2023 10-Year Assessment Preliminary Needs

Stakeholder and Customer Webcast

PRESENTED BY

Ted Weber, Matt Waldron, Scott Adams, Matt Falkowski, Kerry Marinan, Michael Billups, Amy Wilke, Anna Torgerson, Logan Brecklin

March 6, 2023

AMERICAN TRANSMISSION COMPANY®

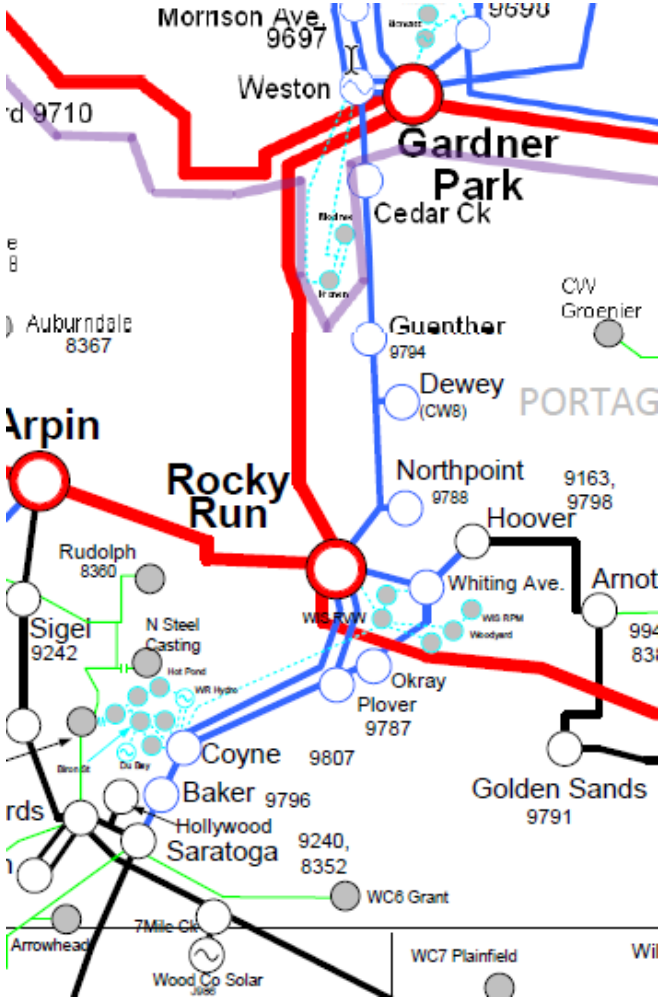
Purpose – Ted Weber

- 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

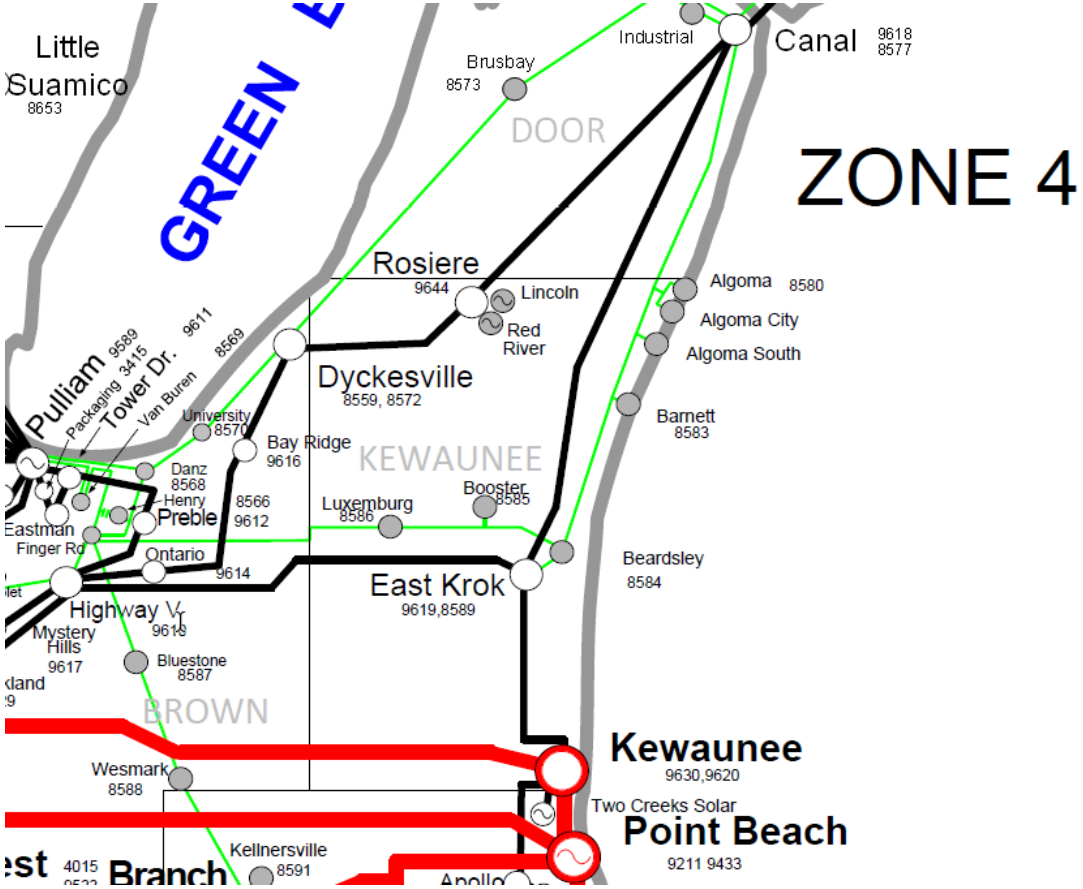
- We are seeing new projects based on new needs this year.
  - New network reliability projects
  - Additional renewable interconnections & generation retirements
  - Distributed Energy Resources (DERs)
  - Madison-area substation asset renewal work
  - Changes in regulatory body priorities & policies

Rocky Run T2 and T4 Replacement



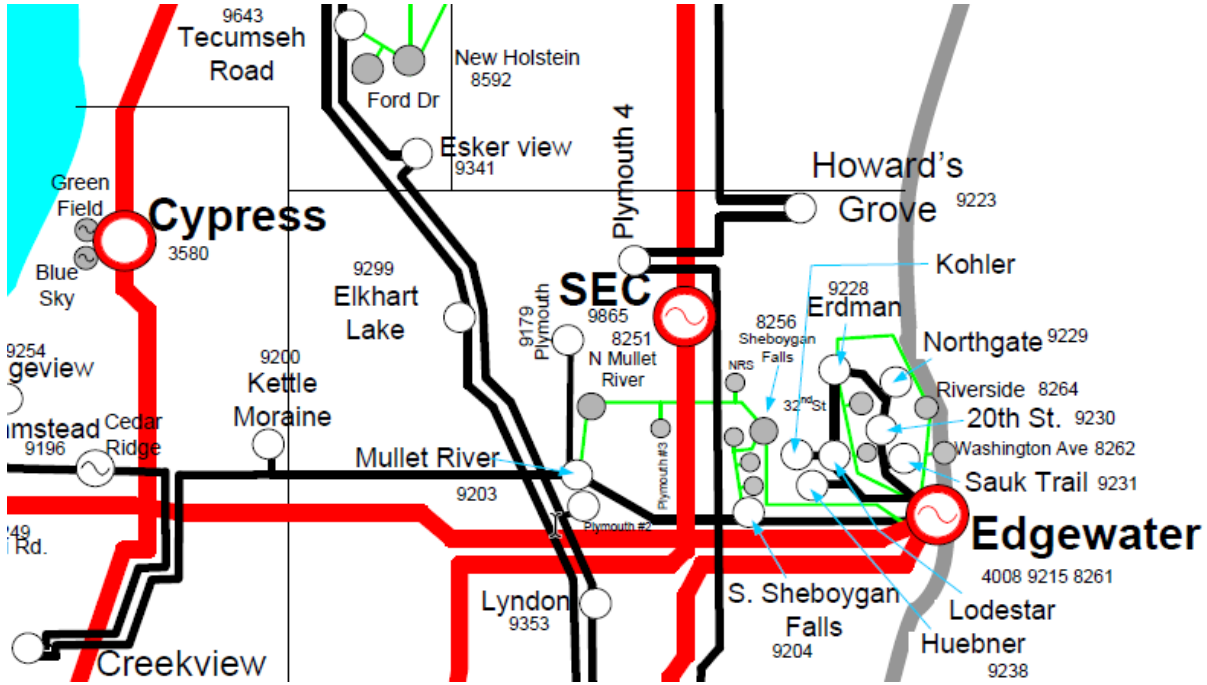
- N-1-1 Limitations on T2 and T4 at Rocky Run
  - Scope to replace both T2 and T4 with a single larger 345/115kV 500 MVA unit
- Target MTEP23 App A
- ISD of 6/1/2026

