2022 10-Year Assessment Preliminary Needs

Stakeholder and Customer Webcast

PRESENTED BY

Allison Bartz, Heather Andrew, Scott Adams, Matt Falkowski, Erik Winsand, Joel Berry, Kerry Marinan, Michael Billups, Anna Torgerson

March 7, 2022

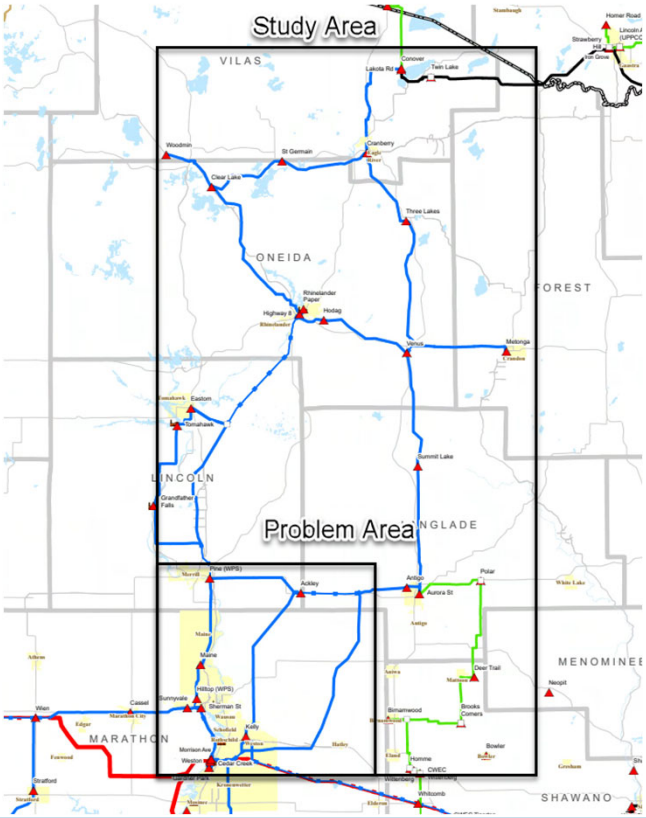
Purpose – Allison Bartz

- Define and Solicit Input on Needs
  - Network/System Planning
  - Generation Interconnection/Generation to Transmission (G-T) and Distribution to Transmission (D-T)
  - Asset Renewal
  - Communications
- Solicit Input on Public Policy Driven Needs
- Summarize Next Steps

Preliminary Needs

- We are seeing new projects based on new needs this year.
  - North-Central WI reliability
  - Additional renewable interconnections & generation retirements
  - Distributed Energy Resources (DERs)
  - Madison-area substation asset renewal work
  - Changes in regulatory body priorities & policies

North-Central WI Reliability Project – Michael Billups



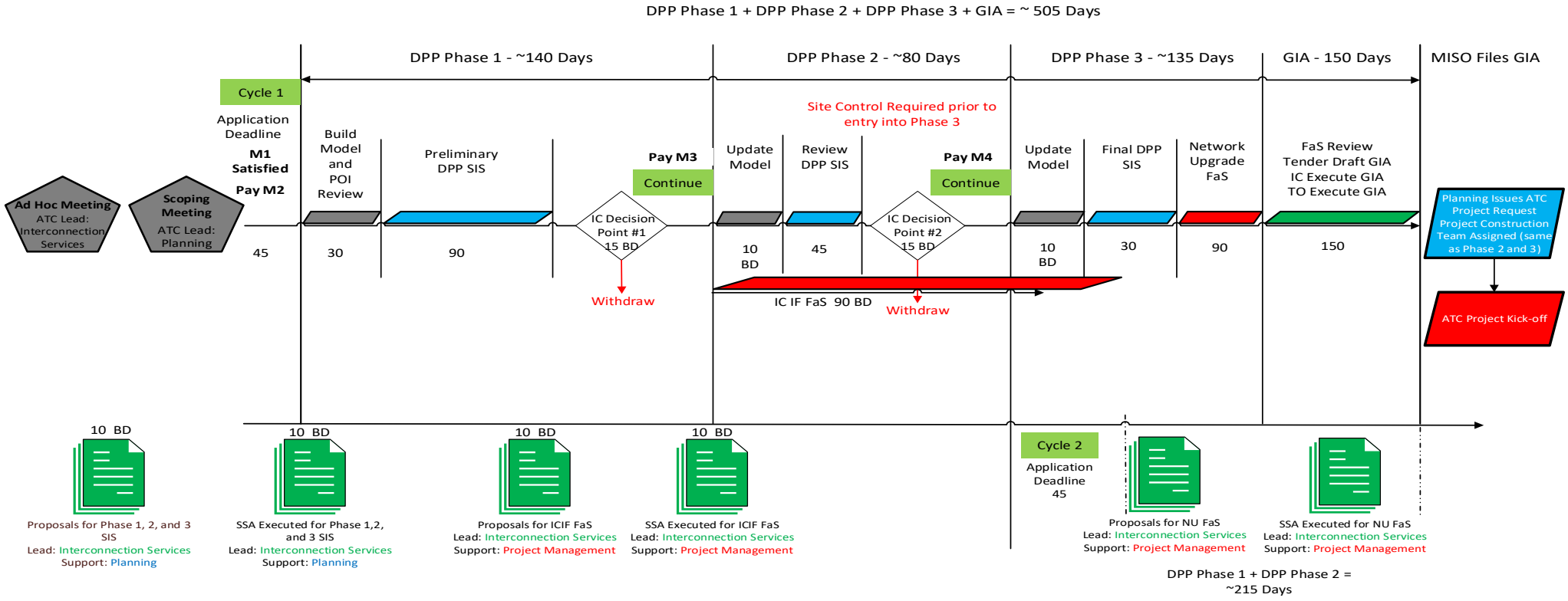
- New study to investigate N-1-1 identified in MTEP21 analysis
- Project in MTEP22 App B
- Targeting 7/1/2022 for preferred solution
- Project ISD 6/1/2026

Generation Interconnections MISO Process – Heather Andrew

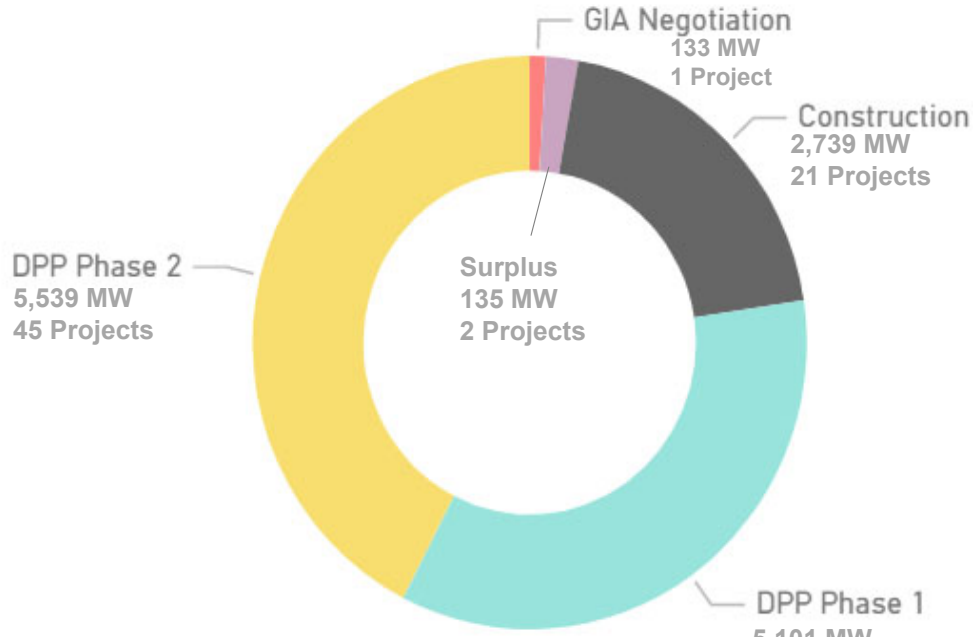
Link to interconnection queue (CTRL + click to follow)

