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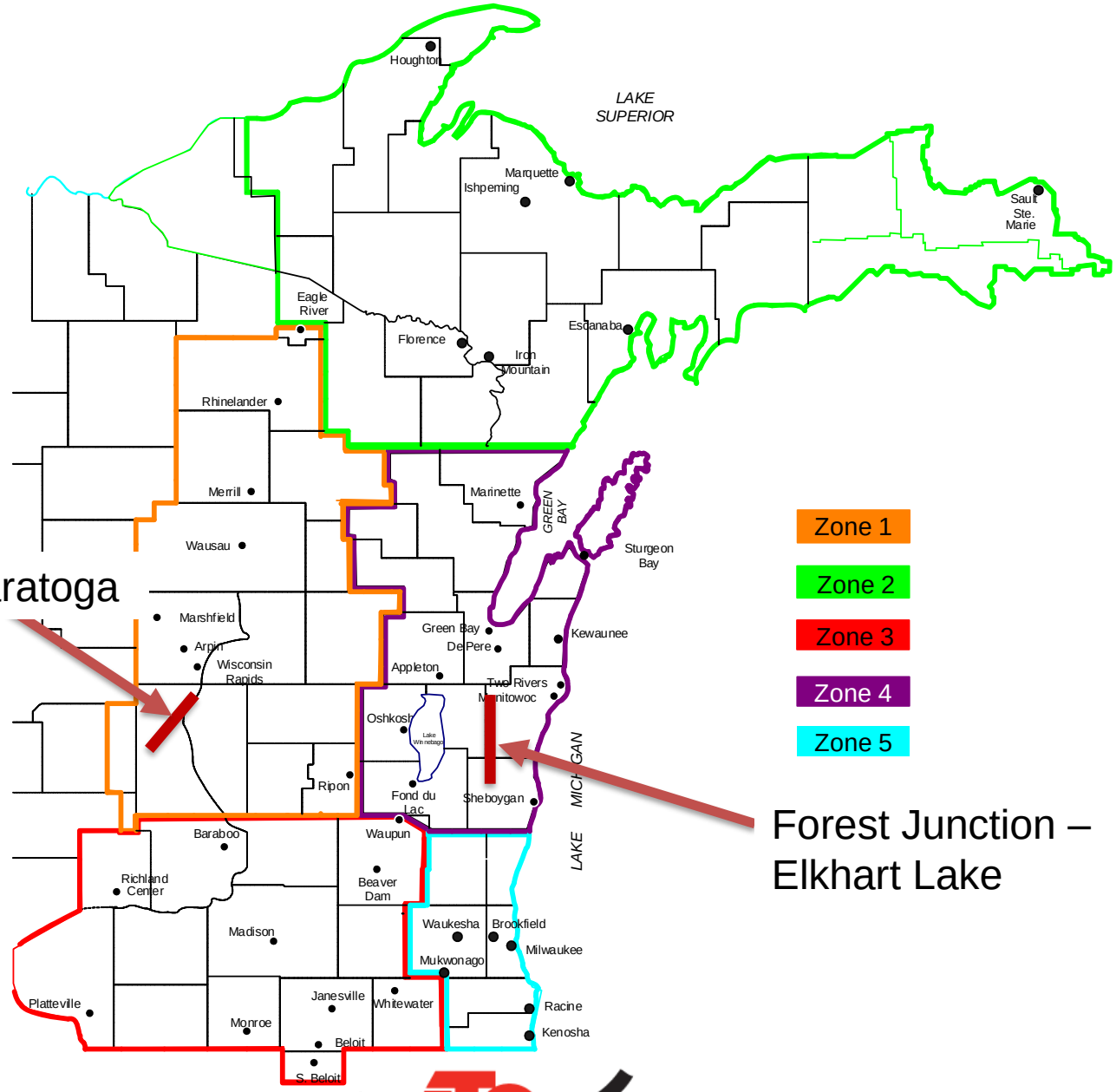
Economic Planning Study Update

Anna Torgerson, ATC Economic Planning

March 10, 2020



Petenwell-Saratoga

Forest Junction – Elkhart Lake

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Elkhart Lake Series Reactor

- Waiting on delivery of equipment
- Construction will start later this year
- In-service by end of 2020

- Cost of $1.3 Million
- 40 Year Customer Benefit of $11.2 Million

Petenwell – Saratoga (X-43) Rebuild

- Improves Reliability Issues
- IT Project Cost Savings
- Lowers Market Congestion
- Removes the need for the Council Creek Remedial Action Scheme
  - Saves time and money
- Acceleration of Asset Renewal Projects

- Cost of $24.5M
- Project in-service date of 12/2022

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2020 Economic Planning Study Kickoff

Anna Torgerson, ATC Economic Planning

March 10, 2020

Introduction

- Process Overview and Timeline
- 2020 Futures Development
- Stakeholder Input
- Next Steps

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.

