

# 2023 10-Year Assessment Preliminary Solutions

*Stakeholder and Customer Webcast*

**PRESENTED BY:**

Ted Weber, Amy Wilke, Logan Brecklin, Bob Morton,  
Scott Adams, Anna Torgerson

May 8, 2023

- ATC Proprietary -

[atcllc.com](https://atcllc.com)

# Purpose – Ted Weber

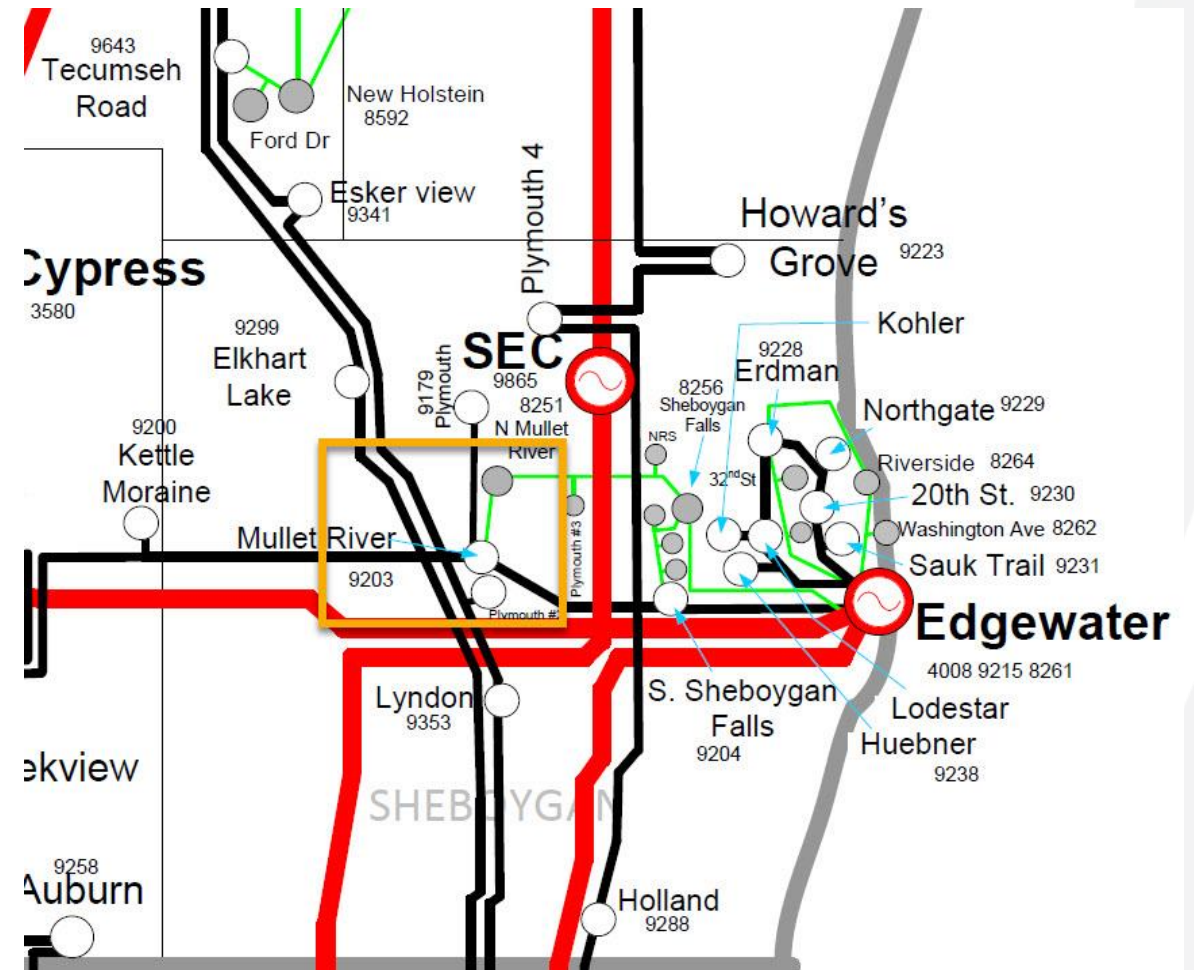
- Define and Solicit Input on Preliminary Solutions
  - Network/System Planning
  - Generation Interconnection/Generation to Transmission (G-T) and Distribution to Transmission (D-T)
  - Asset Renewal
- Solicit Input on Public Policy Driven Needs
- Summarize Next Steps