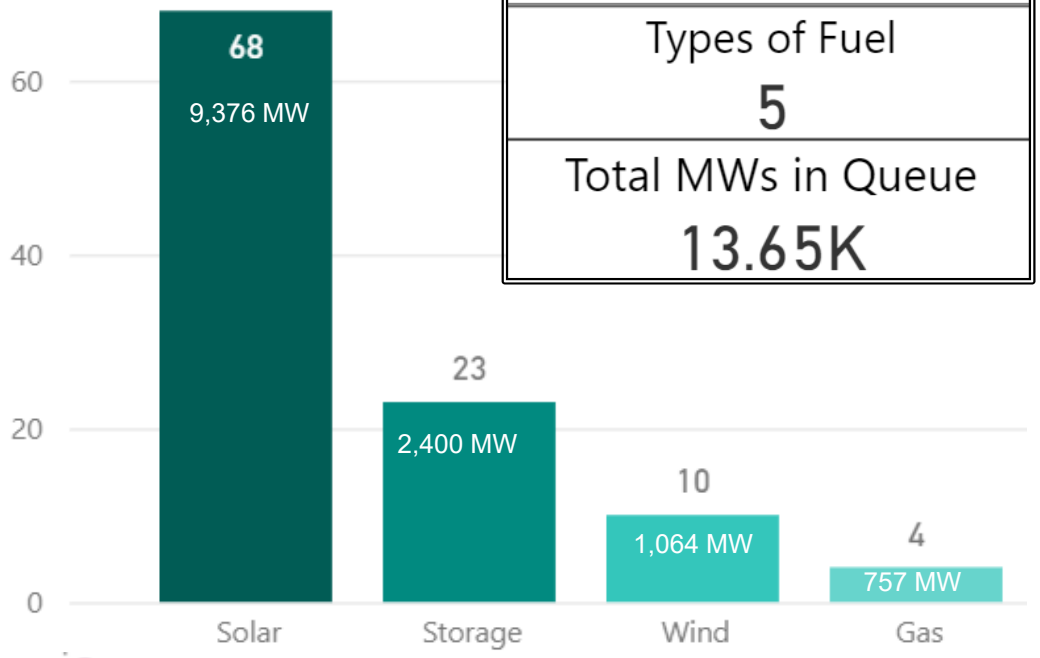
Link to Process Guide (CTRL + click to follow)

Generator Interconnection Process



G-T Dashboard





Phase Construction DPP Phase 1 DPP Phase 2 GIA Negotiation Surplus

Active MISO GT Projects
106
Developers
37
Types of Fuel
5
Total MWs in Queue
13.65K

Other Generator Updates

- ATC filed at FERC to change reimbursement policy for the 2020 queue cycle
- Replacement generators
- Surplus generation

Distribution to Transmission (D-T) Interconnections

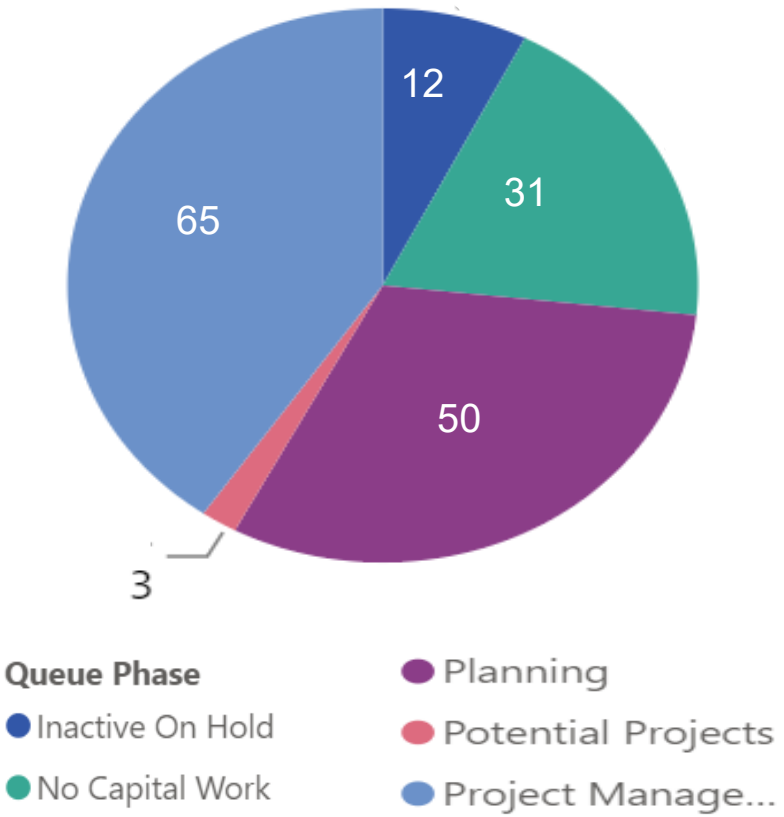
90+ requests in 2021

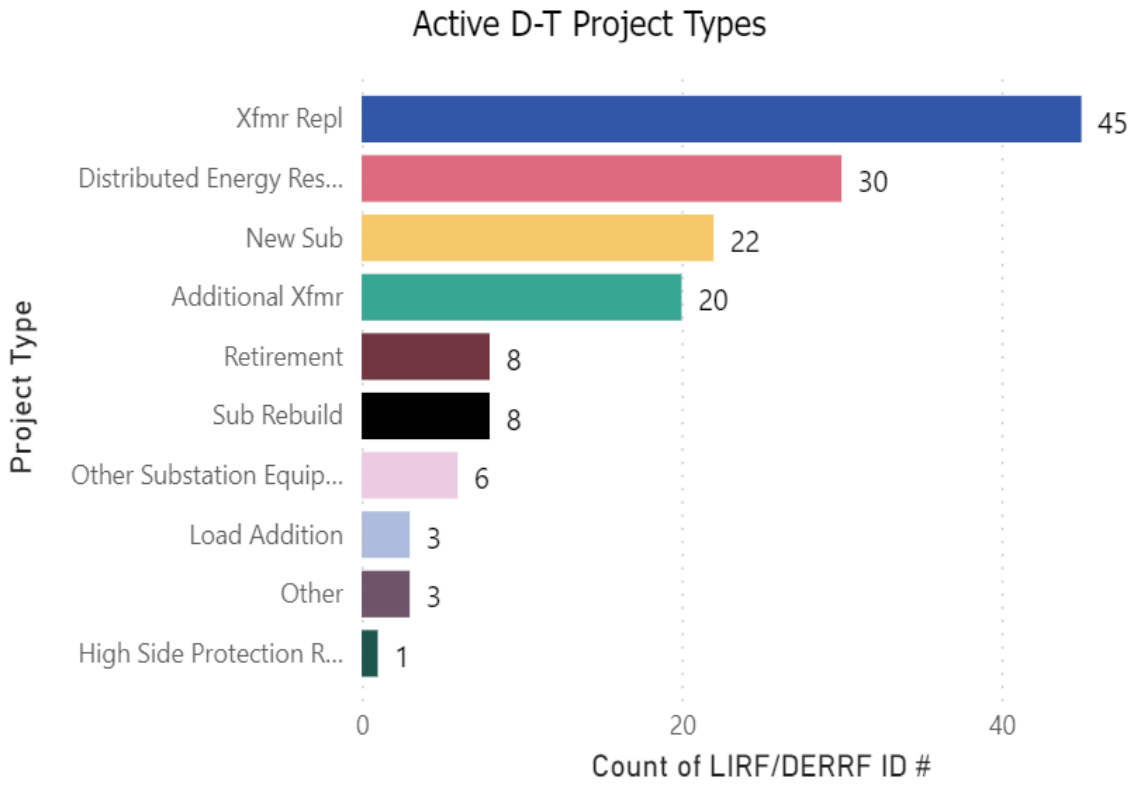
- Governing documents:
  - FERC Tariff Attachment FF-ATCLLC
  - NERC Standards
  - FERC Filed D-T Interconnection Agreement (IA)
  - ATC's Load Interconnection Guide
  - ATC's Business Practices

Distribution to Transmission Interconnections

- Best Value Planning (BVP)
  - Collaborative planning assessment to determine the best value solution for all parties
  - Types of requests
    - New distribution substation
    - Distribution substation equipment change
    - Distributed energy resources (DERs)
    - Unforecasted load or change in load characteristics
    - Power quality issues
  - Individual Project Timelines Vary Widely