2020 Futures Development

- Utilize the MISO Transmission Expansion Plan (MTEP) models and futures
- Review MISO models and provide updates as necessary
  - Review generation interconnection request in MISO Queue
  - Review load profiles and demand and energy growth
  - Better modeling of time of use industrial customers
  - Most updated transmission topology
- Ensures greater alignment with MISO stakeholder process

MISO MTEP20 Futures

- Same Futures as MTEP19

- Limited Fleet Change – (LFC)
- Continued Fleet Change – (CFC)
- Accelerated Fleet Change – (AFC)
- Distributed & Emerging Technology – (DET)

Limited Fleet Change

- Largely unchanged generation fleet
- Age related coal retirements
- Low demand and energy growth rates
- Low renewable/technology development
- Low fuel costs

Continued Fleet Change

- Age related retirements of coal and natural gas
- Transitioning of generation fleet to natural gas
- Mid level demand and energy growth rates
- Current trend of renewable/technology investment
- Mid level fuel prices

Accelerated Fleet Change

- Policy/Regulation targeting reduction in CO^2 emissions causing increased coal retirements
- Increased demand on Natural Gas drives prices higher
- Robust economy drives more technology advancement, resulting in more energy efficiency, distributed generation, and demand response
- Higher gross demand and energy

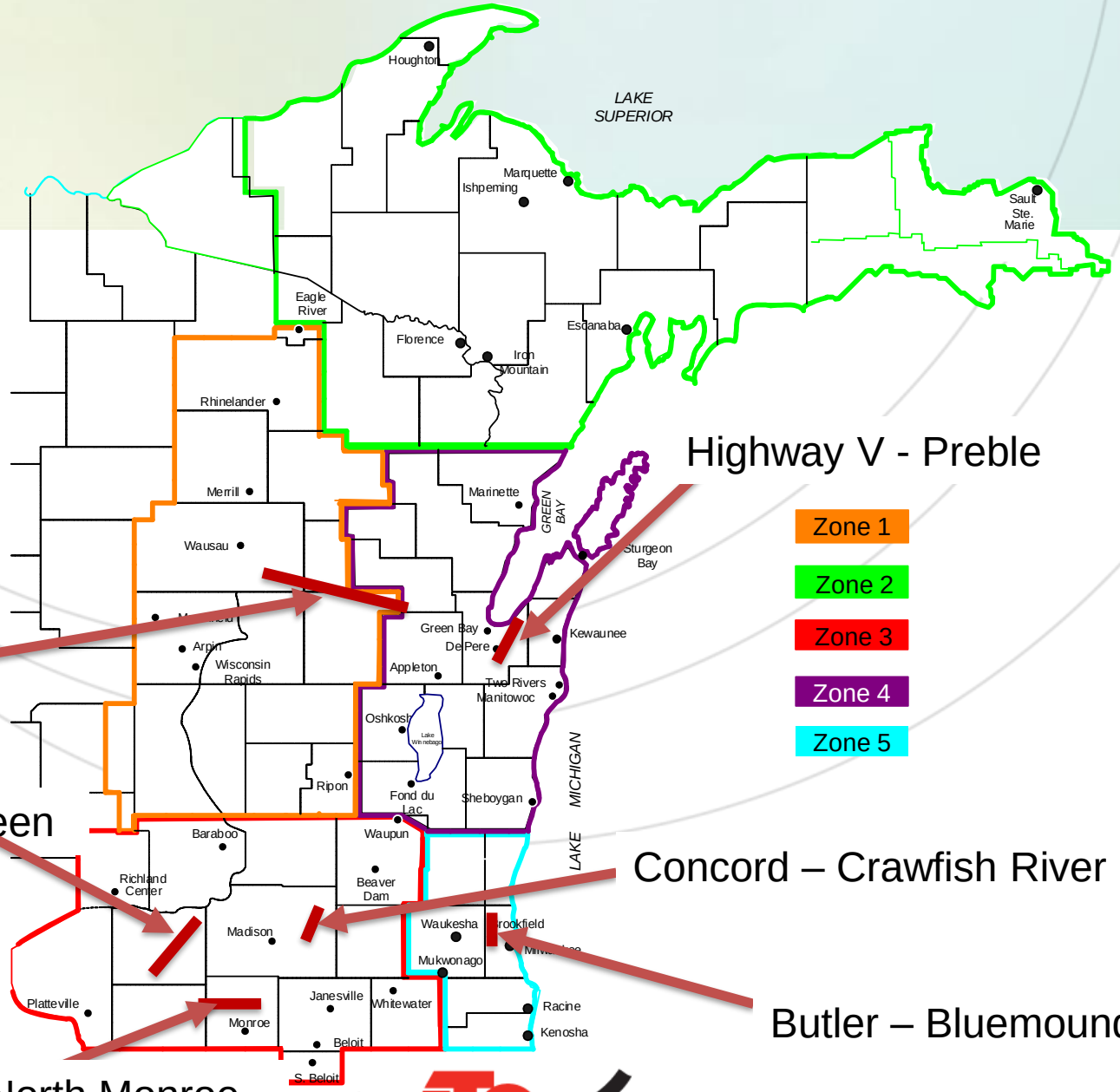
Distributed & Emerging Technology

- Age and economic related coal retirements
- Higher energy usage driven by electric vehicles (EVs)
- Mid level fuel prices
- Renewable siting is much more localized and urban
- High usage of demand side generation and management
- Retirements of nuclear based on licenses

Notable MTEP20 Congestion

- Darlington – North Monroe 138kV
- Preble – Highway V 138kV (Existing Series Reactor)
- Concord – Crawfish River 138kV
- Rocky Run – Werner West 345kV
- Eden – Spring Green 138kV
- Granville – Bluemound 138kV Corridor

- Note: Models here include 2017 Phase 3 Generation


Houghton
LAKE SUPERIOR
Marquette
Ishpeming
Sault Ste. Marie
Eagle River
Florence
Escanaba
Iron Mountain