East Krok T1 Replacement



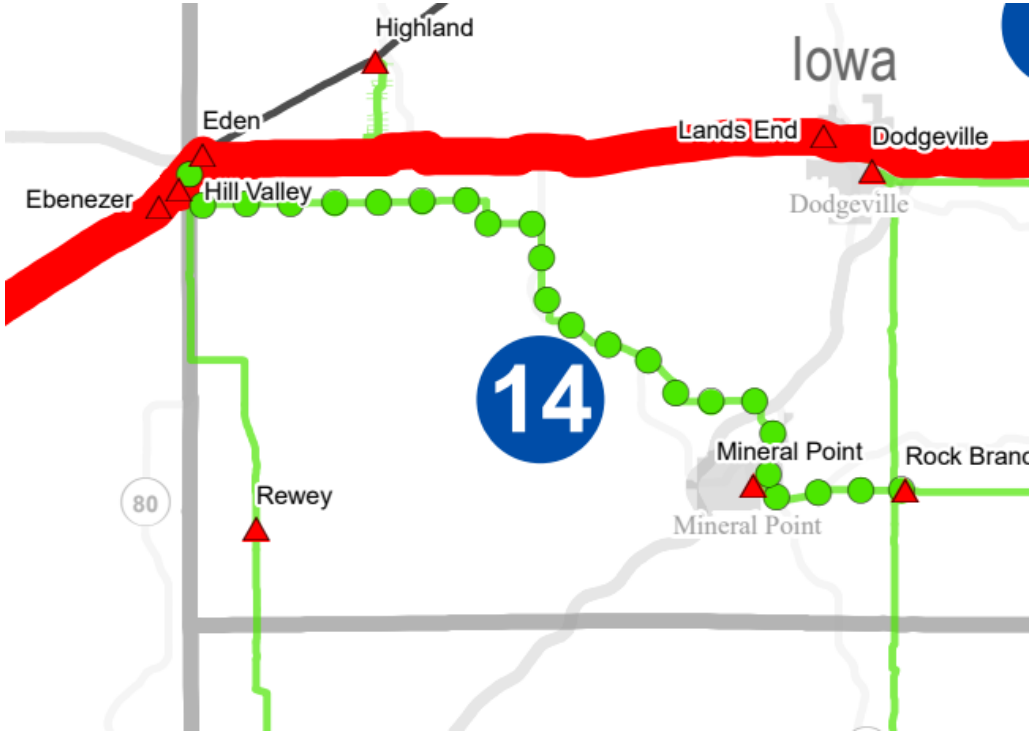
- N-1-1 contingencies causing thermal limitations
  - Scope: Replace existing transformer with new138/69kV 100 MVA
- Future asset renewal needs
- Real-time constraints may require radializing Door Co
- MTEP23 App A

Mullet River Area Reliability



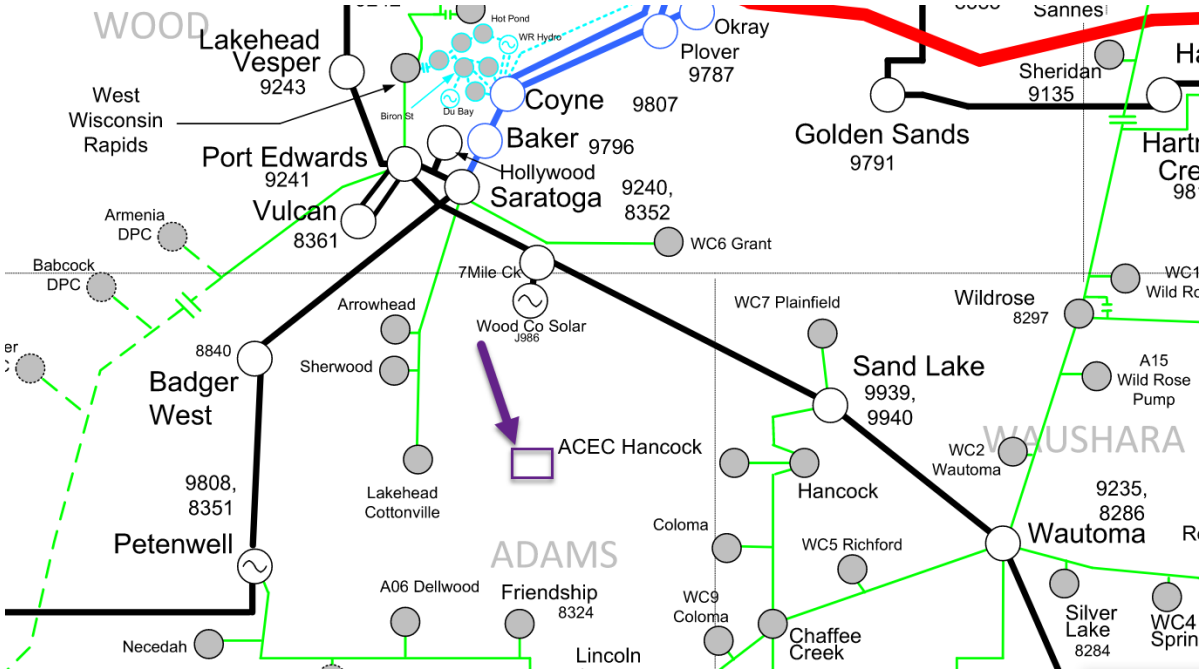
- Multiple N-1-1 contingencies causing thermal and voltage limitations
  - Existing mitigation radializes load
- Asset renewal needs and space constraints at existing sites
- MTEP22 App B

Eden-Rock Branch (Y-106) – Anna Torgerson



- Historical Congestion
  - N-1 Generation Curtailment
- Structure Replacements needed based on condition and performance
- OPGW Communications
- ISD 2026 - 2028

Colburn Load Interconnection Request



- Load Interconnection Request
  - Colburn area load growth
- Additional Source Need
  - Limited Y-302 substation load bridging capabilities in summer/winter months
- Evaluating networked service to Colburn/Y-302
- Target Appendix B, MTEP23

Distribution to Transmission (D-T) Interconnections

100 requests in 2022

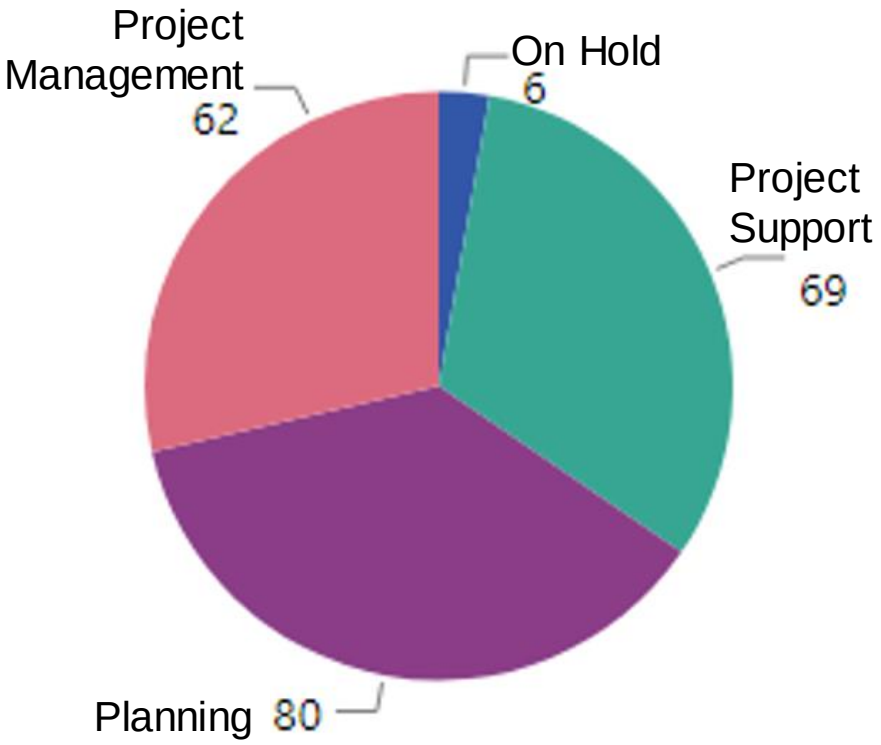
- Governing documents:
  - FERC Tariff Attachment FF-ATCLLC
  - NERC Standards
  - FERC Filed D-T Interconnection Agreement (IA)
  - ATC's Load Interconnection Guide
  - ATC's Business Practices

