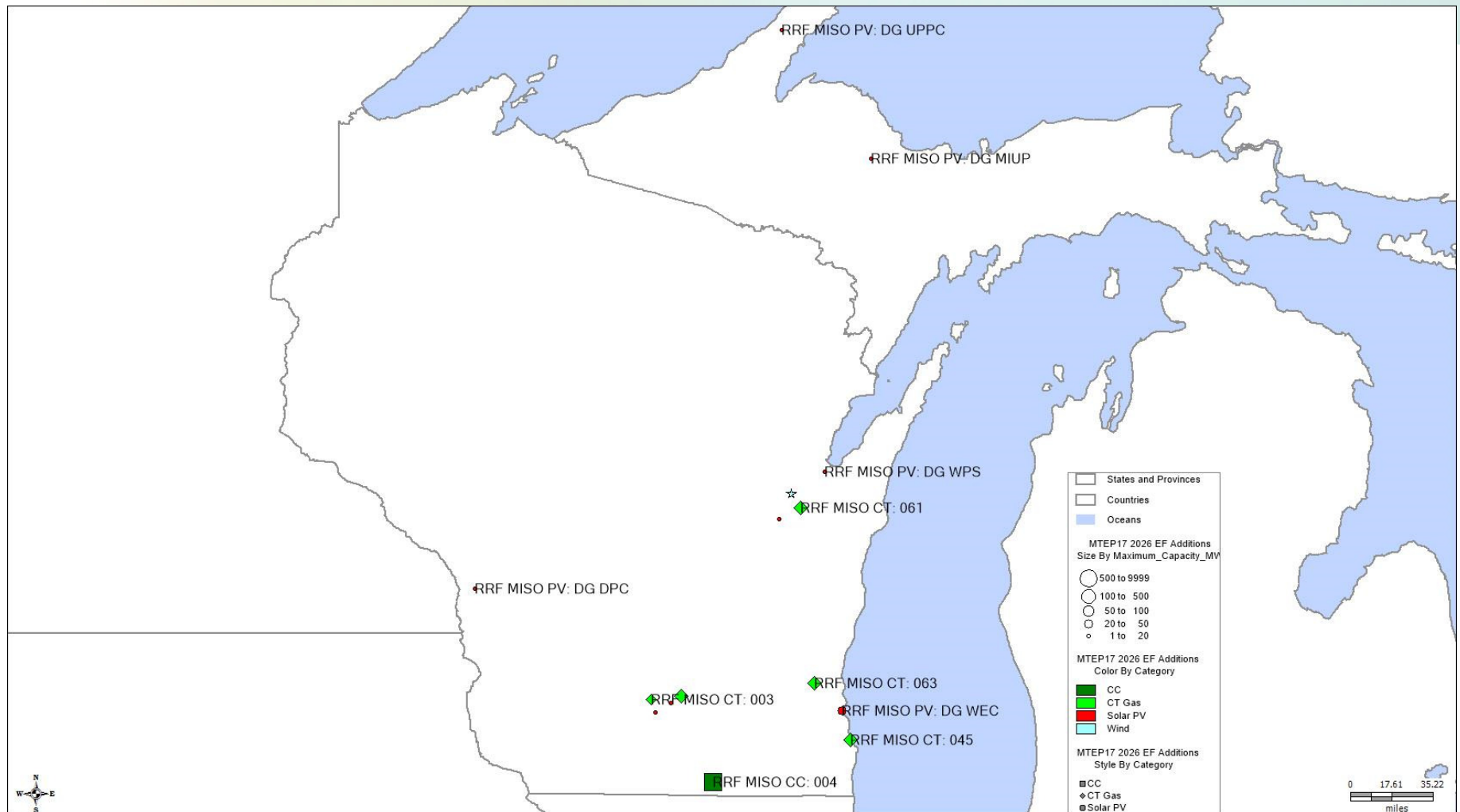
MTEP17 EF Future 2026 Additions



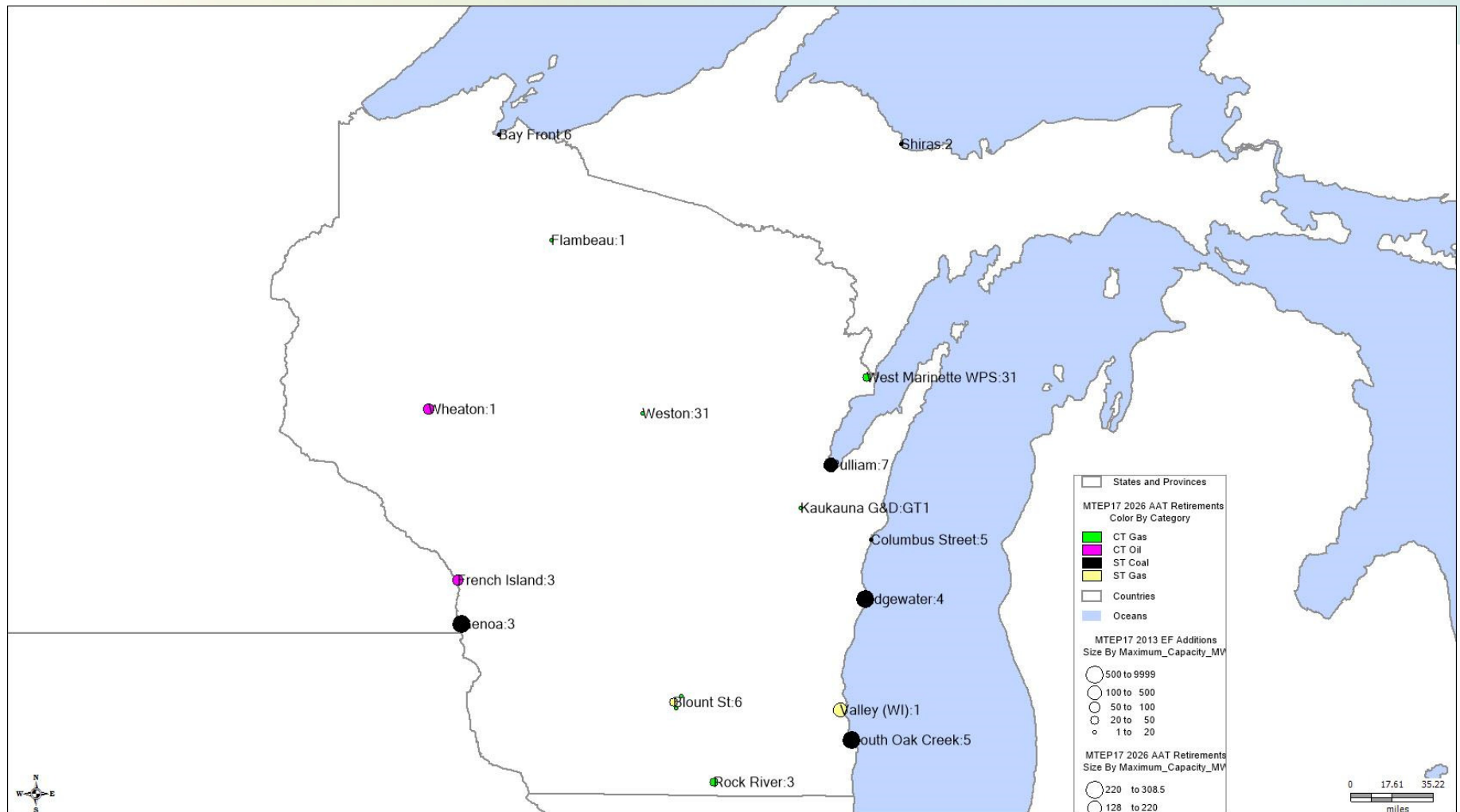
MTEP17 PR Future 2026 Retirements



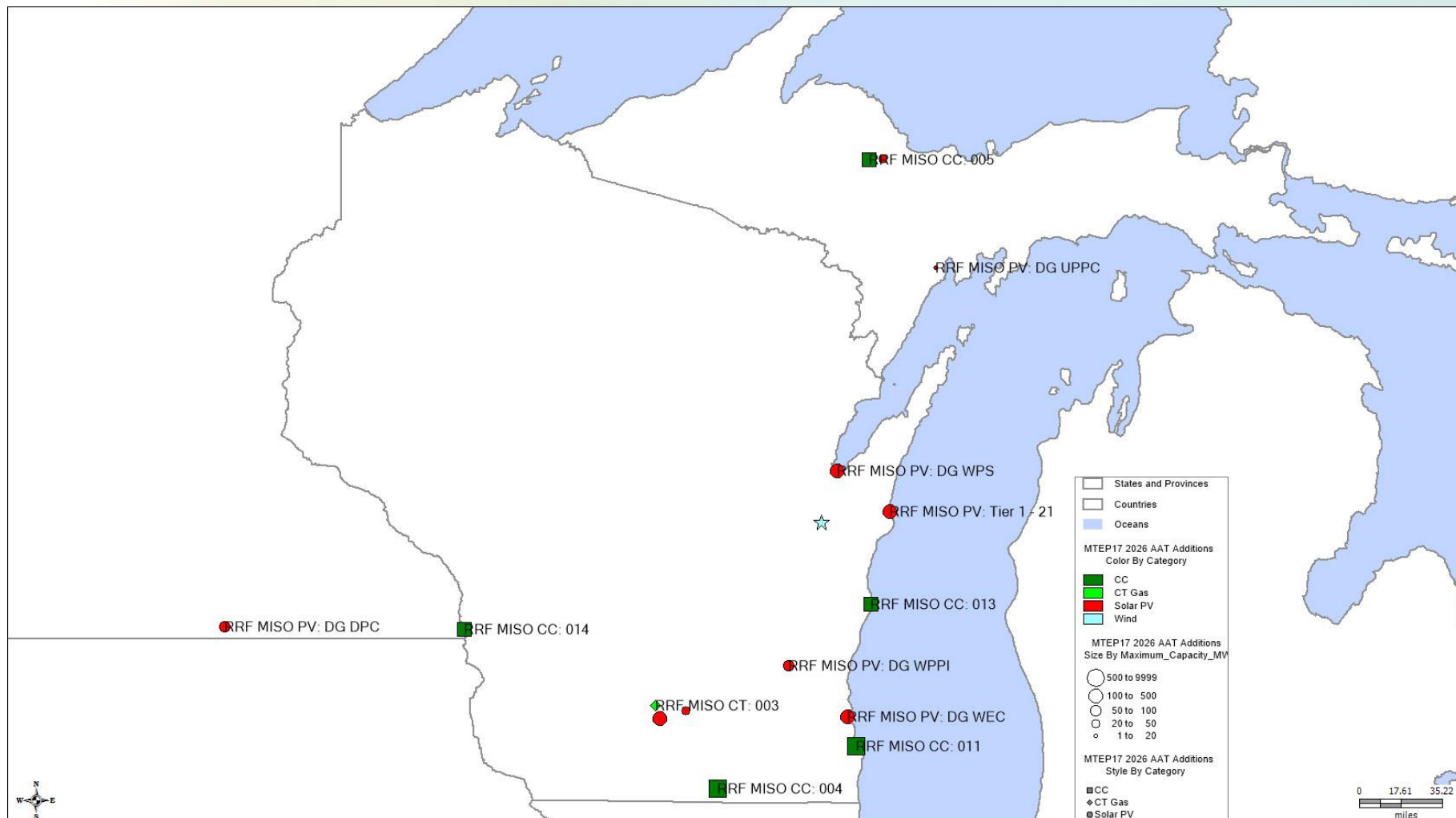