D-T Dashboard





ATC's Asset Renewal strategy is about balancing Performance Risk and Life Cycle Costs – Scott Adams

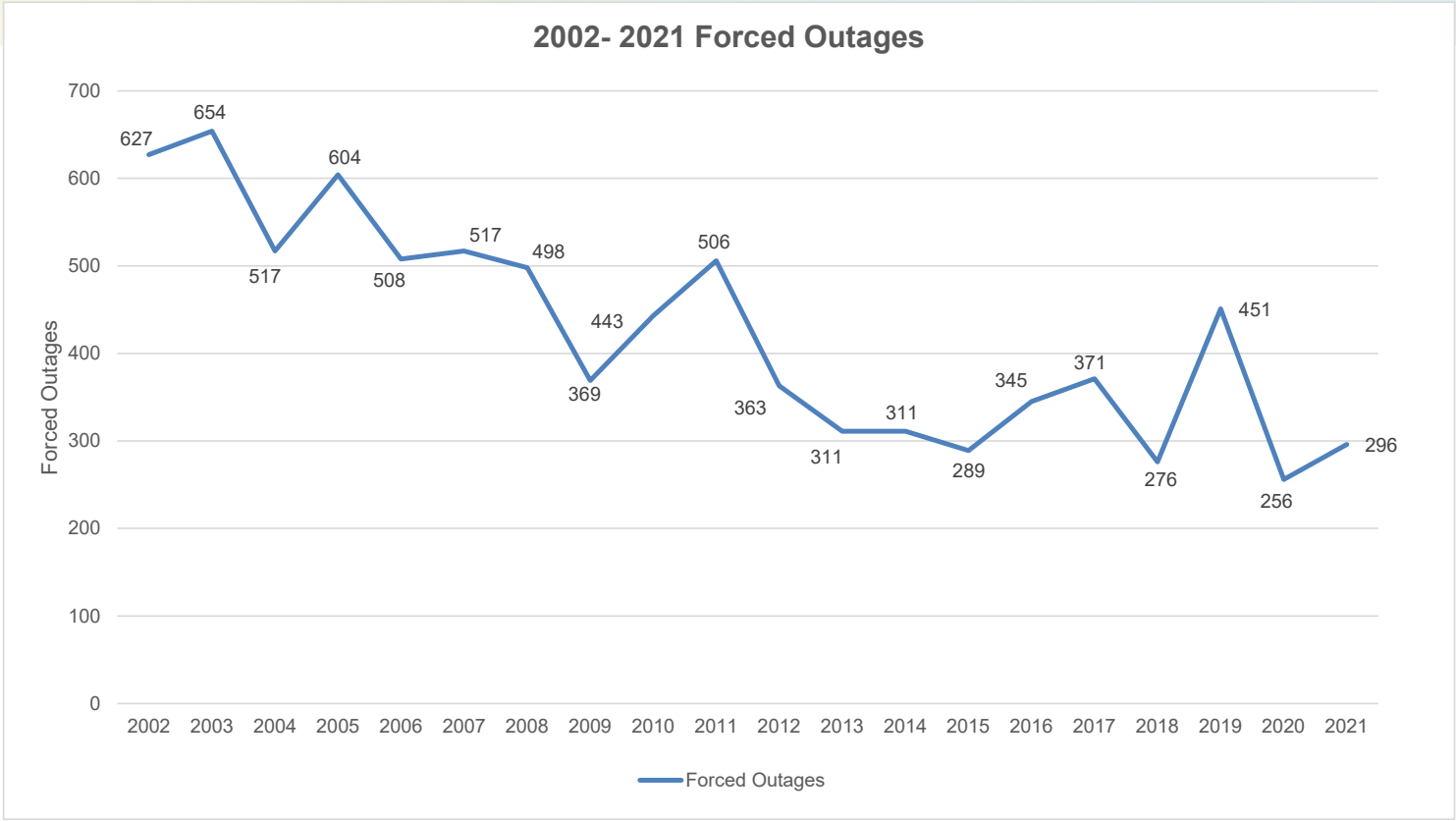
Asset Renewal Program Objectives

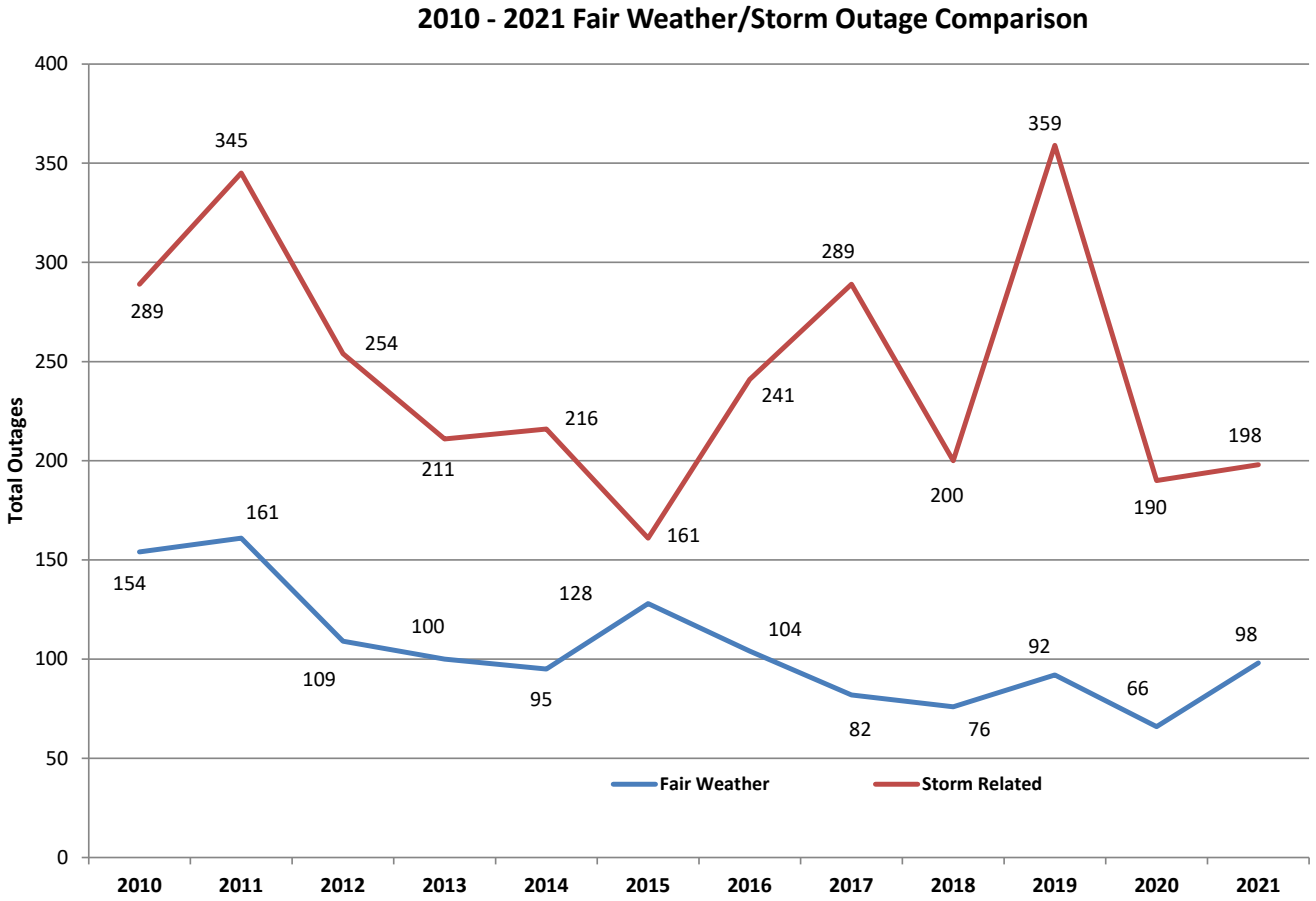
- Safety – public and worker
- Minimize total life cycle cost [Net Present Value of Revenue Requirements (NPV RR) from customer cost/rate perspective]
- Compliance
- Manage risk
- Reliable performance – maintain or improvement
- Environmental performance improvements
- Coordination with Stakeholders

Replacement is based on… (Hint: Not Age!)