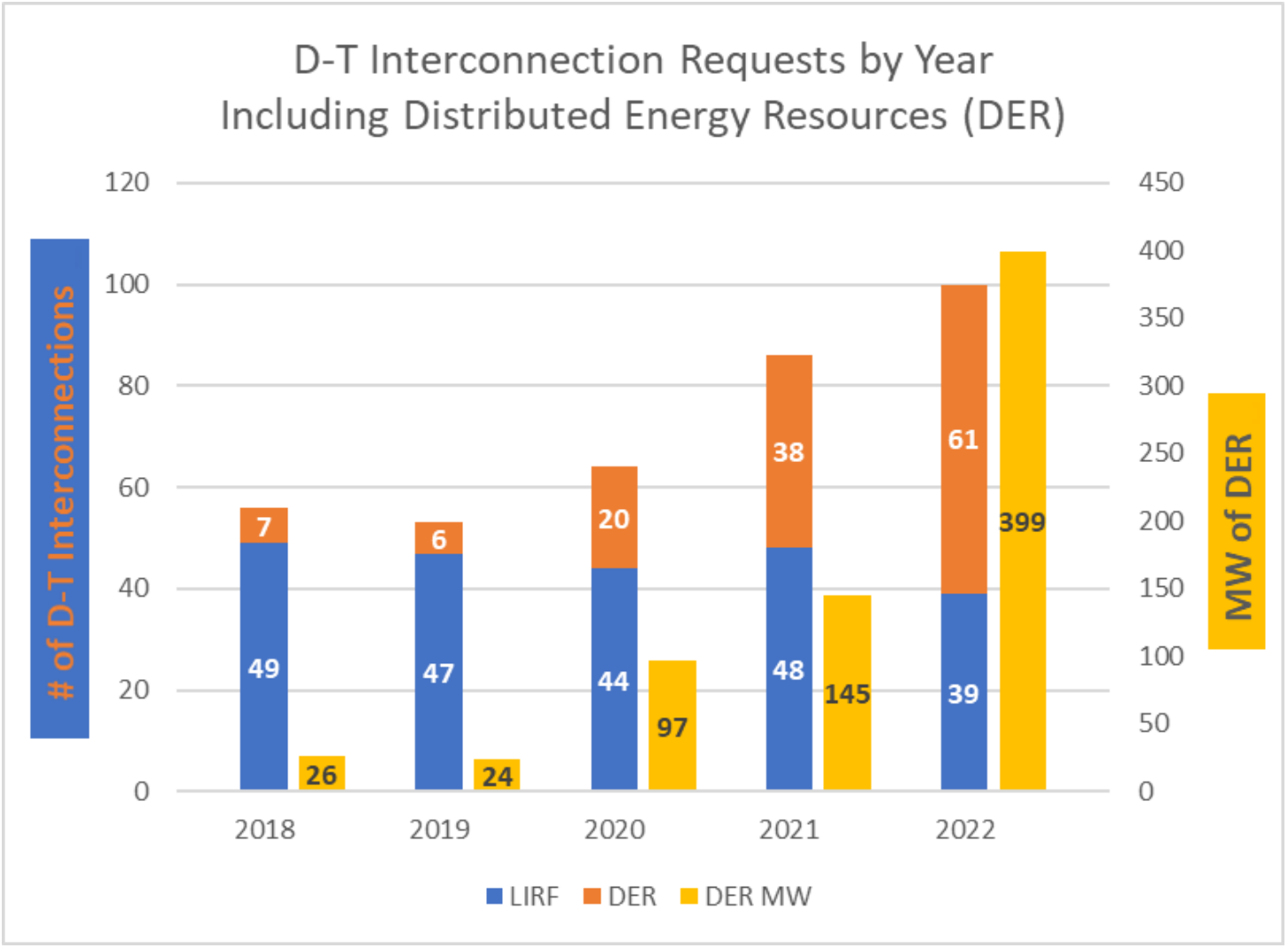
D-T Best Value Planning (BVP) Process

- 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

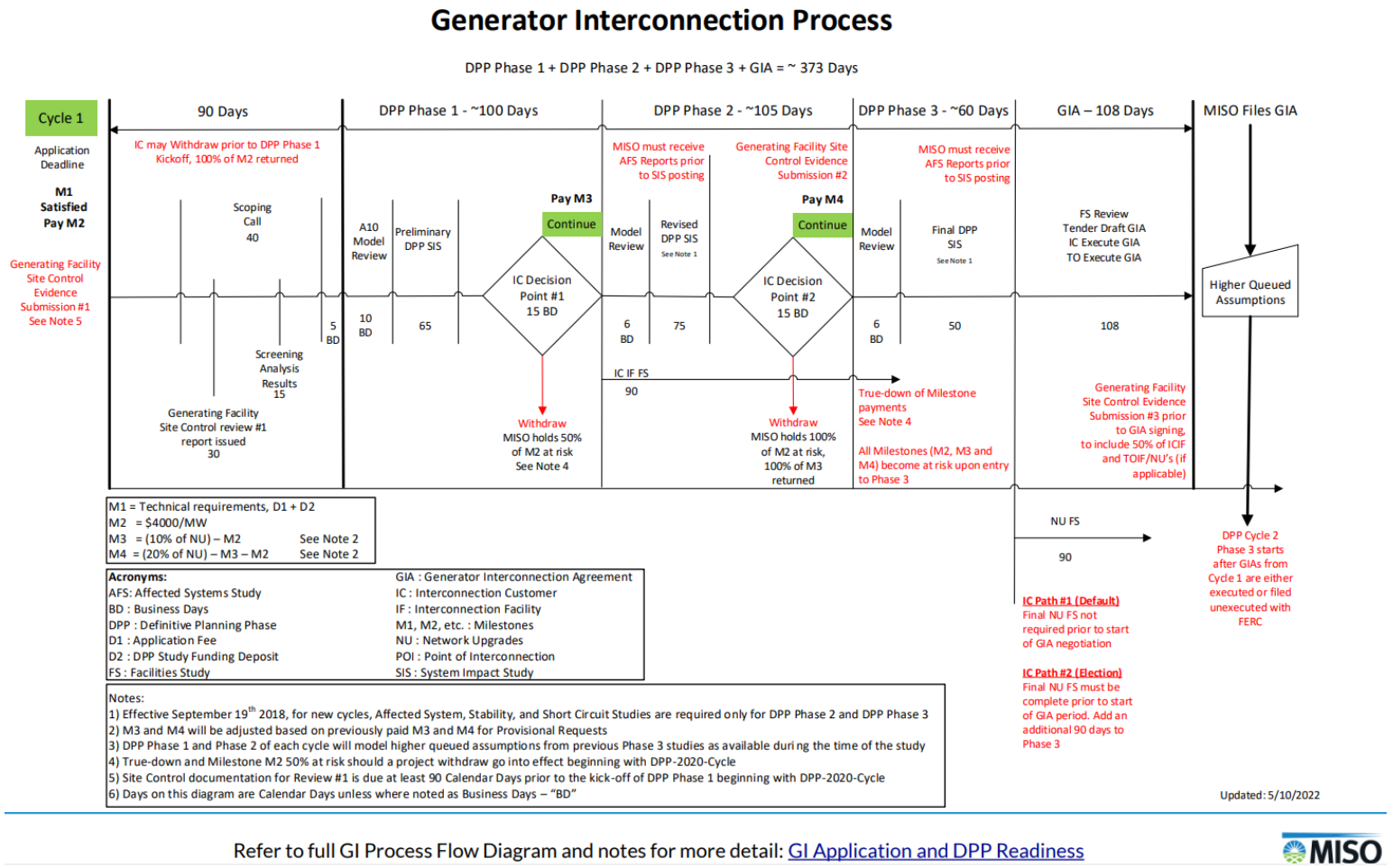
193 Active Projects



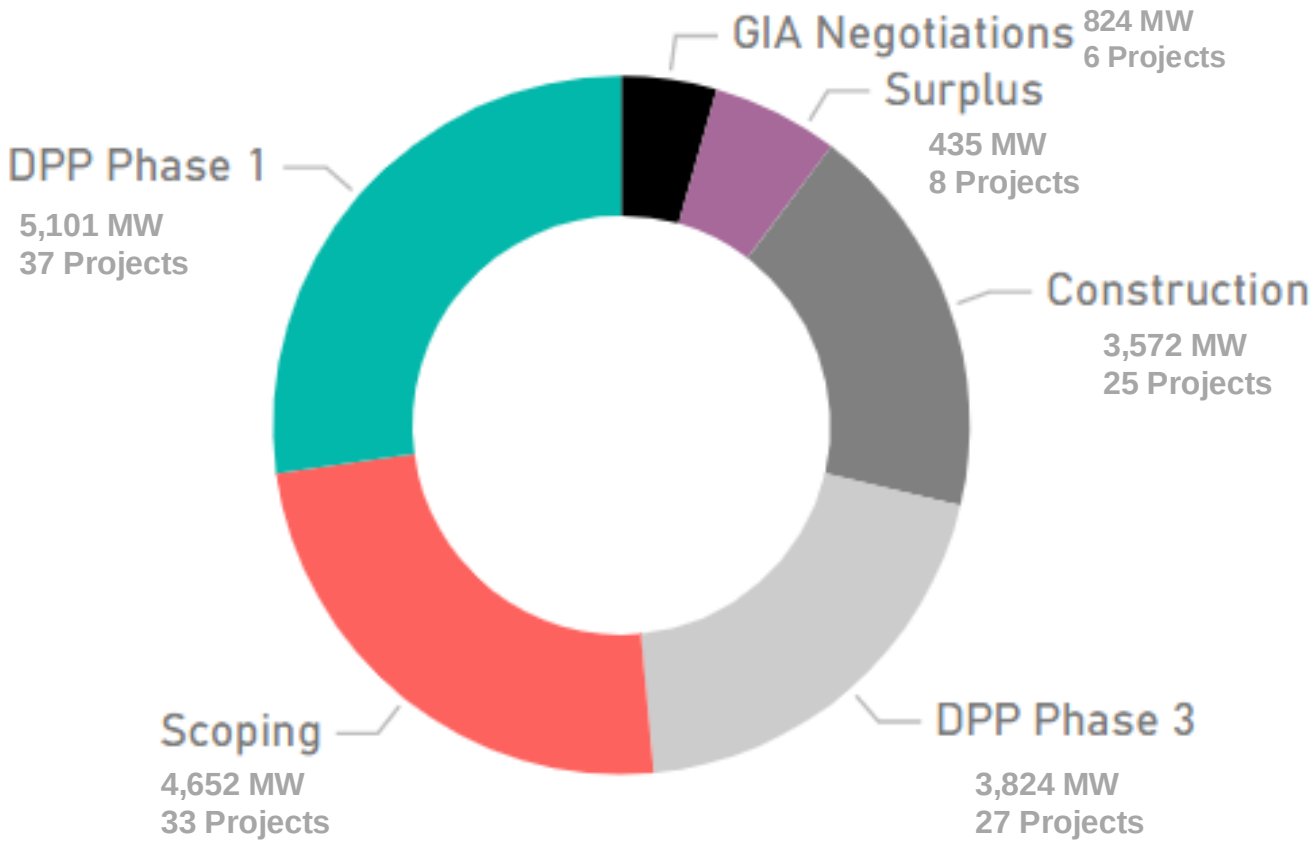


MISO Generation Interconnections Process

- FERC approved GIP timeline reduction in 2022
- Decreases time from 505 calendar days to 373 days
- Starting with 2022 MISO Queue