MTEP17 PR Future 2026 Additions



MTEP17 AAT Future 2026 Retirements



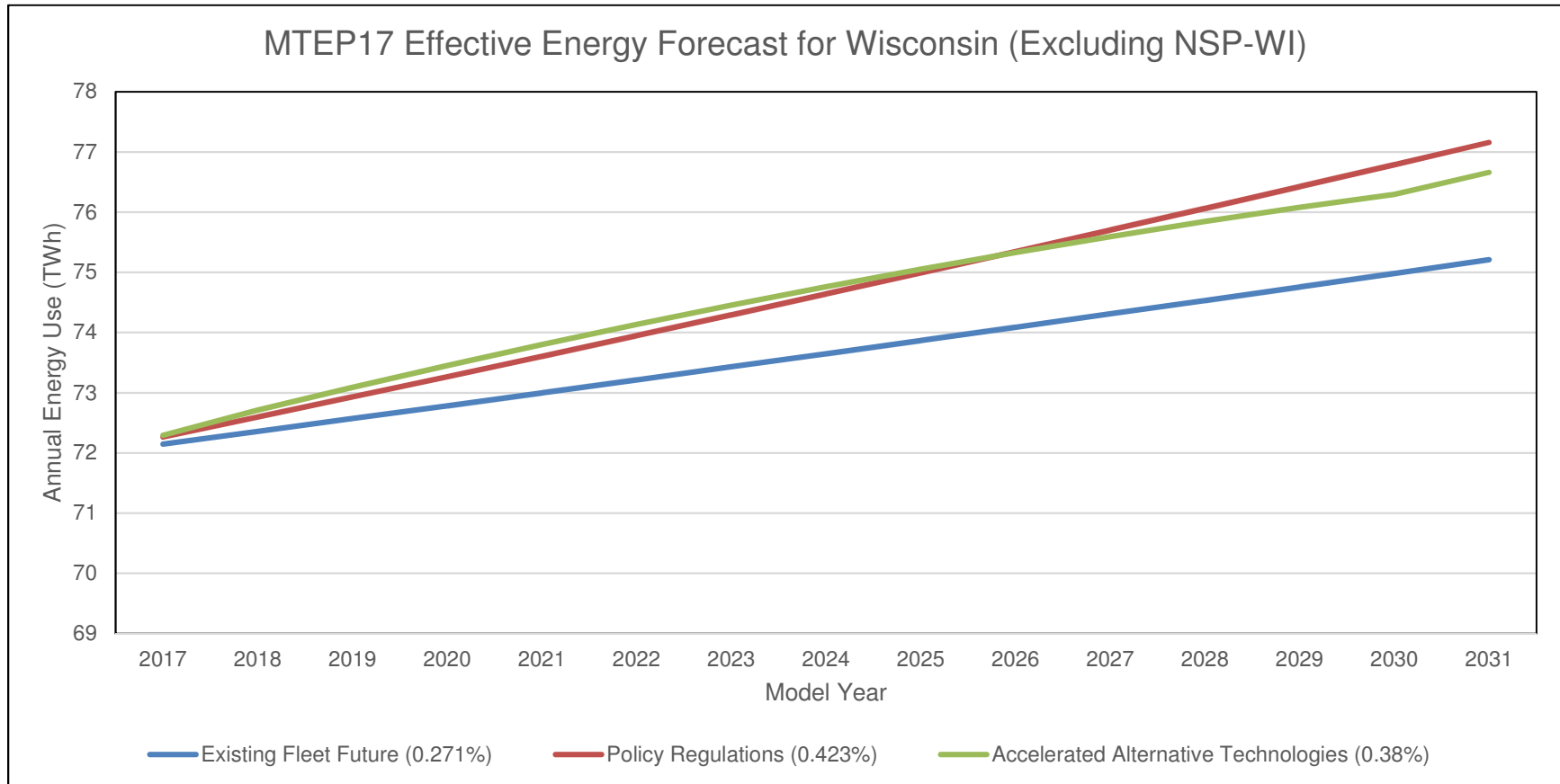
MTEP17 AAT Future 2026 Additions



MTEP17 Wisconsin Energy Forecast

- MISO MTEP Demand and Energy based on submittals by utilities (Alliant, WEC Energy, Dairyland, etc...)
- MISO stakeholders agreed and voted on futures based on gross load growth
- Demand Side Management lowers gross demand and energy forecast