- Safety – public and worker
- Condition – tests, maintenance costs/risks
- Obsolescence – part availability, factory support, craft labor expertise with this specific equipment, available spares
- Utilization – application, system changes
- Criticality – consequence of failure, outage impacts
- Costs – maintenance and replacement
- Environmental – PCB contamination, oil volumes and containment, proximity to waterways, SF6 gas leaks, lead, mercury, environmental compliance/risks
- Compliance – NERC, CIP, EPA, State DNR
- Other Considerations – test frequency, on-line monitoring, test information available, fleet size, common fleet issues, maintenance history, failure mode, industry experience

Reliability Trend




2010 - 2021 Fair Weather/Storm Outage Comparison
Total Outages
400
350
300
250
200
150
100
50
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
289
345
254
211
216
161
241
289
200
359
190
198
154
161
109
100
95
128
104
82
76
92
66
98
Fair Weather
Storm Related

Reliability Performance: January - December 2021

Customer Impact

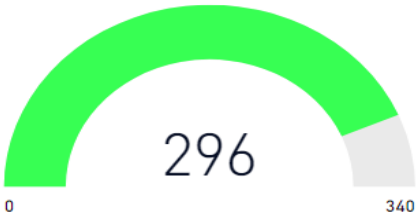
TSAIDI

The 6.30 T-SAIDI YTD is 1.04 minutes less than our five year average of 7.34 minutes.

TSAIFI

The 0.051 T-SAIFI YTD is 0.014 less than our five year average of 0.065.

Total Forced Outages

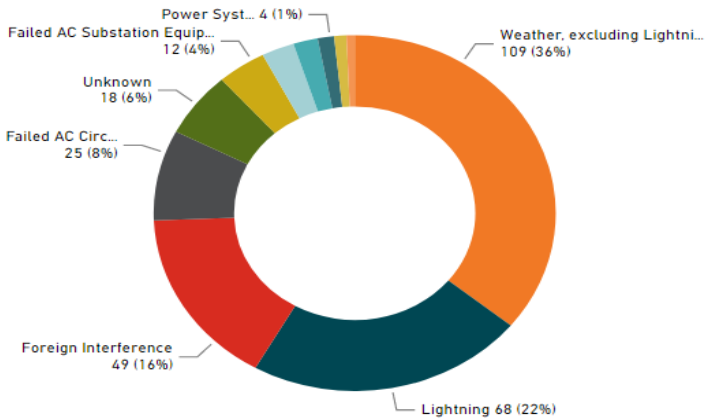


The 296 total Forced Outages YTD are 44 less than our five year average of 340.

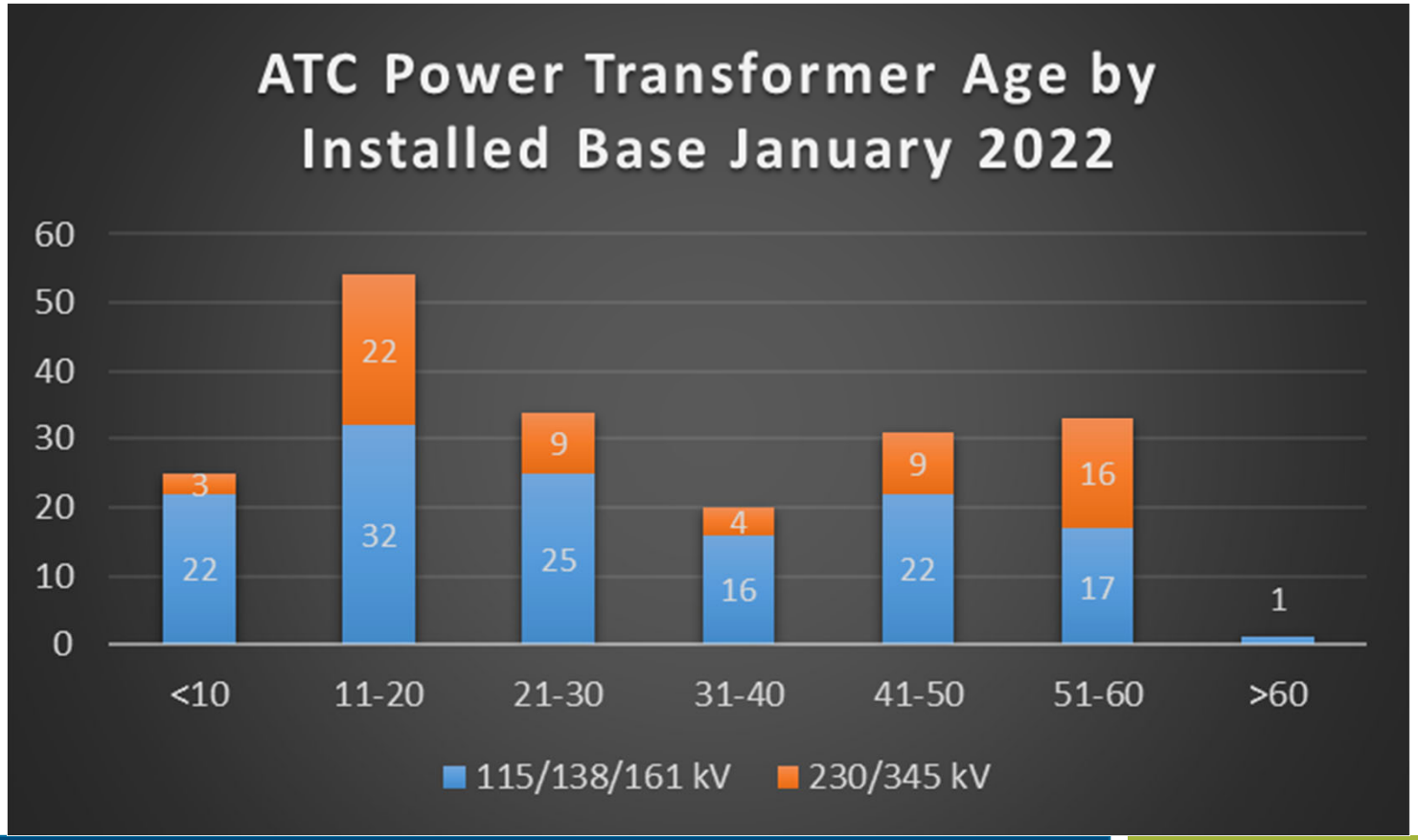
2021 Top impacting outages:

July 28-29: Severe storms caused major customer impact with approx. 50 downed structures and multiple off ROW tree fall-ins on 11 circuits (31,731 customers). The 4.18 minute T-SAIDI from this event accounts for 67% of the 6.28 minute T-SAIDI YTD.

Total Circuit Outages by Cause Code



Transformer Age Distribution



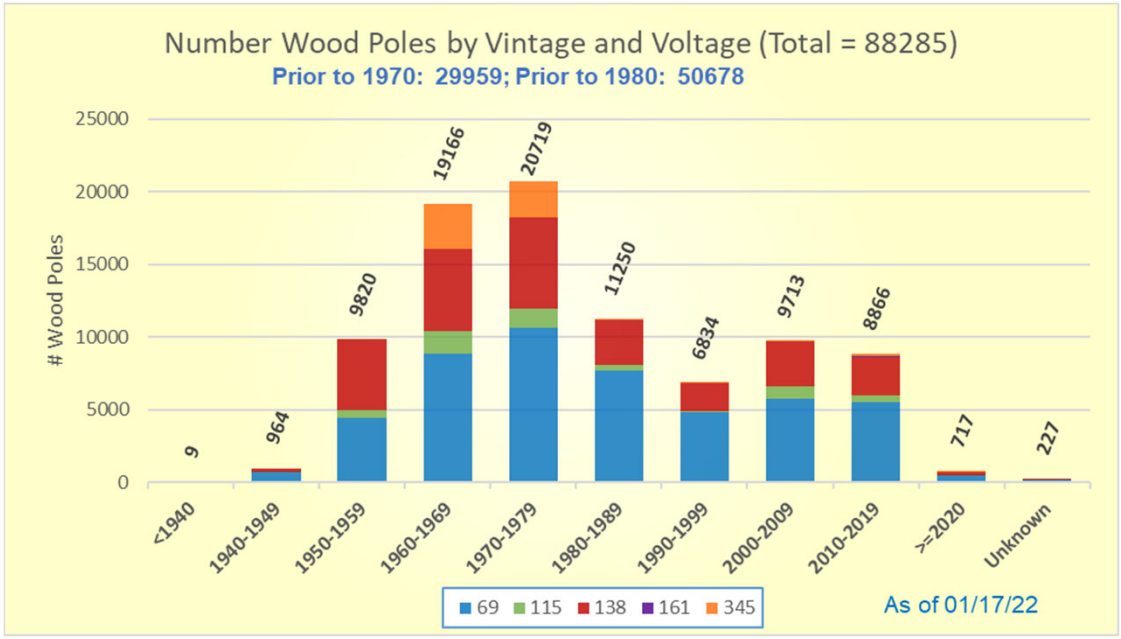
Madison Area Substation - Relays

- Ensure performance and reliability – relays at end-of-life.
- Stations
  - Blackhawk
  - Blount
  - East Campus
  - Femrite
  - Ruskin
  - Sycamore
  - Walnut
  - Wingra