G-T Project Dashboard



Active MISO GT Projects
136
Developers
43
Total MWs in Queue
18.41K

- Solar -10.4 GW
- Storage - 4.8 GW
- Gas - 1.8 GW
- Wind - 1.4 GW

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

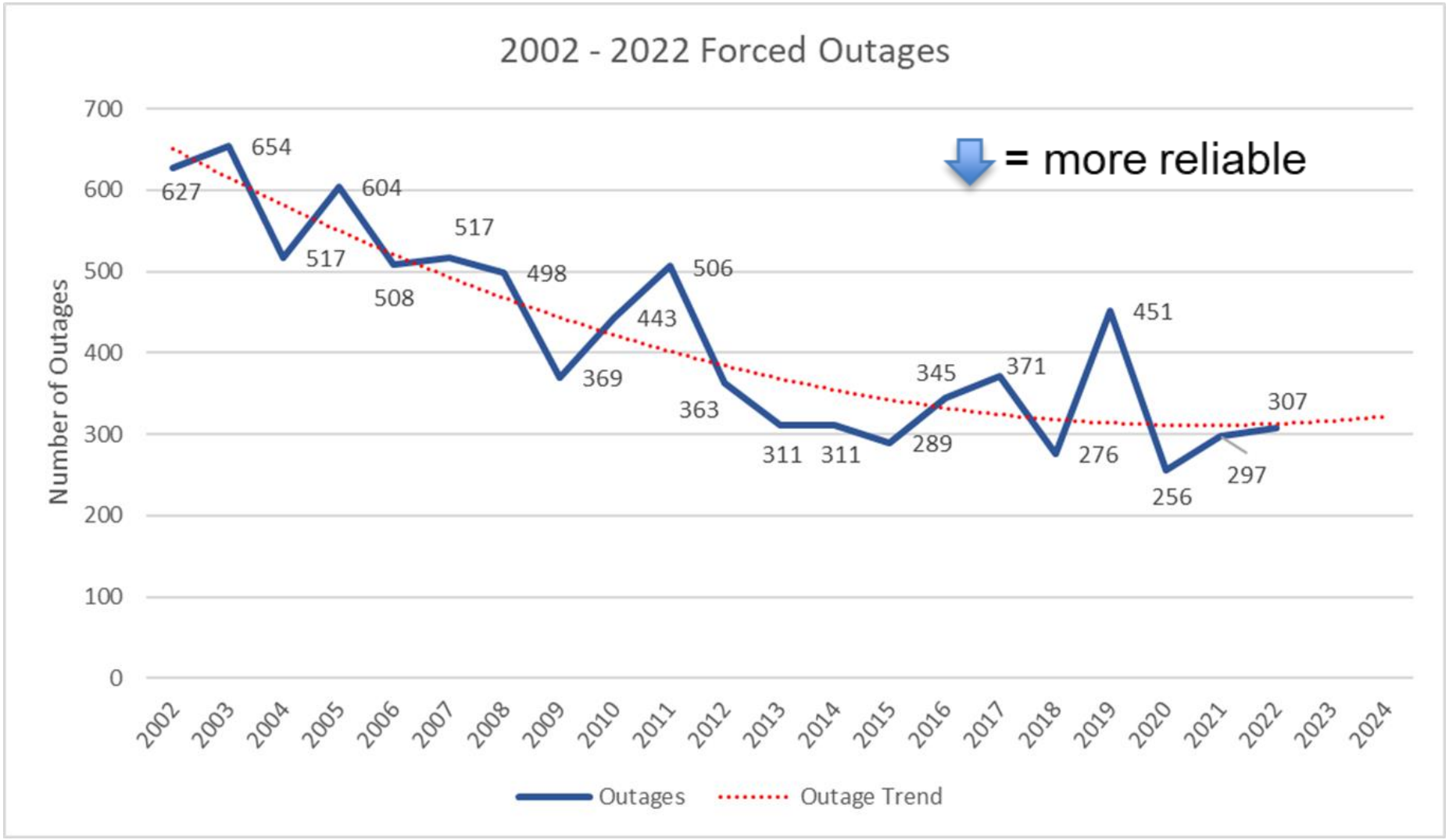
Asset Renewal Program Objectives

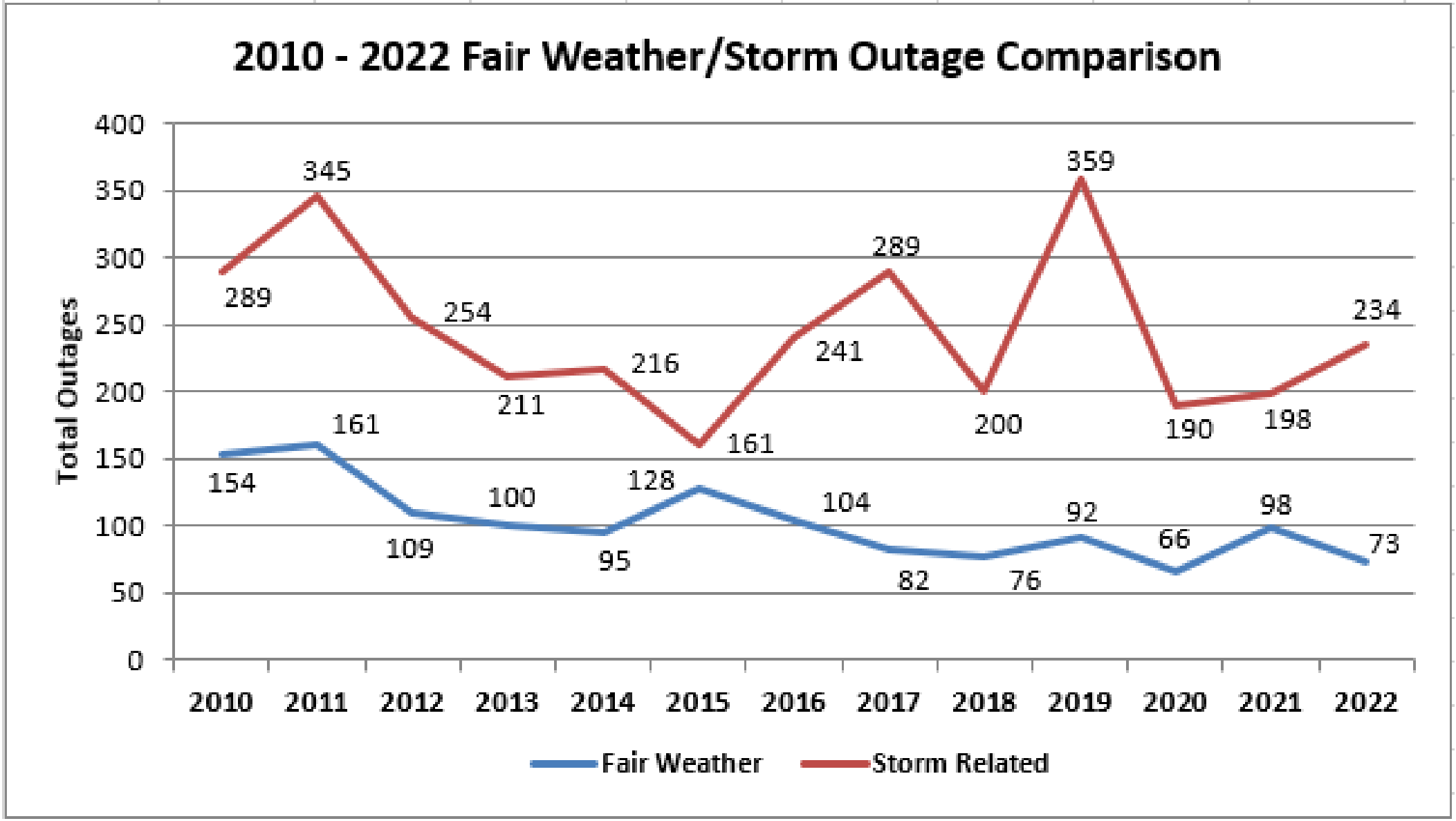
- Safety – public and worker
- Minimize total life cycle cost [Net Present Value of Revenue Requirements (NPV RR) from customer cost/rate perspective]
- Compliance
- Manage risk
- Reliable performance – maintain or improvement
- Environmental performance improvements
- Coordination with Stakeholders

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 – Annual Forced Outages




2010 - 2022 Fair Weather/Storm Outage Comparison
Total Outages
400
350
300
250
200
150
100
50
0
345
359
289
289
254
234
216
241
211
200
161
190
198
161
154
128
104
100
92
98
109
66
73
95
82
76
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Fair Weather
Storm Related

Reliability Performance: January - December 2022