MTEP17 Wisconsin Energy Forecast



MISO vs. Wisconsin

Futures	Existing Fleet	Policy Regulations	Accelerated Alternative Technologies
MISO Wide Gross Rates	0.3%	0.7%	1.0%
Wisconsin Effective Rates	0.271%	0.423%	0.38%

*Gross WI rate unavailable. Only models released are with effective rate.

Maximum DR/EE/DG Tech Potential

- DR – Demand Reponse is price sensitive modeling of reduction in demand (explicitly modeled)
- EE – Energy Efficiency is inherently assumed in the demand and energy growth assumptions (effective growth rate)
- DG – Distributed Generation is locally sited, non-utility scale solar (explicitly modeled)

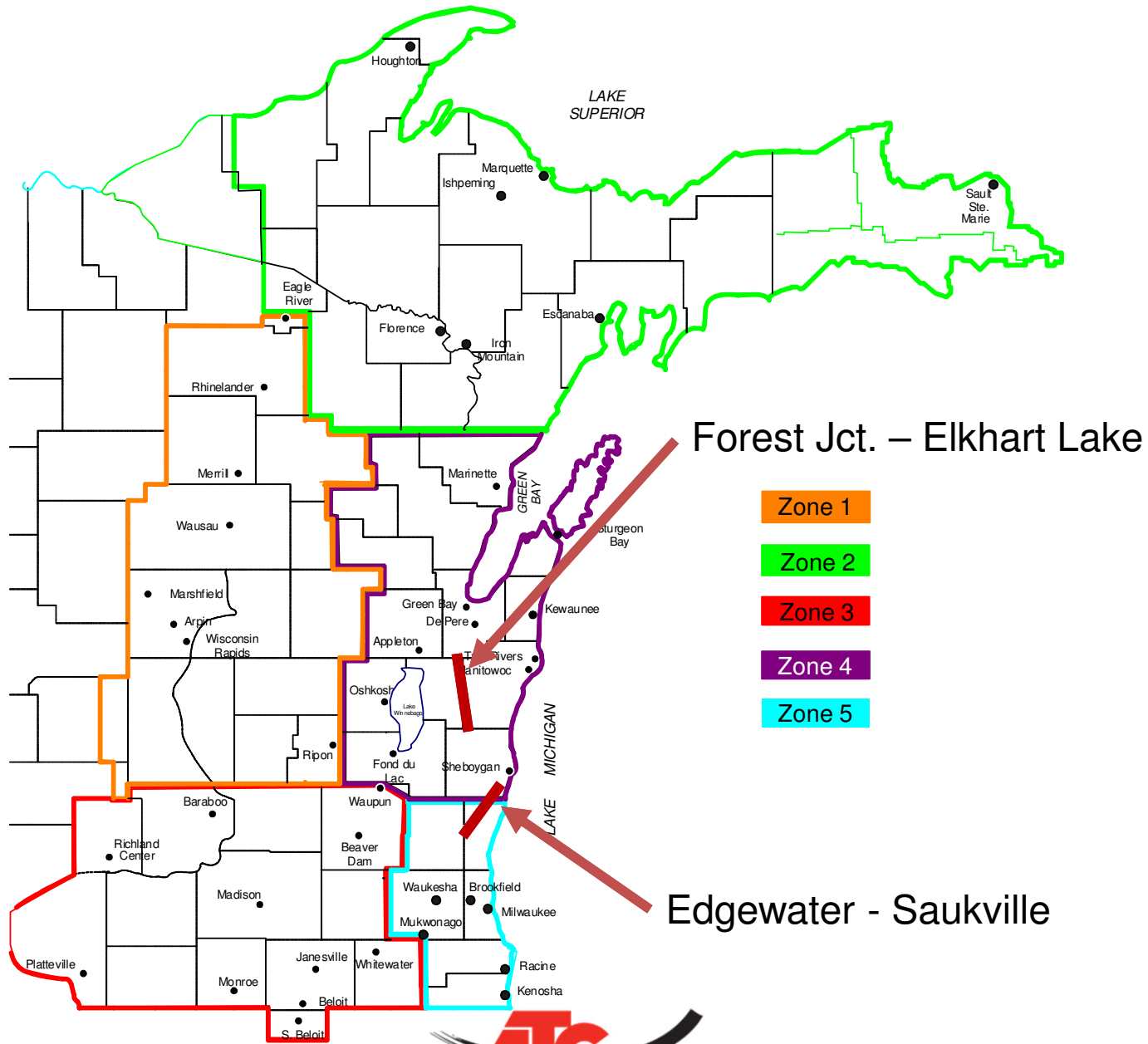
Modeled DR/EE/DG Tech Potential - WI

Futures	Existing Fleet	Policy Regulations	Accelerated Alternative Technologies
MISO Wide Max Potential - DR	8 GW	9 GW	12.1 GW
Modeled In Wisconsin - DR	0.69 GW	0.90 GW	1.11 GW
MISO Wide Max Potential - DG	2.3 GW	2.8 GW	6.4 GW
Modeled In Wisconsin - DG	0.09 GW	0.35 GW	0.80 GW