Sycamore SS 69kV circa 1969

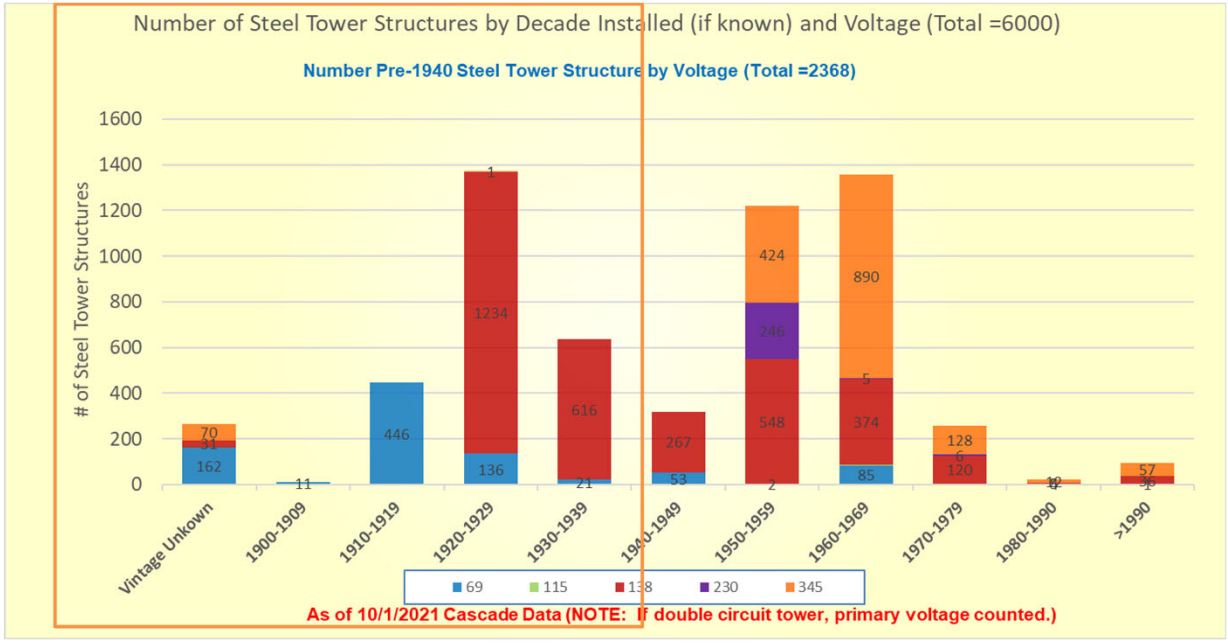
Overhead Transmission Lines – Wood Pole Lines 20 year Outlook

- Objective is to manage condition and preserve reliability and safety as these assets reach end of life.
- Pre-1980 vintage wood poles are likely to be replaced in the next 20 - 25 years.



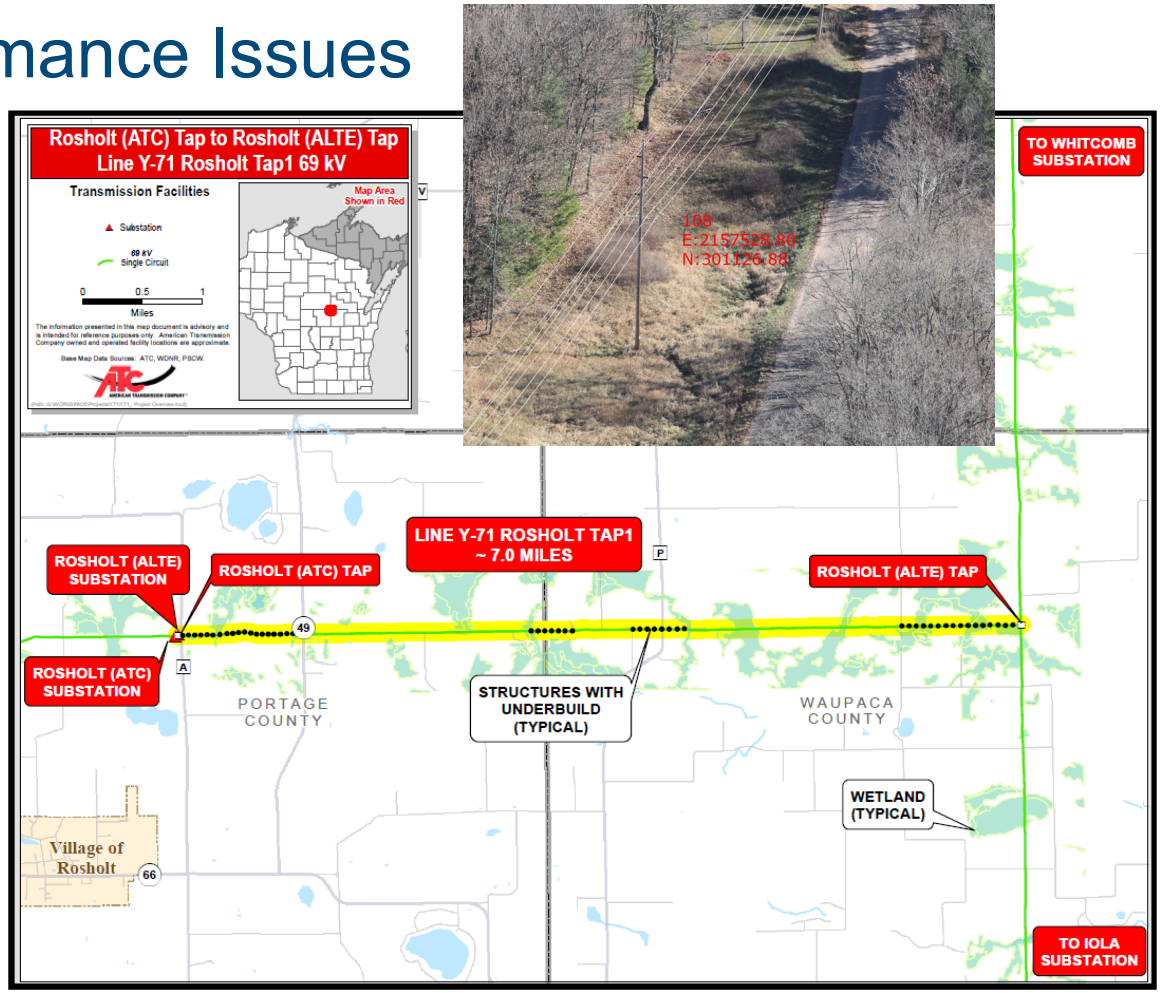
Overhead Transmission Lines – Steel Lattice Lines – Preliminary 20 year Outlook

- Objective is to manage condition and preserve reliability and safety as these pre-1940's assets reach end of life.
- Pre-1940 vintage lattice tower structures are likely to be replaced in the next 20 - 25 years.