Customer Impact

TSAIDI

The 6.82 T-SAIDI YTD is 0.80 minutes less than our five year average of 7.62 minutes.

TSAIFI

The 0.055 T-SAIFI YTD is 0.010 less than our five year average of 0.065.

Total Forced Outages

The 307 total Forced Outages YTD are 23 less than our five year average of 330.

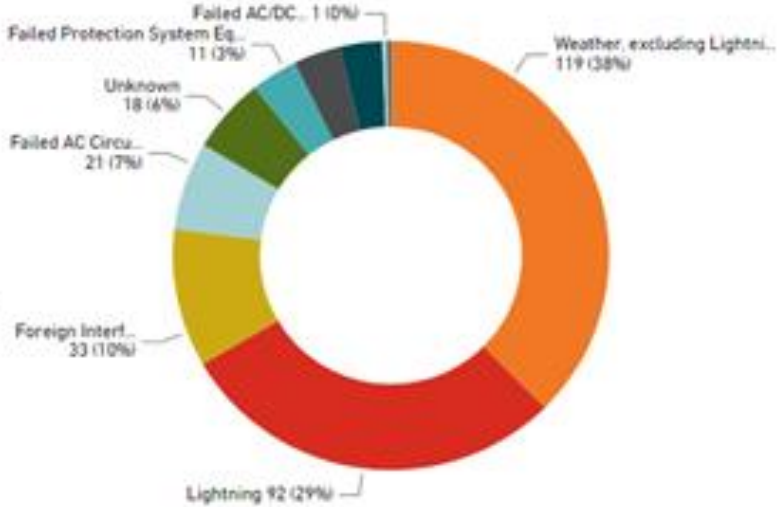
2022 Top impacting outages:

June 15th - Severe storms impacted 27,816 customers (20 delivery points). This event accounted for 1.38 of the 6.82 minutes (20%) of T-SAIDI and 0.010 of the 0.055 (18%) of T-SAIFI YTD.

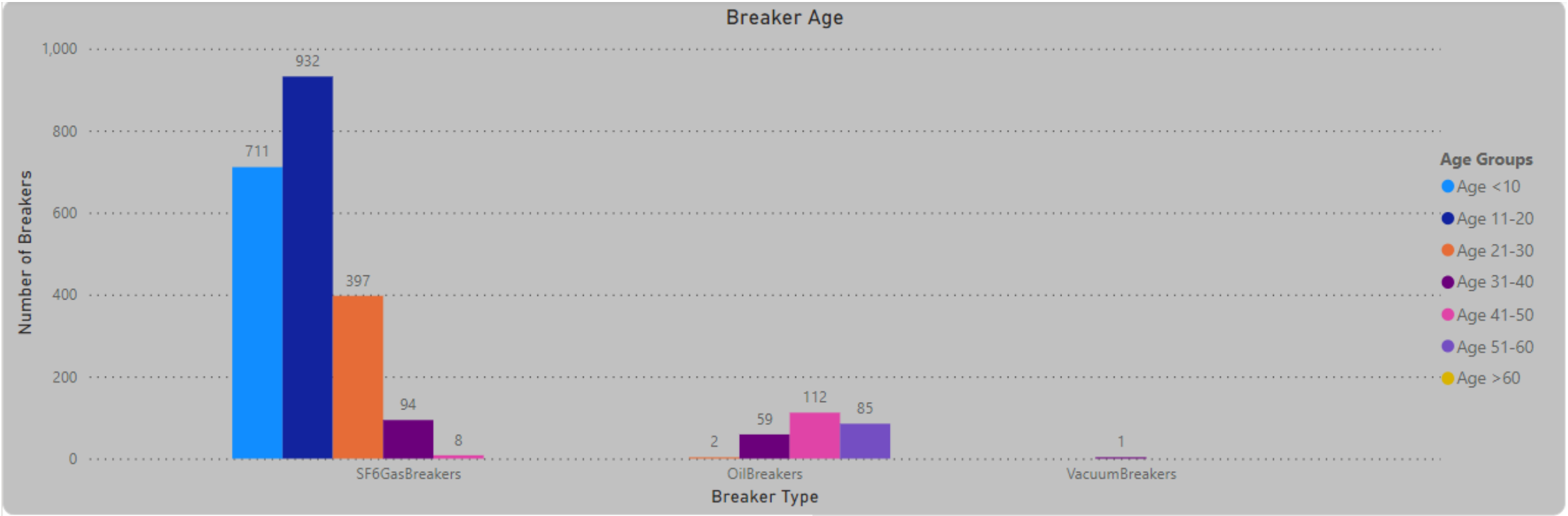
July 8th - An Unknown outage on D-82 impacted 23,578 customers (7 delivery points). This event accounted for 0.009 (16%) of the 0.055 T-SAIFI YTD. Circuit K-37 storm repairs caused the unusual configuration.

July 23rd - High winds on July 23rd took down 15 poles on circuits Y80 and Y103 impacting 6,260 customers (3 delivery points) for 20.5 hours. This accounted for 2.89 of the 6.82 minutes (42%) of T-SAIDI YTD.