*Additional confirmation needed from MISO

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 138 kV
- Shoto – Northeast 69 kV



Next Steps

- **Project / Analysis Development**
 - Investigate impacts of generation expansion and retirement on congestion
 - Compile and answer additional stakeholder feedback
- **2017 Futures Development**
 - Continued Review of MISO MTEP17 Development
 - Review of MISO PROMOD Models
- **Analysis of Projects**
 - Study Years – 2026 and 2031
 - Futures – All MISO MTEP17 Futures
- **Timelines**
 - May 15: Finalize Assumptions
 - November 15: Provide Analysis Update

Detailed MISO Futures Information

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

Questions?

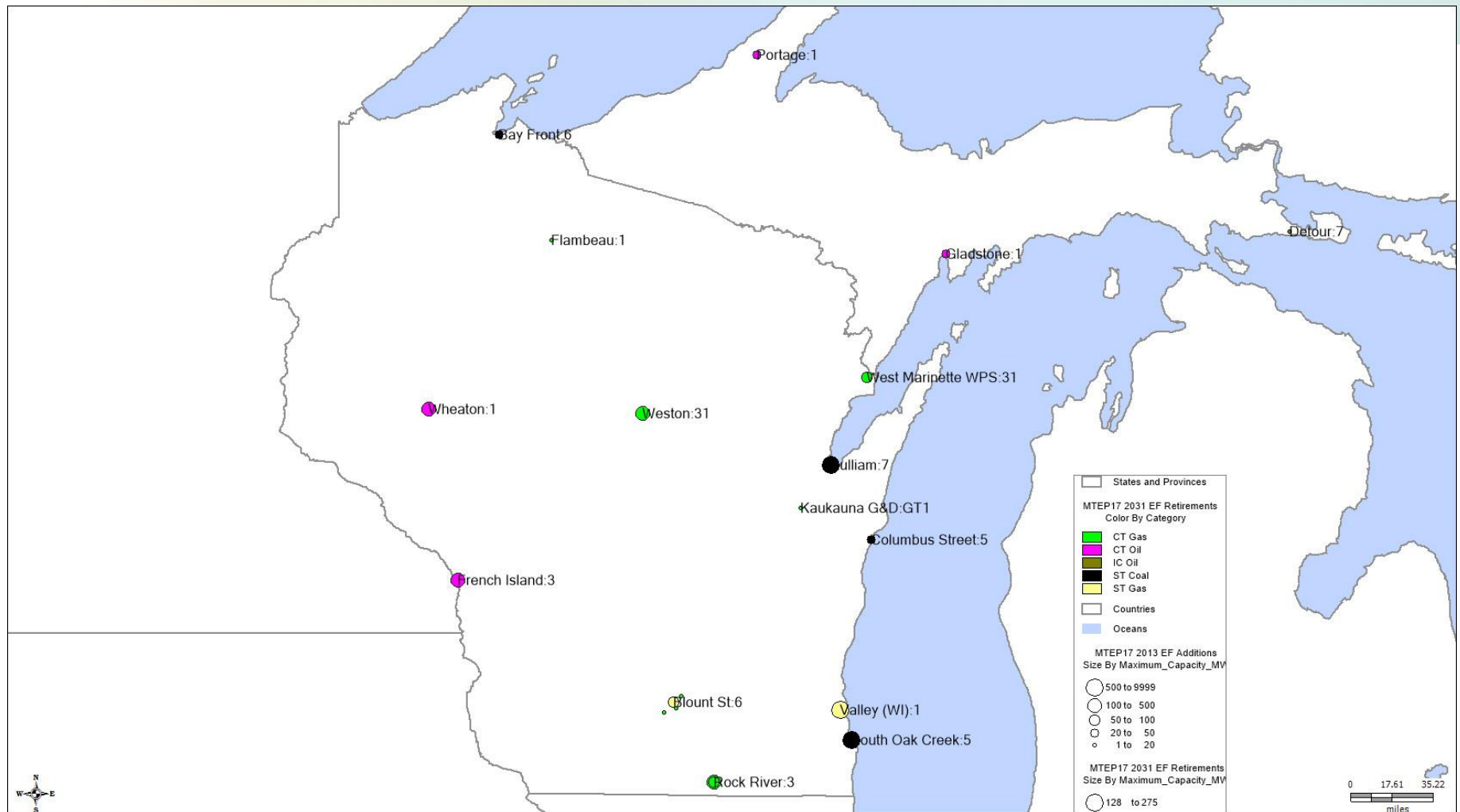
- ATC Economic Planning
- Dale Burmester
 - dburmester@atcllc.com
- Erik Winsand
 - ewinsand@atcllc.com

Thank You For Your Time!