Y-71 Rosholt Tap – Performance Issues

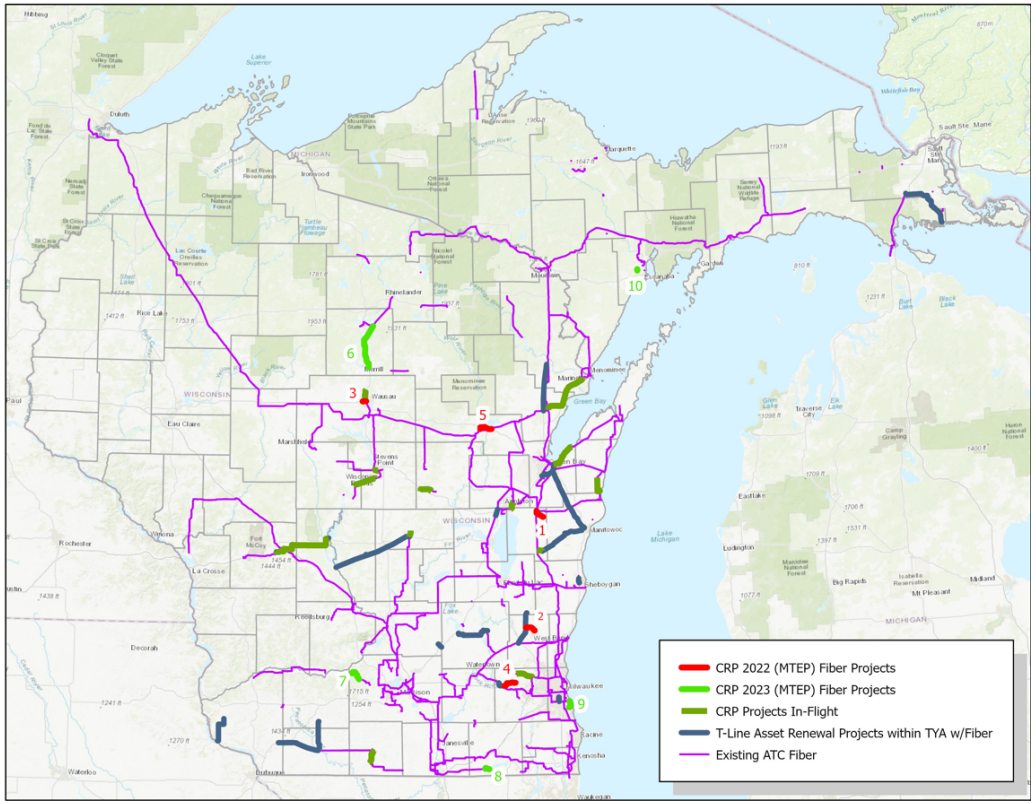
- Y-71 is a 69kV line running from Iola substation to Whitcomb substation, ~35 miles in length.
- Radial tap section ~7 of 15 miles long off the Y-71 main line identified for preliminary needs study.
- Condition and Performance Issues
  - 69 kV radial line section installed in the 1950s
  - Tap is a frequently outaged circuit due to vegetation (off ROW live tree)
  - Internal wood pole decay, wood pole top splits, woodpecker damage, flashed and chipped insulators
  - Structural utilization



Asset Renewal T-line Needs Example

- Portage – Dam Heights 69kV Rebuild (Line Y-16)
  - Project Background
    - Approximately 25 of miles of rebuild
  - Past Needs
    - Condition and Performance Issues
    - Replace 1910's vintage lattice structures
    - Outages: One of the most frequently outage ATC lines
      - ✓ On average about 4 outages per year
      - ✓ Need to update to avian friendly design
      - ✓ Improved lightning performance
  - Current status
    - Project went in-service Fall of 2017
    - No outages since the new design went into service

Communications Projects
- In Service and Active Projects – Matt Falkowski



Label	CRP - MTEP22 Projects:	Cost Estimate
1	OPGW - Line E-57 - (Glenview to Forest Junction)	$1.7M+
2	OPGW - Line 8032/9752 - (Barton to Structure #951)	$1.3M+
3	OPGW - Line W-127 - (Sunnyvale to Sherman Street)	$688K+
4	OPGW - Line SMTG21 - (Cottonwood to Summit)	$2.5M+
5	**Shawano Plan** OPGW - Line 86504 - (West Shawano to HWY22/L21) - (Tap @ Structure: #17560) OPGW - Line 85851 - (West Shawano to East Shawano) OPGW - Line 26523 - (East Shawano to HWY22/L3) - (Tap @ Structure: #112472)	$2.5M+
Label	**CRP - MTEP23 Projects:**	**Cost Estimate**
6	OPGW - Line I-9 - (Pine to Skanawan Tap Structure: (#107651)	$5.9M+
7	OPGW - Line Y-62 - (Wick Drive to Black Earth)	$1.9M+
8	OPGW - Line Y-159 - (Walworth to Brick Church)	$1.2M+
9	OPGW - Line NWHG41 - (Barland to Norwich)	$2.3M+
10	OPGW - Line OMDY51 - (Delta to Structure: #134024)	$452K+

Communications Projects - 2022 & Beyond

- Challenges, Trends & Opportunities
  - AT&T Performance & Customer Service Challenges
  - Substation Communication Demands
  - T-Line Asset Management Alignment

Project Chameleon – Erik Winsand

- Goal – Improve the way we plan, anticipate instead of react
- Keeping up to keep the lights on reliably and economically

Project Chameleon

- Adapting to changes in energy production and consumption
  - Retirement and additions timeframe is months
  - Transmission needs/solution timeframe is years
  - Electrification of the economy
    - Electric vehicles, industrial equipment, home appliance, etc…
- Anticipate vs. React
  - Can’t wait for Generator Interconnection Agreements and Signed Attachment Y (for retirements)
  - View planning through common and consistent modeling

Project Chameleon

- Develop plausible 5 year out future
  - Go out to 10 and 15 years in following studies
- Model and study in economic modeling software
- Convert economic modeling output into reliability model
  - Not just peak or off-peak models
- Model and study in reliability modeling software
- Perform additional special studies as needed
  - Voltage Stability
  - Short Circuit