Total Circuit Outages by Cause Code



Circuit Breakers Age Distribution

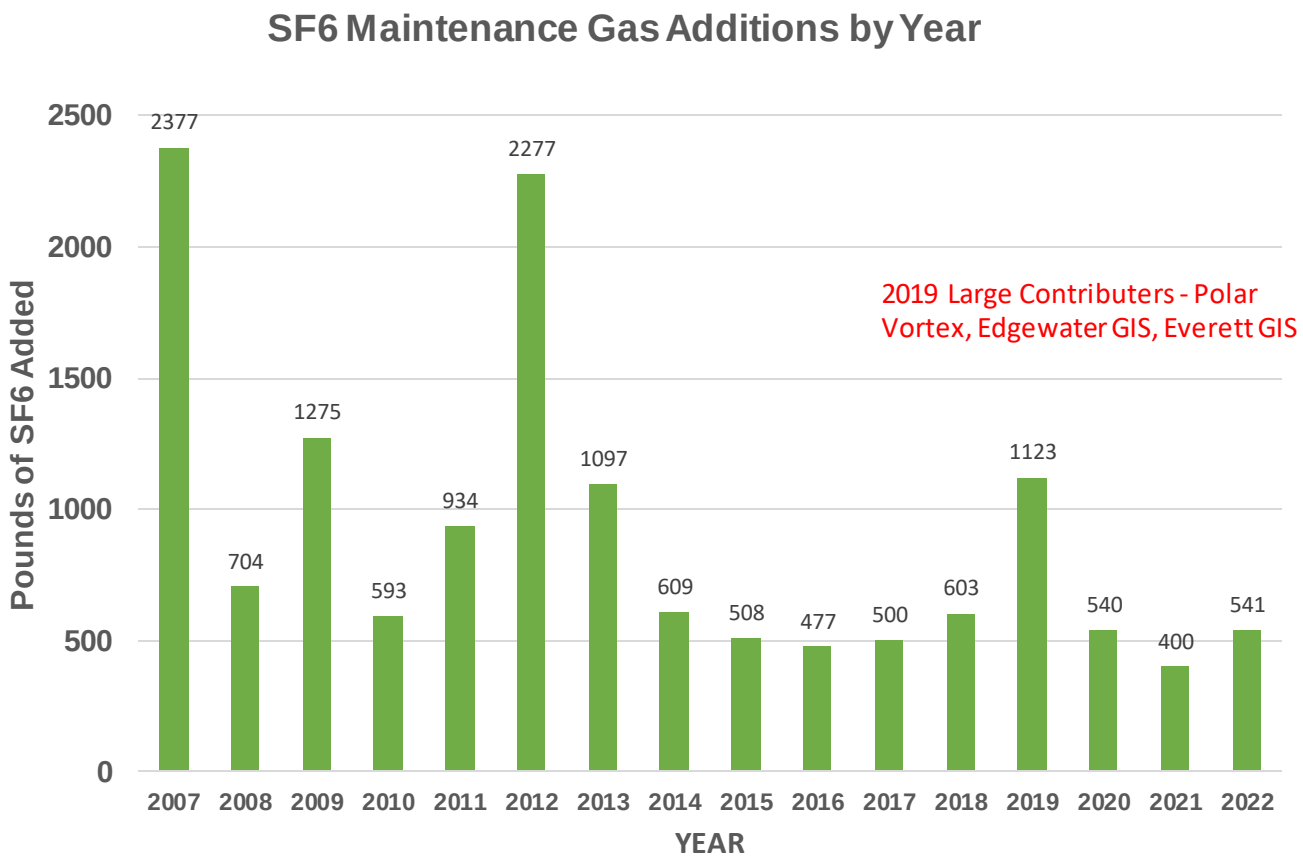


EquipmentSubType	Age <10	Age 11-20	Age 21-30	Age 31-40	Age 41-50	Age 51-60	Age >60
SF6GasBreakers	711	932	397	94	8		
OilBreakers			2	59	112	85	
VacuumBreakers				1			
Total	**711**	**932**	**399**	**154**	**120**	**85**	

Number of Breakers in Fleet

69 kV	115/138/161 kV	230/345 kV	Total
786	1378	232	2401

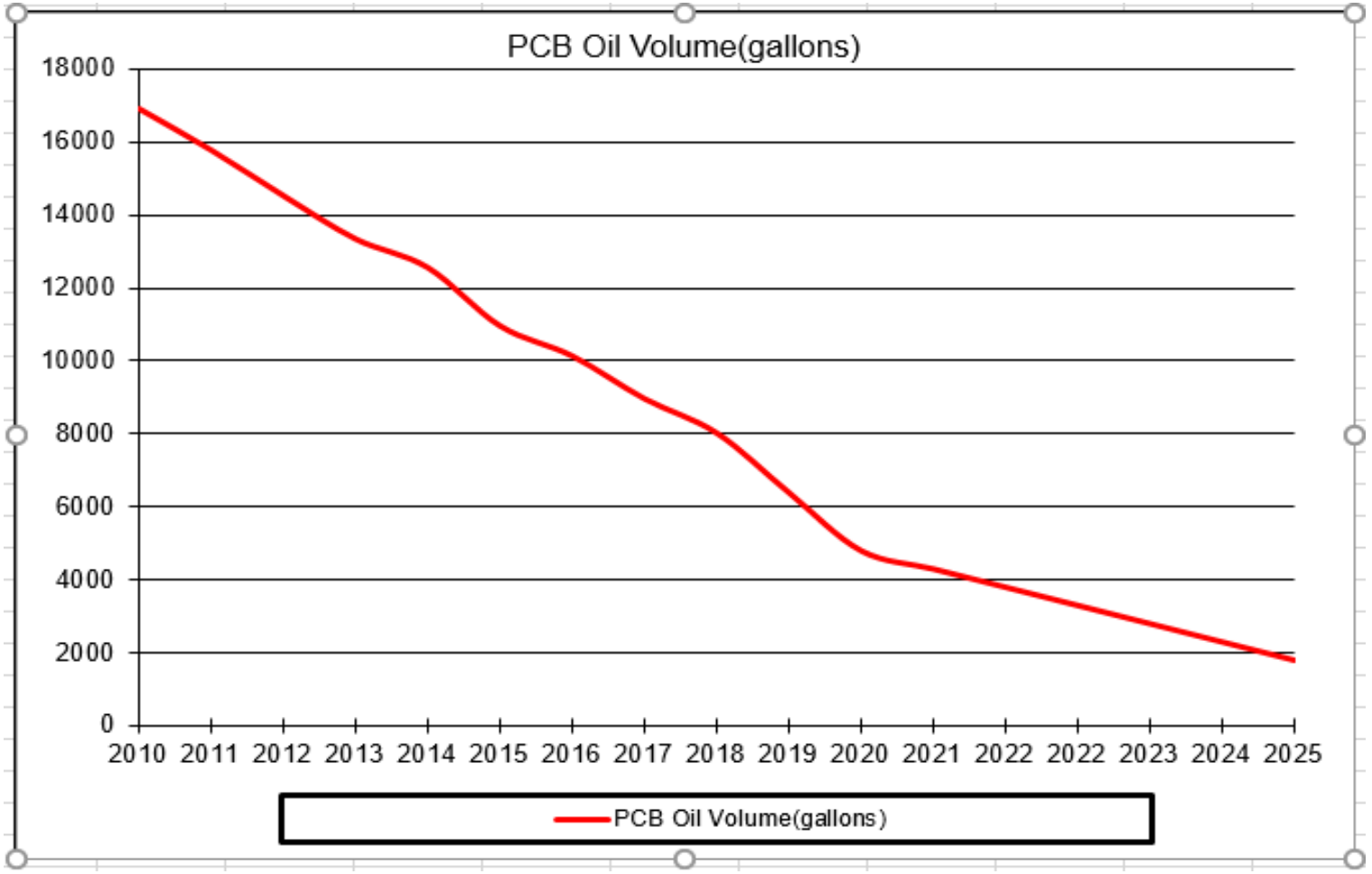
SF6 Equipment Leakage Tracking 2007-2022