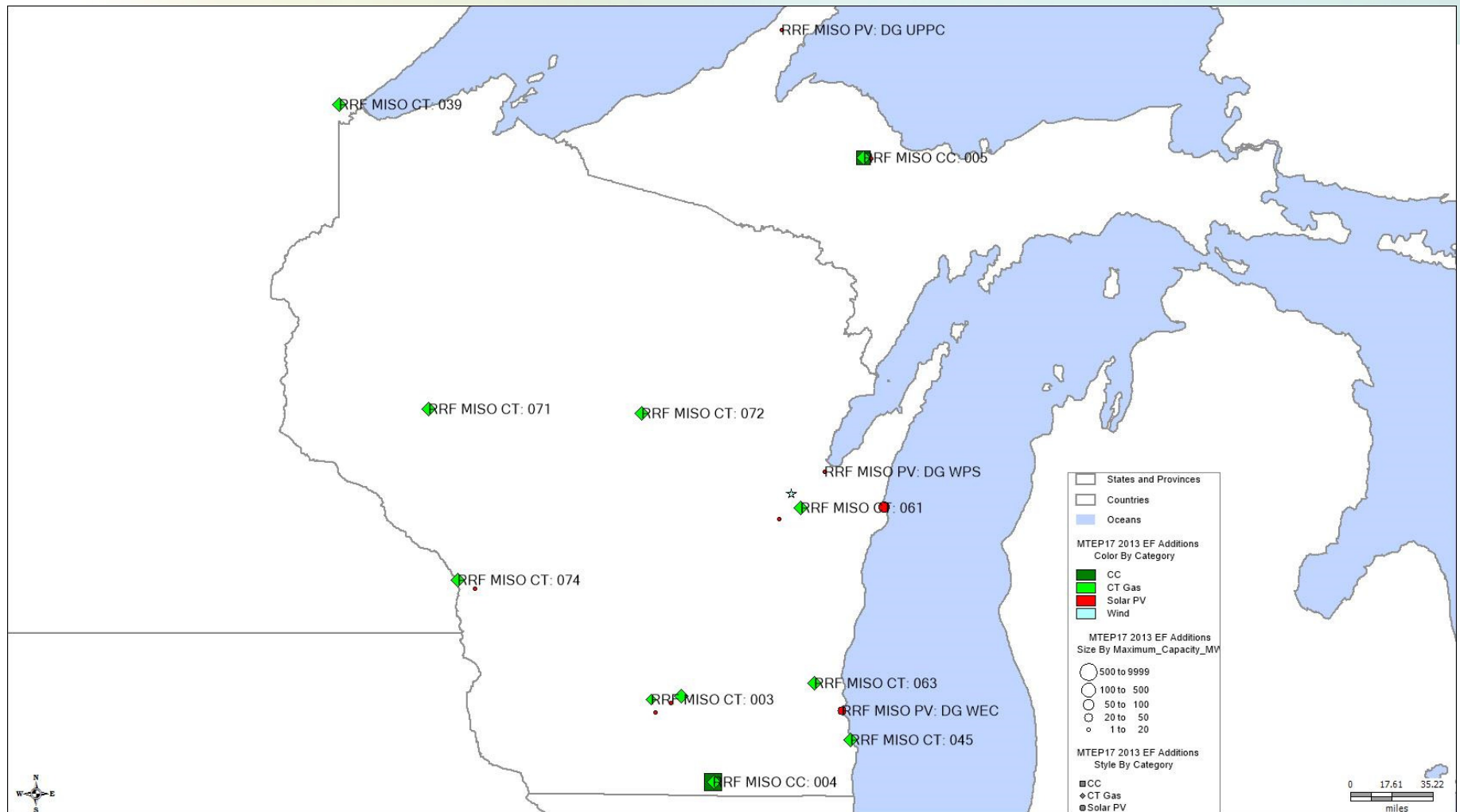


Appendix with 2031 Retirement and Addition Maps

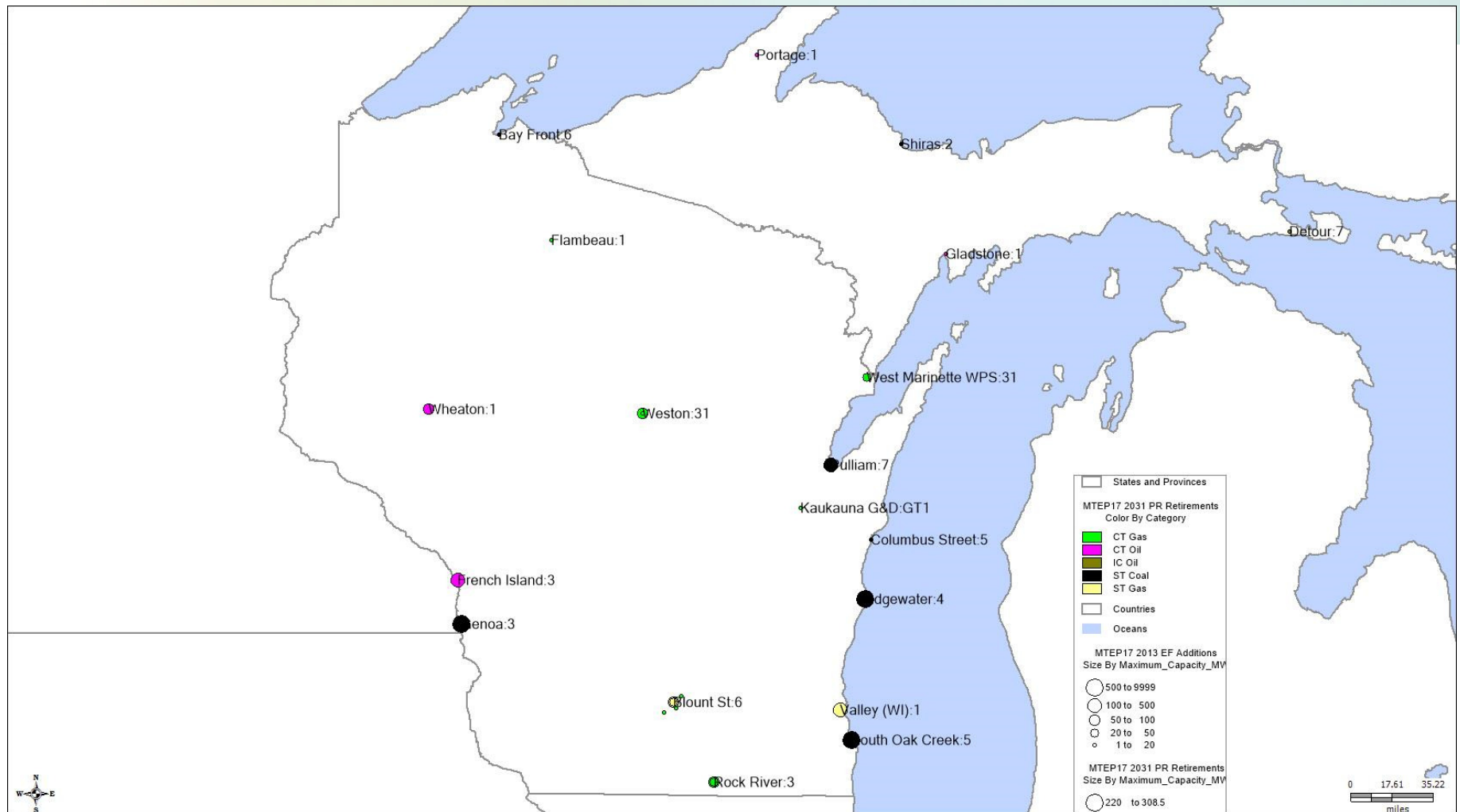