# Preliminary Solutions

- New projects and asset renewals are offering solutions to issues in the ATC footprint.
  - Mullet River Area Reliability Project
  - Colburn Load Interconnection Request
  - Plymouth #5 T-D
  - Racine County T-D

# Mullet River Area Reliability Project

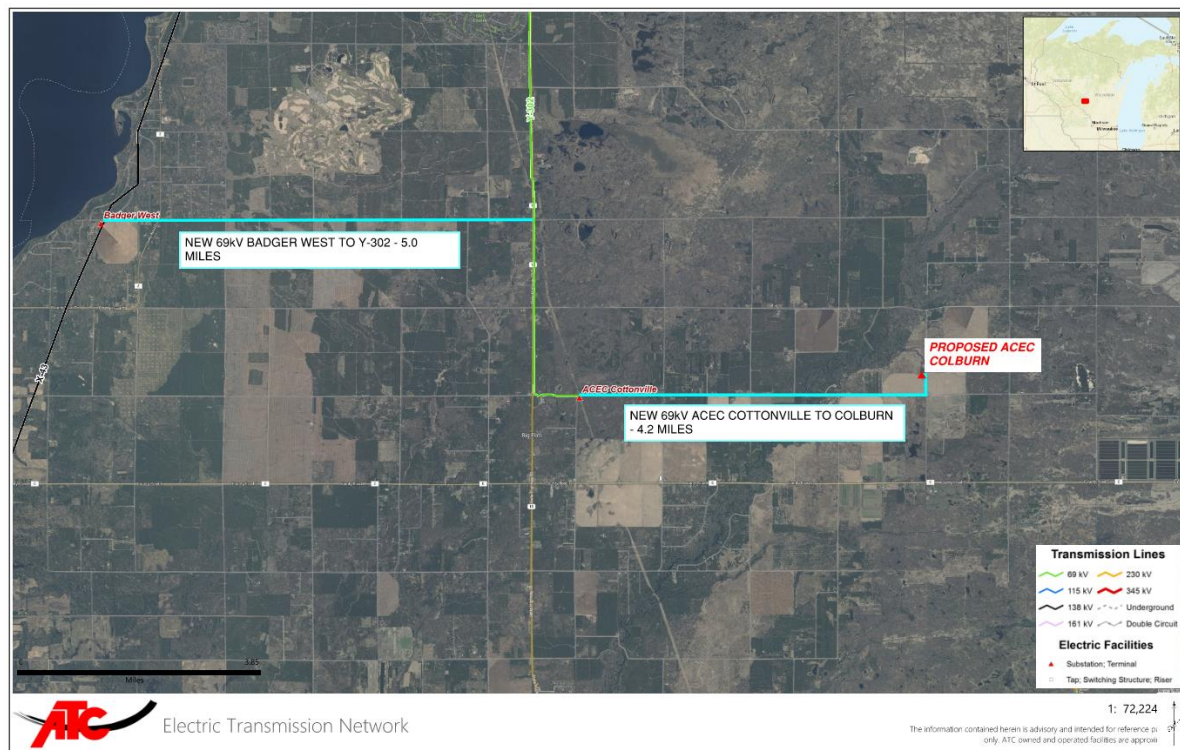
- Relocate Mullet River substation and reroute and re-terminate X-97, X-57, X-89, Y-50, and network 8241 and LYNG11.
  - MTEP22 21900 Appendix B
  - ISD targeting 2027
  - Cost Estimate: \$35M (under review)
- Multiple benefits
  - Improved reliability
  - Operational flexibility
  - Asset renewal needs
  - More environmentally friendly location