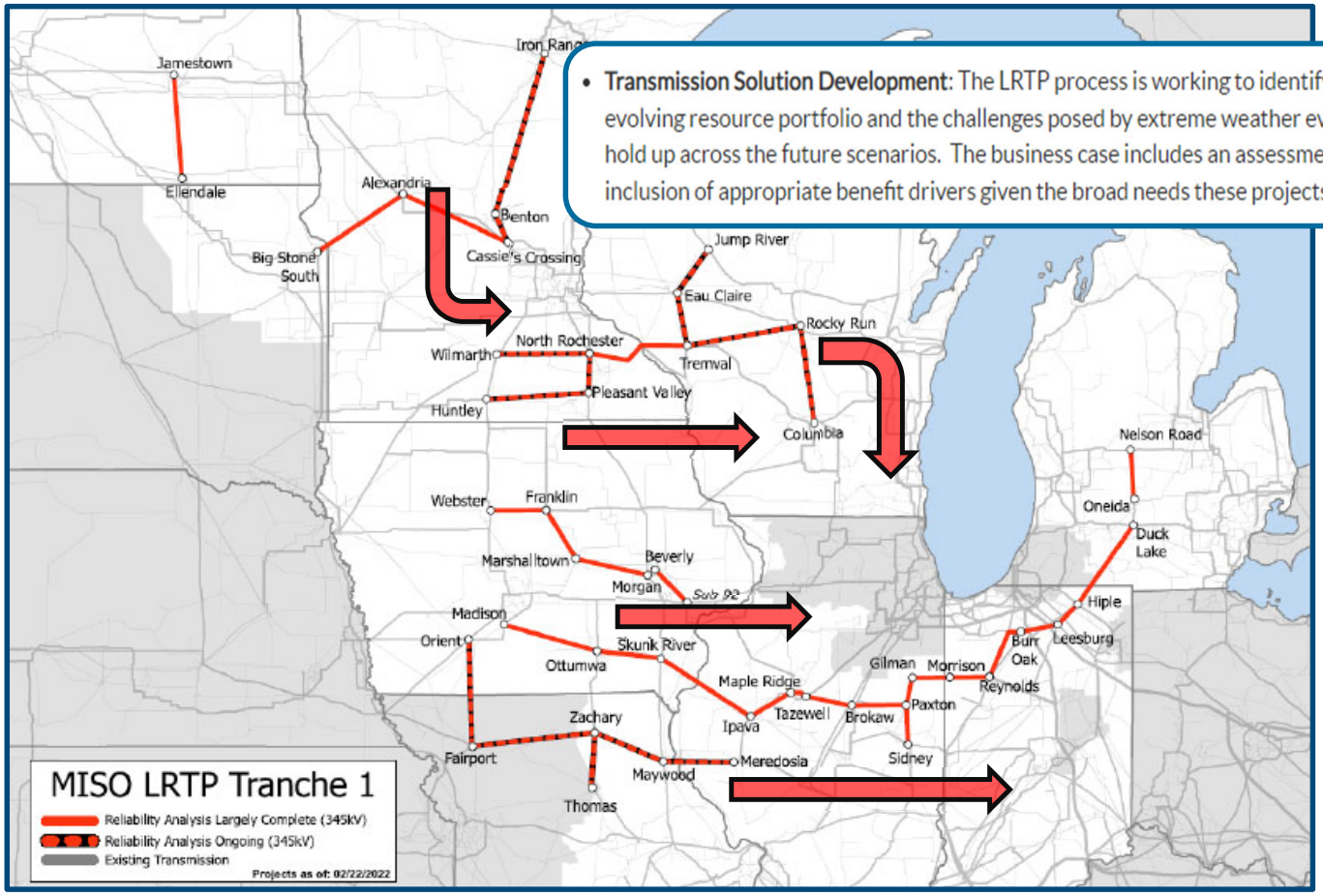
Project Chameleon

- Next Steps
  - Continued study work
  - Feedback from stakeholders
  - Follow up discussions are stakeholder meetings

Erik Winsand

Email: ewinsand@atcllc.com

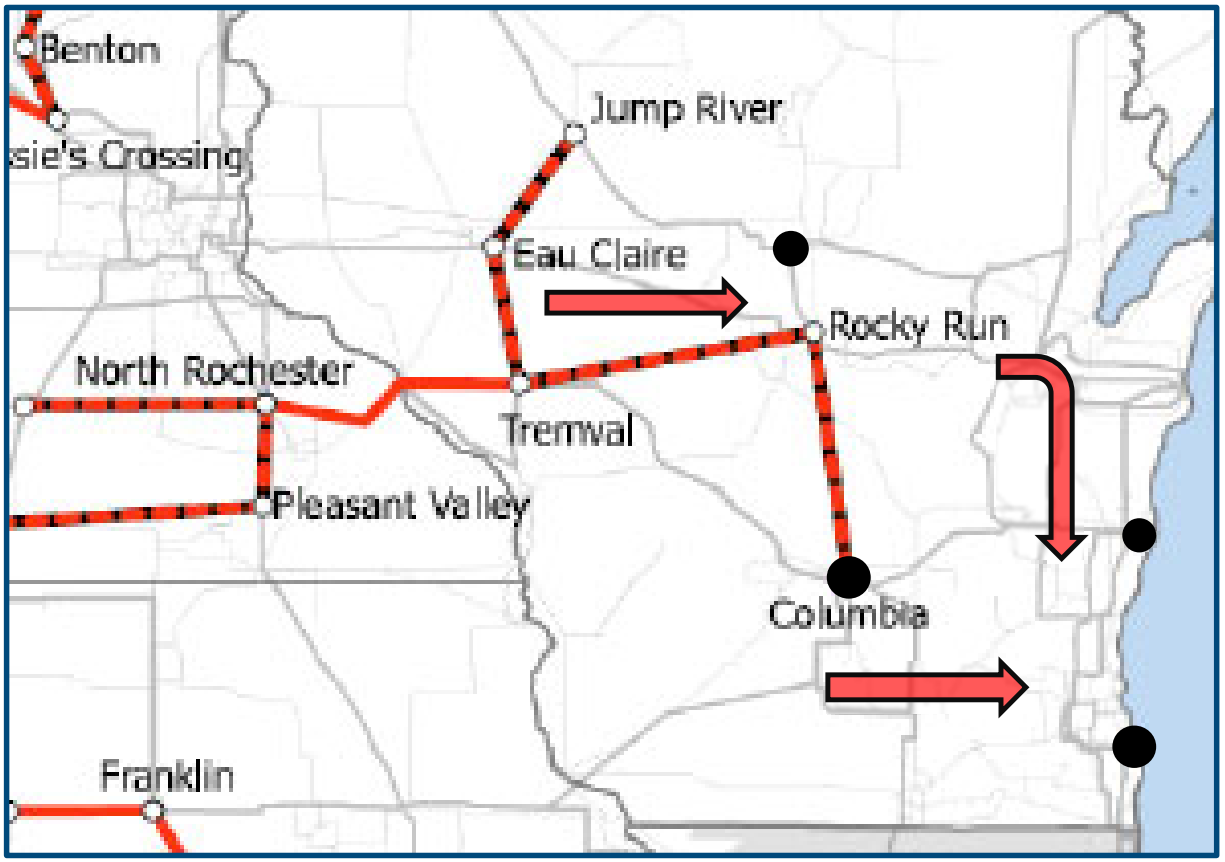
LRTP: Focus on Meeting Current and Future Needs



- **Transmission Solution Development**: The LRTP process is working to identify solutions that meet current and future needs driven by the evolving resource portfolio and the challenges posed by extreme weather events. These solutions must have strong business cases that hold up across the future scenarios. The business case includes an assessment of benefits against costs and MISO is working to ensure the inclusion of appropriate benefit drivers given the broad needs these projects are expected to address.

The changing generation mix will stress the transmission system differently, often with additional north-to-south and west-to-east flows.

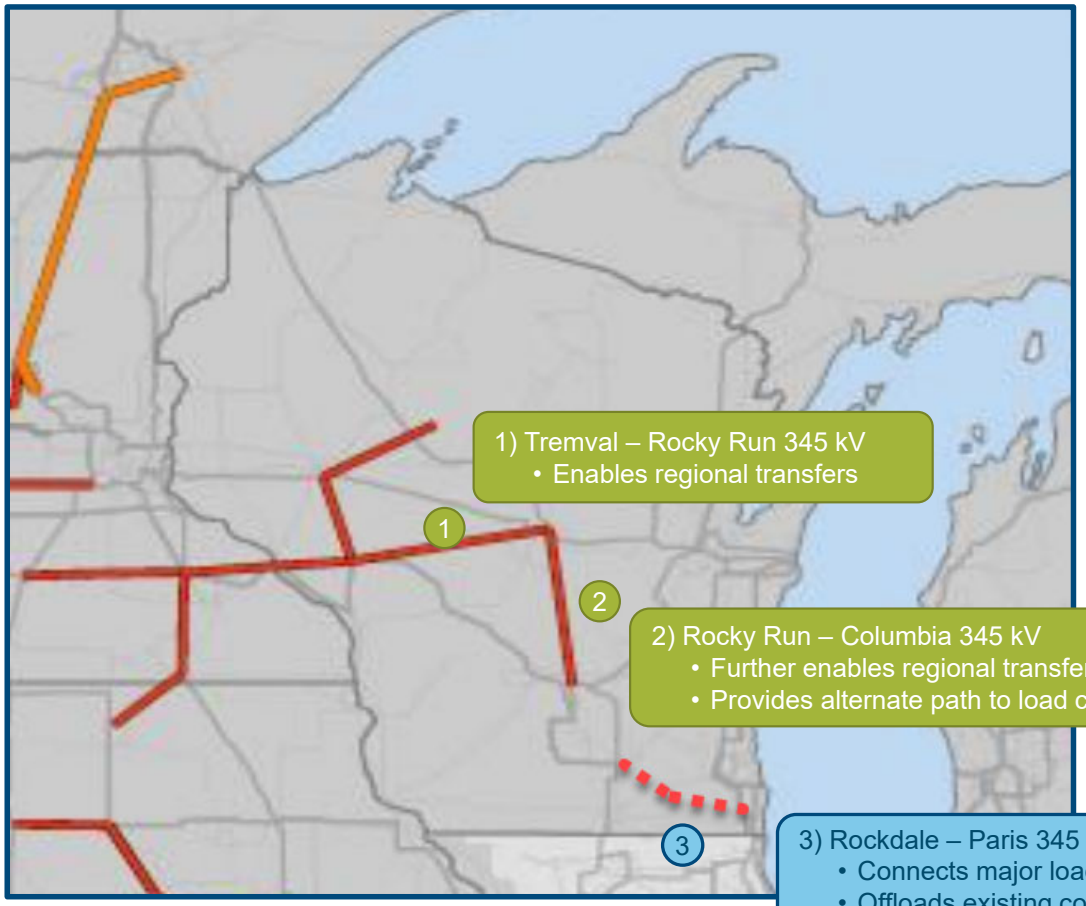
Regional Flows and Generation Changes in Wisconsin



The changes to the local generation fleet will contribute to the regional flow bias that LRTP is designed to facilitate, increasing the pressure on ATC's transmission system and customers.