MTEP17 EF Future 2031 Retirements



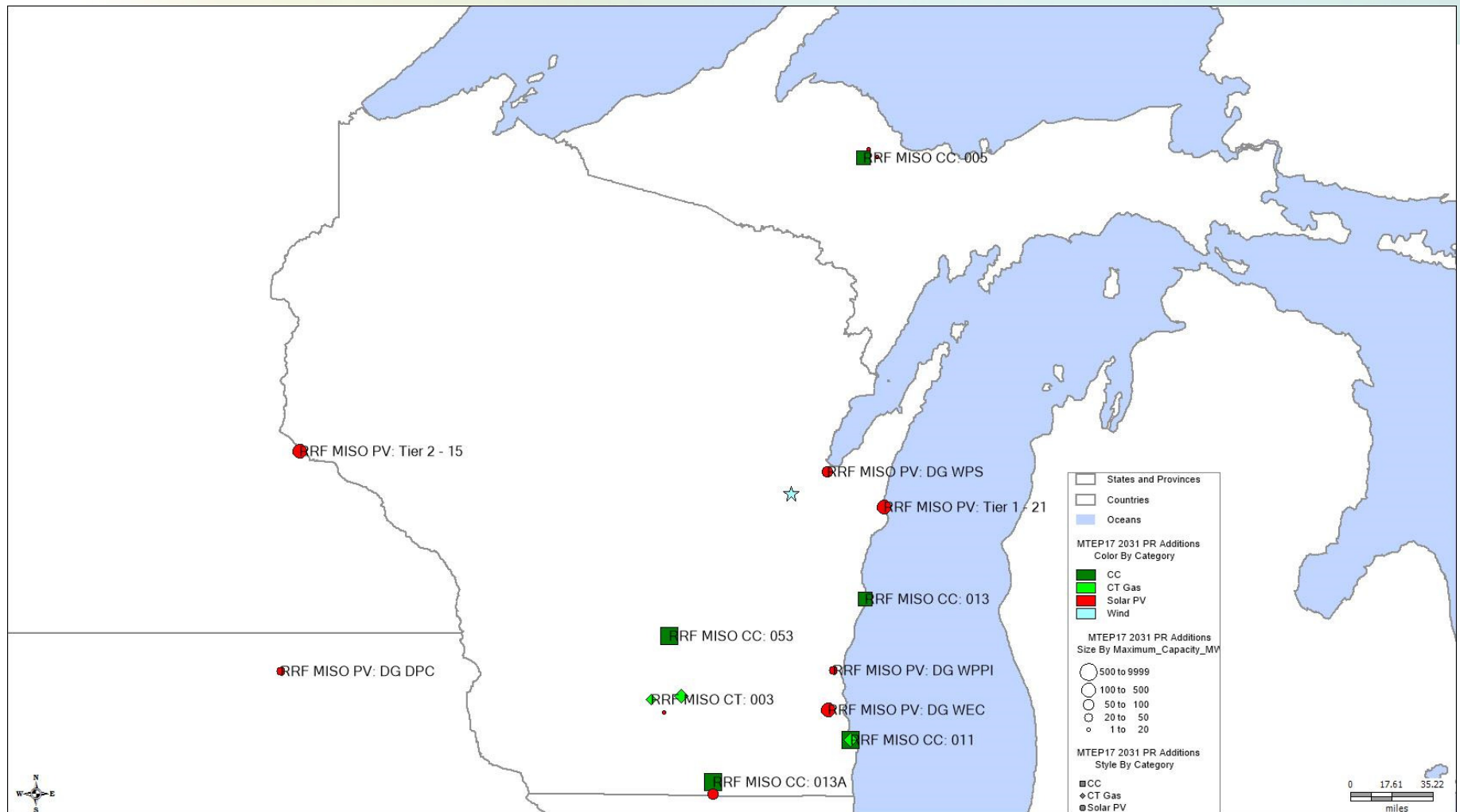
MTEP17 EF Future 2031 Additions



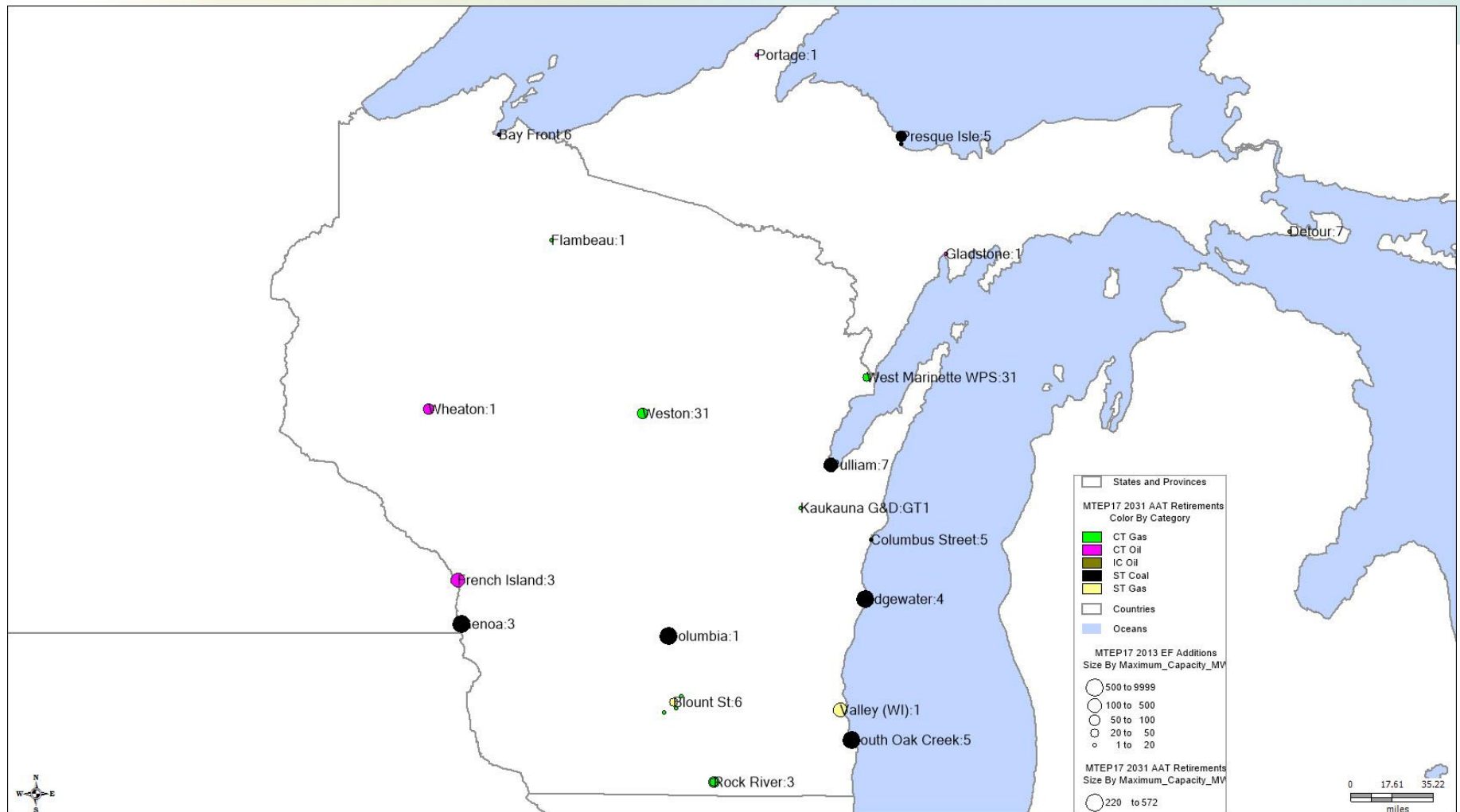
MTEP17 PR Future 2031 Retirements



MTEP17 PR Future 2031 Additions



MTEP17 AAT Future 2031 Retirements



MTEP17 AAT Future 2031 Additions