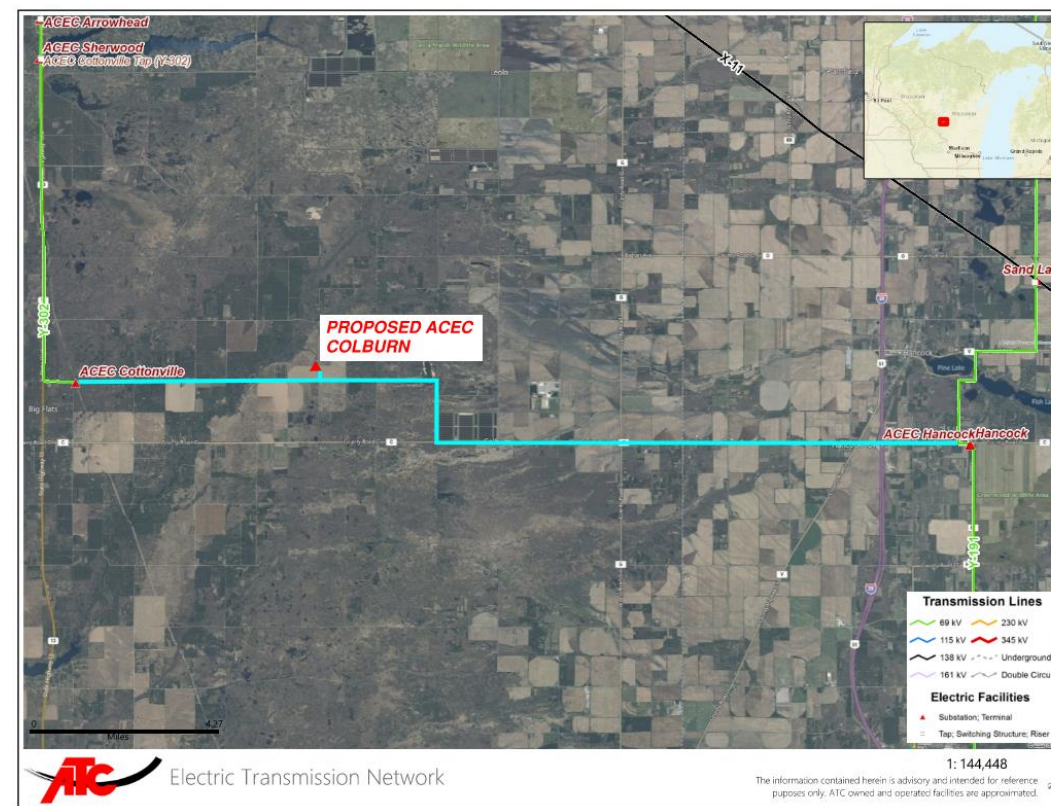


# Colburn Load Interconnection Request

Alternative 1: Badger West 138/69 kV Expansion, 9.2 