● = Projected Coal Retirements

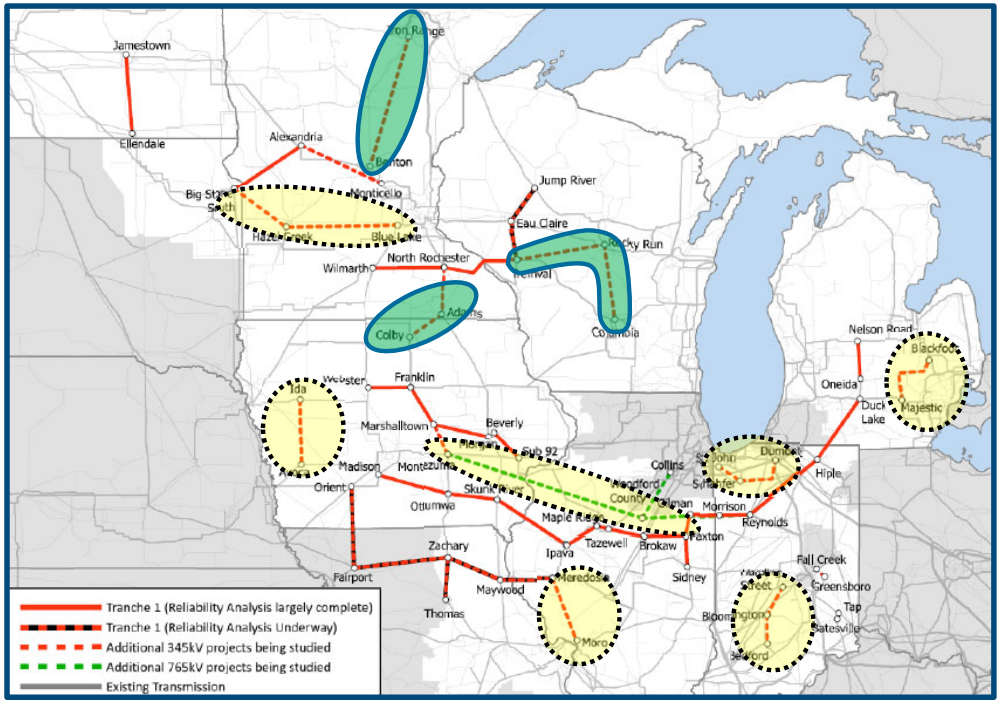
LRTP: ATC Top Priority Reinforcements



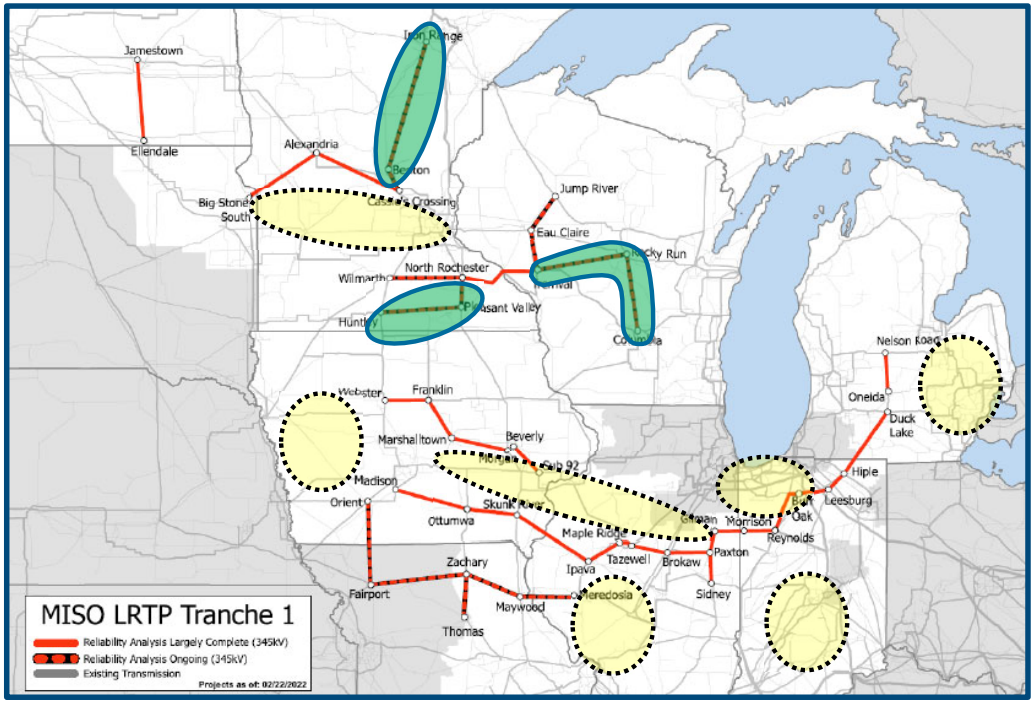
Listed in order of highest to lowest priority:

1. Include Tremval - Rock Run 345 kV
   - Significantly improves Minnesota to Wisconsin transfer capability (250 MW incremental transfer)
2. Include Rocky Run – Columbia 345 kV
   - Further significant improvements on Minnesota to Wisconsin transfer capability (150 MW improvement in incremental transfer)
   - Provides backbone for high-value connection points for future renewable resources.
3. Add new Rockdale – Paris 345 kV
   - Connects Wisconsin's major load centers, Madison and Milwaukee
   - Proposed to enable regional transfers, offload existing constraints, and establish high-value connection points for future renewable resources.

January Workshop Map



February Workshop Map



Projects removed from LRTP Tranche 1 map

Projects “upgraded” on LRTP Tranche 1 map

LRTP: Next Steps

- Continue to participate in the MISO stakeholder process
- Perform additional analysis and share results to support projects that provide value to Wisconsin electricity customers.

Tom Dagenais

Email: tdagenais@atcllc.com

Erik Winsand

Email: ewinsand@atcllc.com

Ambient Adjusted Ratings (AAR) - Anna Torgerson

- FERC Order 881
- the Commission is requiring: public utility transmission providers to implement ambient-adjusted ratings on the transmission lines over which they provide transmission service; regional transmission organizations (RTO) and independent system operators (ISO) to establish and implement the systems and procedures necessary to allow transmission owners to electronically update transmission line ratings at least hourly;
- https://www.ferc.gov/media/e-1-rm20-16-000

TPL-001-5 Changes – Kerry Marinan & Joel Berry

- Requires analysis of known planned outages, regardless of the duration, in the Near-Term Planning Horizon against applied NERC Category P1 contingency events.
- Requires stability analysis with long lead time equipment outages.
- Single Points of Failure: Expands the definition of non-redundant components of a Protection System in Footnote 13 to include relays, communication systems, dc supplies, and control circuitry for modeling of P5 events and related Stability extreme events.
  - P5 = Fault plus nonredundant component of a Protection System failure to operate.
- TPL-001-5 is effective on July 1, 2023.

Public Policy Requirements – Comments?

- Any public policy driven needs that may not be covered by the Assessment process?

Assessment Status – Allison Bartz

- Next Steps
  - Needs comments – due March 26
  - Finalize needs – Early April
  - Preliminary solutions meeting/presentation – May 9
  - Finish sensitivity studies – May
  - Develop new or revised scope and cost estimates – June
  - ATC internal review/approval – August
  - 2022 Assessment publication – October/November

Any additional questions?

Contacts

Allison Bartz (TYA)
Email: abartz@atcllc.com

Heather Andrew (G-T and D-T)
Email: handrew@atcllc.com

Scott Adams (Asset Management Substation) or Justin Nettesheim (AR T-line)
Email: sadams@atcllc.com or jnettesheim@atcllc.com

Matt Falkowski (Communications)
Email: mfalkowski@atcllc.com

Erik Winsand & Stephanie Schmidt (Compliance)
Email: ewinsand@atcllc.com or sschmidt@atcllc.com