2021 Year End SF_6 Nameplate Capacity ≈ 220,489 pounds

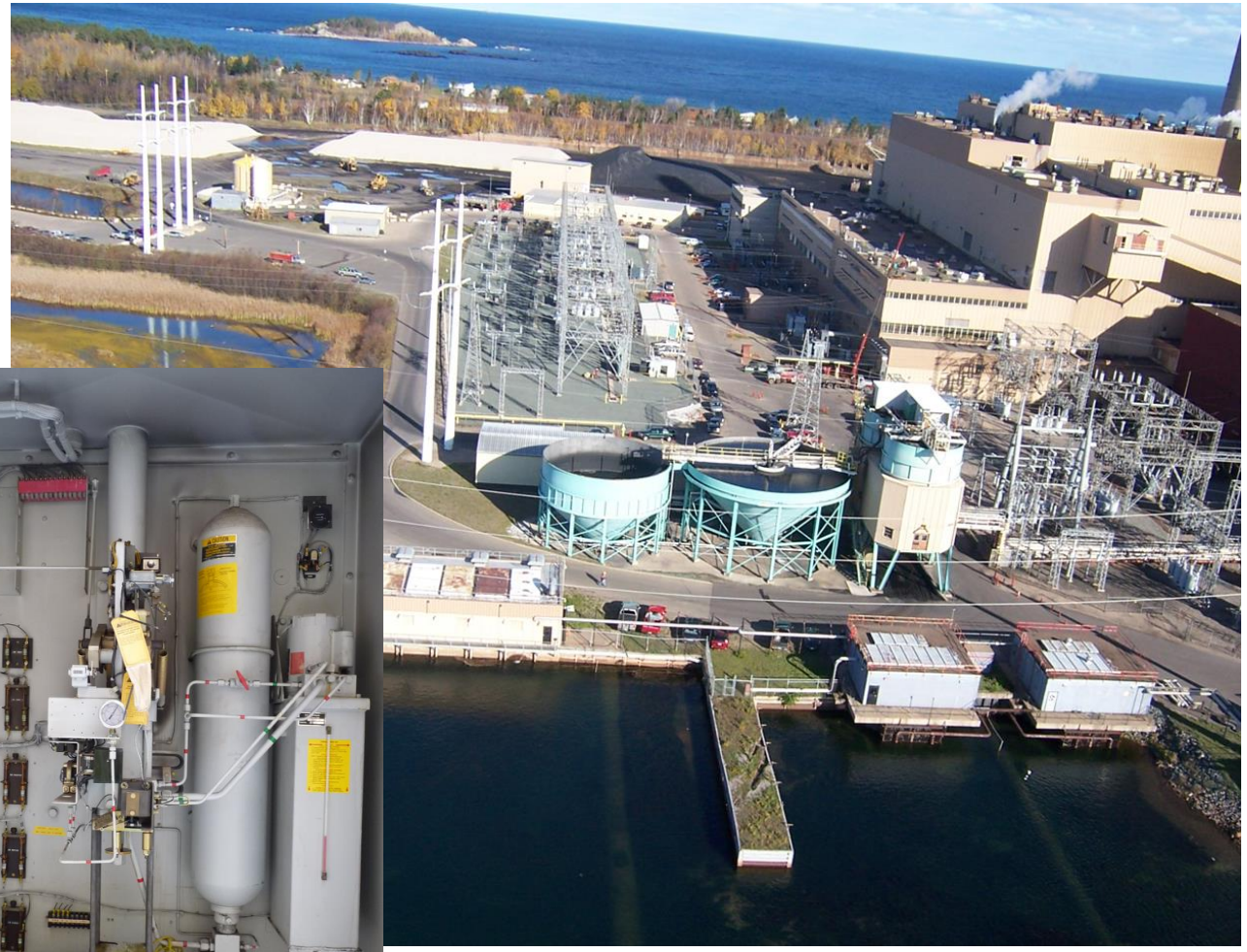
2012 – Edgewater GIS bus leak = 1376#

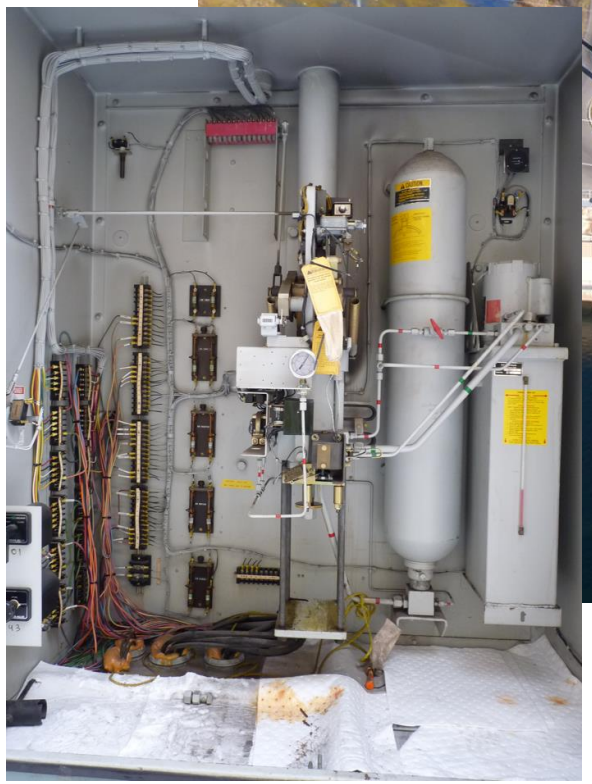
PCB Reduction Plan



500 gallon per year reduction estimated beyond 2020

Presque Isle Switchyard – Breaker Asset Renewal

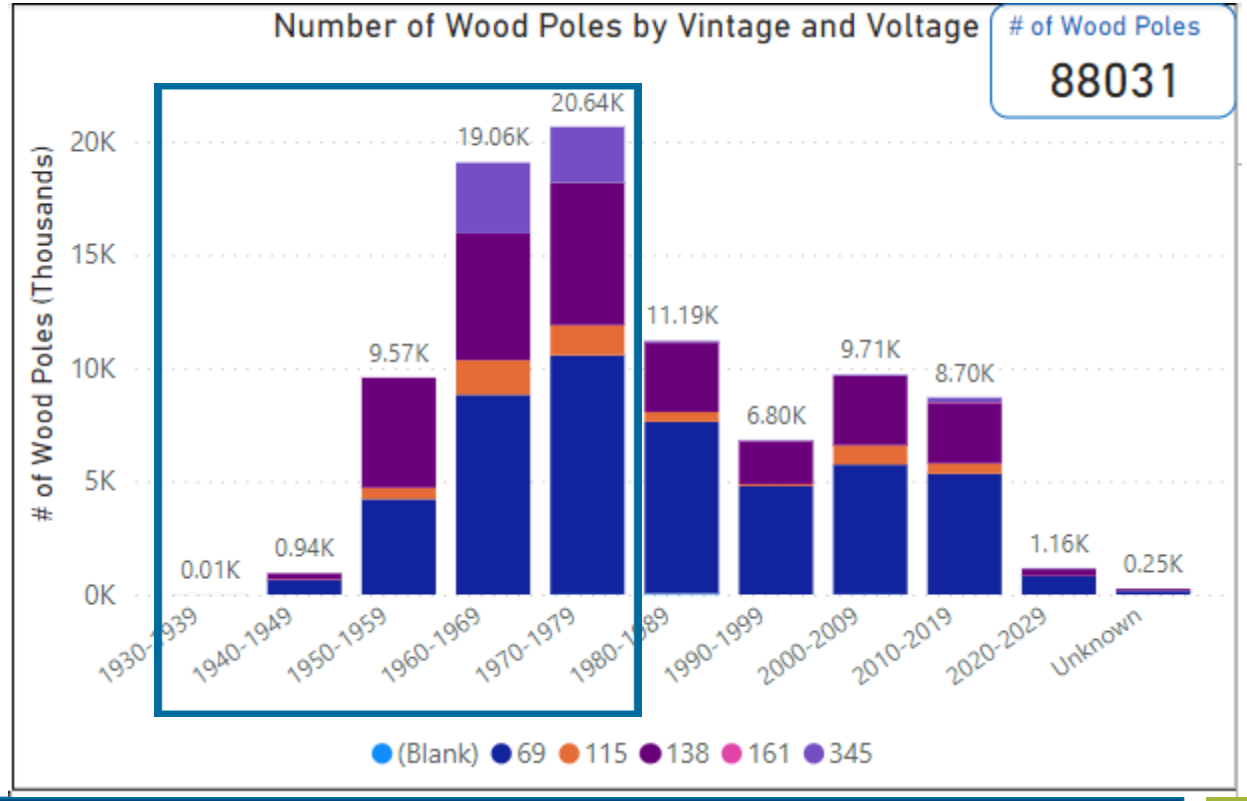




- 15 oil circuit breakers to be replaced, consider configuration
- Hydraulic Operating Mechanism is high maintenance and prone to leaks
- parts are no longer manufactured and limited field support
- HV bushings are at end of reliable life