miles of 69 kV Line



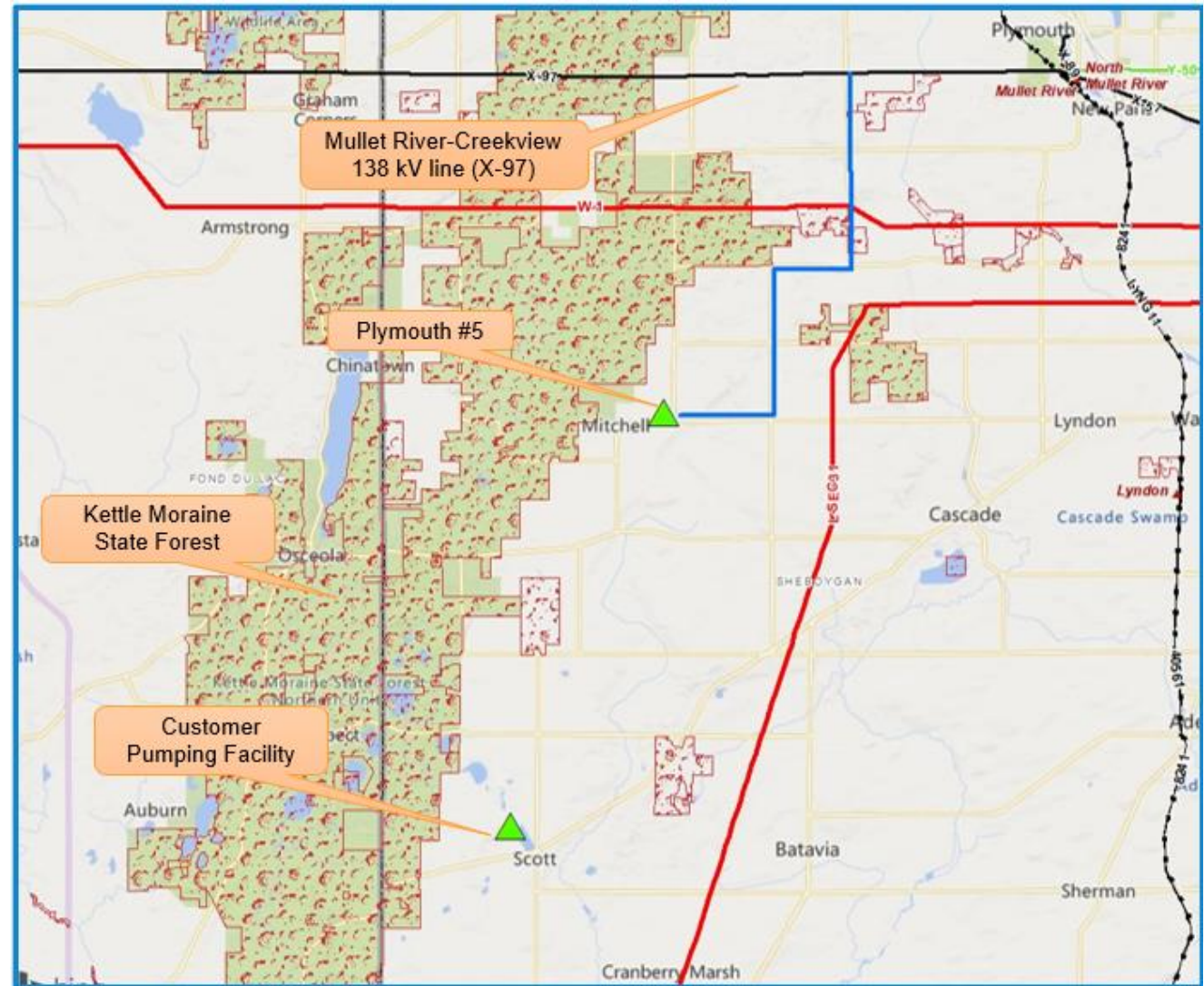
Alternative 2: Hancock 69 kV Expansion, 16.2 miles of 69 kV Line