Rhinelander
Merrill
Marinette
GREEN BAY
Wausau
Sturgeon Bay
Green Bay
De Pere
Kewaunee
Arpin
Wisconsin Rapids
Appleton
Two Rivers
Manitowoc
Oshkosh
Ripon
Fond du Lac
Sheboygan
MICHIGAN
LAKE
Baraboo
Waupun
Richland Center
Beaver Dam
Madison
Waukesha
Brookfield
Mukwonago
Janesville
Whitewater
Racine
Platteville
Monroe
Beloit
Kenosha
S. Beloit
Highway V - Preble
Zone 1
Zone 2
Zone 3
Zone 4
Zone 5
Rocky Run – Werner West
Eden – Spring Green
Concord – Crawfish River
Butler – Bluemound
Darlington – North Monroe

Additional Congestion Mitigation Possibilities

- Battery
  - Size and Duration (MW and MWH)
  - Dispatching per schedule or production cost
  - Locations (large factories or industrial areas)
- Solar
  - Utility Scale Location
  - Distributed generation (DG) sizing and location
- Wind
  - Small utility scale sizing (0.5–5MW)
  - Locations
- Load Modification
  - Time of day
    - Peak shave
    - Running appliances at night

Purposed Generation Updates

- 2017 Definitive Planning Phase 3 Queue Generation
  - J818, J819, J831, J850, J864, J878, J947
  - Nemadji Trail Energy Center
  - Badger Hollow
  - Red Barn
  - Marathon Wind
  - Quilt Block Addition
  - Include associated transmission upgrades

- Are there any additional generation updates to be made?

Stakeholder and Customer Feedback

- ATC is soliciting stakeholders and customers for new/other economic studies, recommended study assumptions changes, and study areas for our 2020 study
- ATC 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
  - Investigate impacts of generation expansion and retirement on congestion
  - Stakeholder Feedback
- 2020 Futures Development
  - Continued Review of MISO MTEP Development
  - Update model with interconnection projects that may impact congestion
- Analysis of Projects
  - Study Years – 2024, 2029 and 2034
  - Futures – All MISO MTEP20 Futures
- Timelines
  - April 15: Define Preliminary Assumptions
    - Includes Generation Updates from customers
  - May 15: Finalize Assumptions
  - November 15: Provide Analysis Update

Questions?

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Thank You For Your Time!