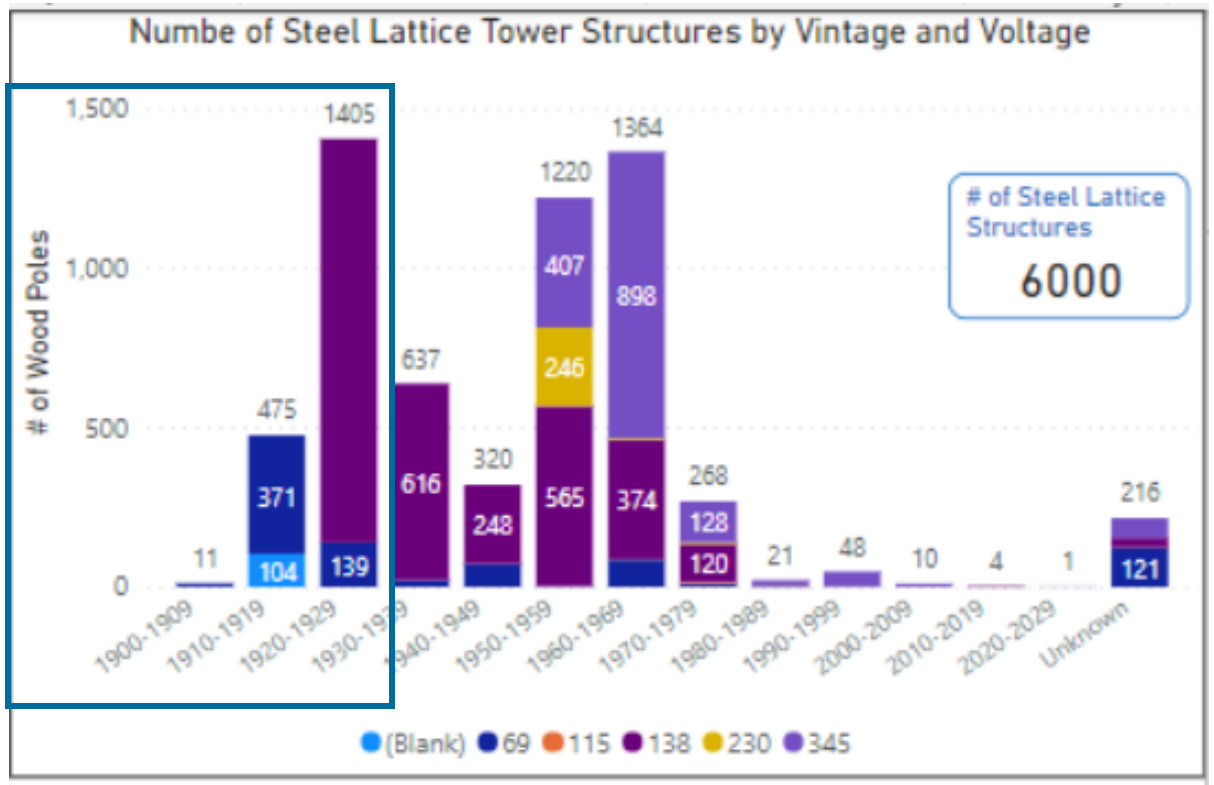
Overhead Transmission Lines – Wood Pole Lines 20-year Outlook

- 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.



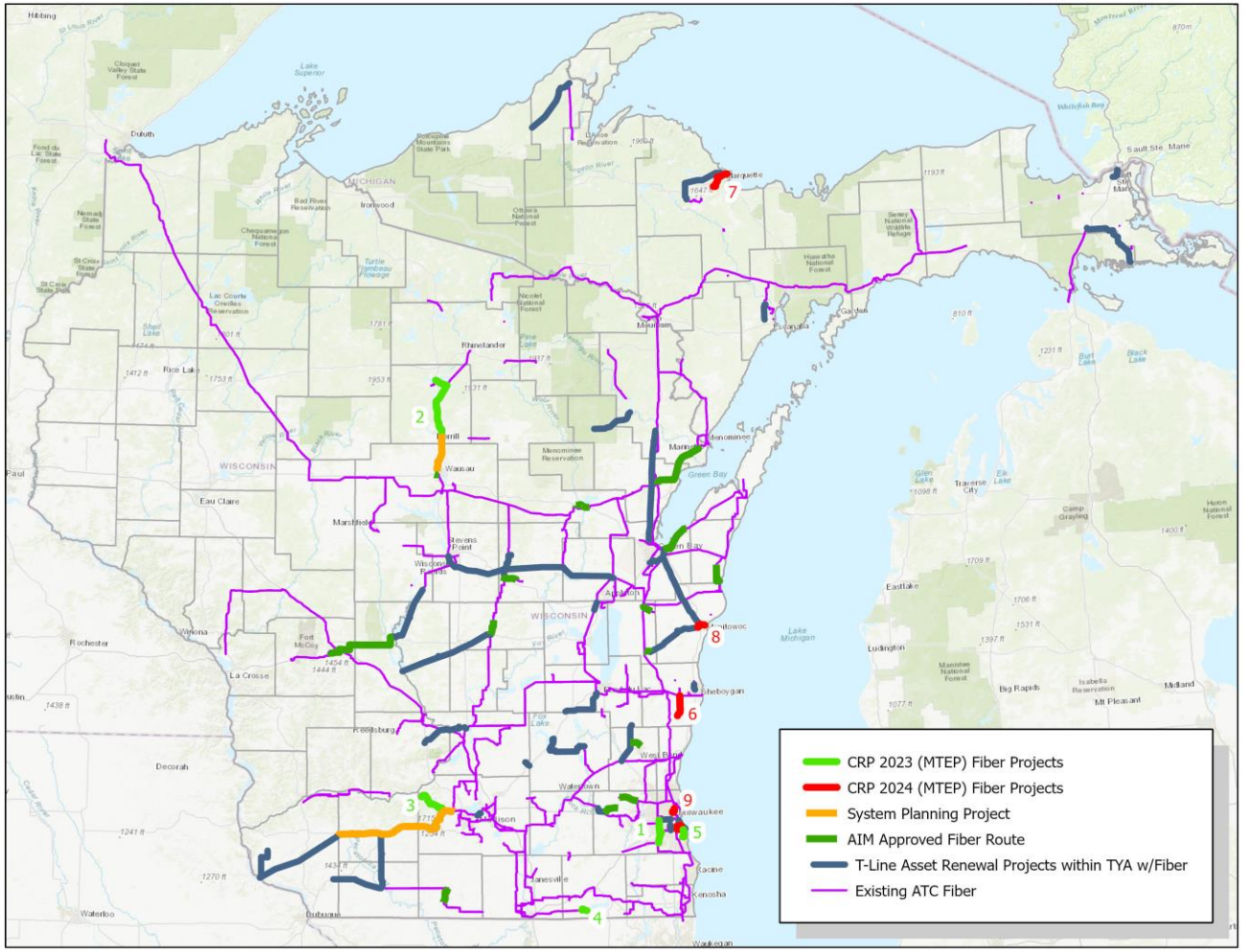
Asset Renewal T-line Needs Example

- 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
    - One lightning outage since the new design went into service (Design 45kA strike, actual192kA strike)

Communications Reliability Program (CRP) Projects - 2023 & Beyond

- Challenges, Trends & Opportunities
  - Telecom Carrier Performance & Service Challenges
  - Future Substation Communication Demands
  - T-Line Asset Management & System Planning Alignment

Communication Reliability Program (CRP) Projects - In Service Fiber and Active CRP Projects



Label:	CRP - MTEP23 Projects:	PCO Cost Estimate
1	**OPGW** - Line 5066 - (St Martins to Bluemound)	$6,113,441.00
2	**OPGW** - Line I-9 - (Pine to Skanawan Tap Structure: #107651)	$7,499,000.00
3	**OPGW** - Line Y-62 - (Wick Drive to Black Earth)	$4,096,584.00
4	**OPGW** - Line Y-159 - (Walworth to Brick Church)	$3,104,796.00
5	**OPGW** - Line NWHG41 - (Barland to Norwich)	$1,599,709.00
	Total Estimate:	**$22,413,530.00**

Label:	CRP - MTEP24 Projects:	PCO Cost Estimate
6	**OPGW** - Line HOLG21 (Holland to Structure: #9662)	$4,014,313.00
7	**OPGW** - Line X-118 - (Freeman to Presque Isle)	$3,823,107.00
8	**OPGW** - Line B-102 - (Rapids to Revere Dr) **OPGW** - Line Y-MRP11 - (Manrap to Custer)	$2,745,930.00
9	**UG Fiber** - (Dewey to Russell Term) **UG Fiber** - (Montana to Norwich) **UG Fiber** - (Center - Fiebrantz)	$6,433,466.00
	Total Estimate:	**$17,016,816.00**

Ambient Adjusted Ratings (AAR) - Anna Torgerson

Existing 4-line Pilot Program

Working on:

- AAR calculation methodology
- Equipment Prioritization
- EMS Modeling
- Verification

Assessment Status – Ted Weber

- 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
  - 2023 Assessment publication – November

Contacts

Allison Bartz (TYA) and Ted Weber (TYA)

Email: abartz@atcllc.com and tweber2@atcllc.com

Matt Waldron (G-T and D-T)

Email: mwaldron@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

Any additional questions?