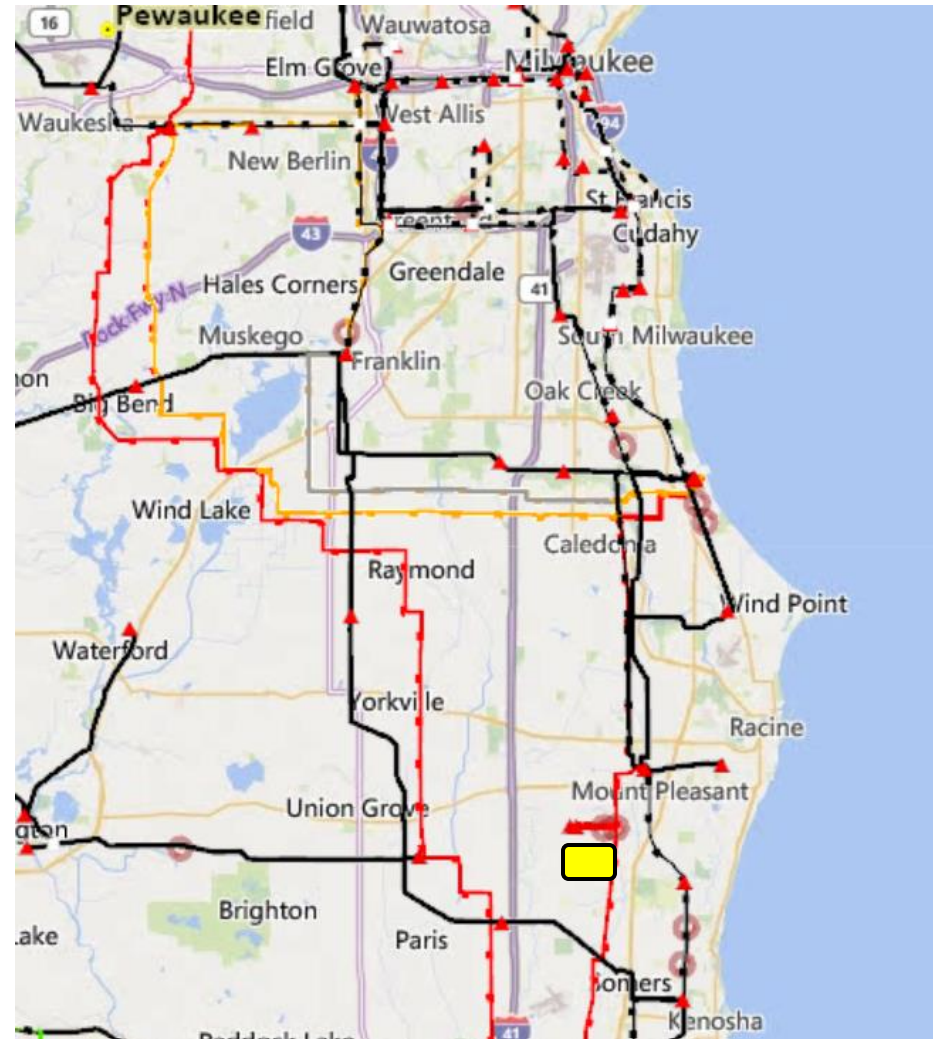
# Plymouth 5 SS, DIC, New Substation

- Requested ISD: 9/2025
  - Projected: 9/2026
- MTEP22, App. A, ID 21925
- Cost: \$27.4M - \$41.1M
- Need:
  - New T-D interconnection request to serve expansion of pipeline pumping facility
- Scope
  - New 138 kV Plymouth 5 Substation with breakers
  - New double-circuit 138 kV line to loop in and out of new substation (~7 to 11 miles depending on route)



# Racine County New T-D Substation

- New load interconnection request in the SE Wisconsin
- ISD targeting Q2 2025
- Project scope is still under evaluation
- ATC will request MISO's Expedited Project Review (EPR) Process to include this project in MTEP 23 App A



# AAR Update - Anna

- ATC began an AAR pilot to understand how to calculate and apply AARs in real-time
  - Pilot lines are all non-BES facilities
  - AARs have been successfully running on a handful of lines since Summer 2022
- ATC is working towards achieving FERC Order 881 compliance by July 2025
  - ratings calculations for all temperature adjustable equipment, not just overhead conductor outside the substation
  - ATC has about 1,000 overhead lines to model as such this modeling effort will be performed on a rolling basis over the next two years
- Equipment receiving an AAR has to be modeled in the ATC EMS and the MISO EMS to apply the AAR in real-time and ongoing coordination between ATC and MISO is occurring to achieve this

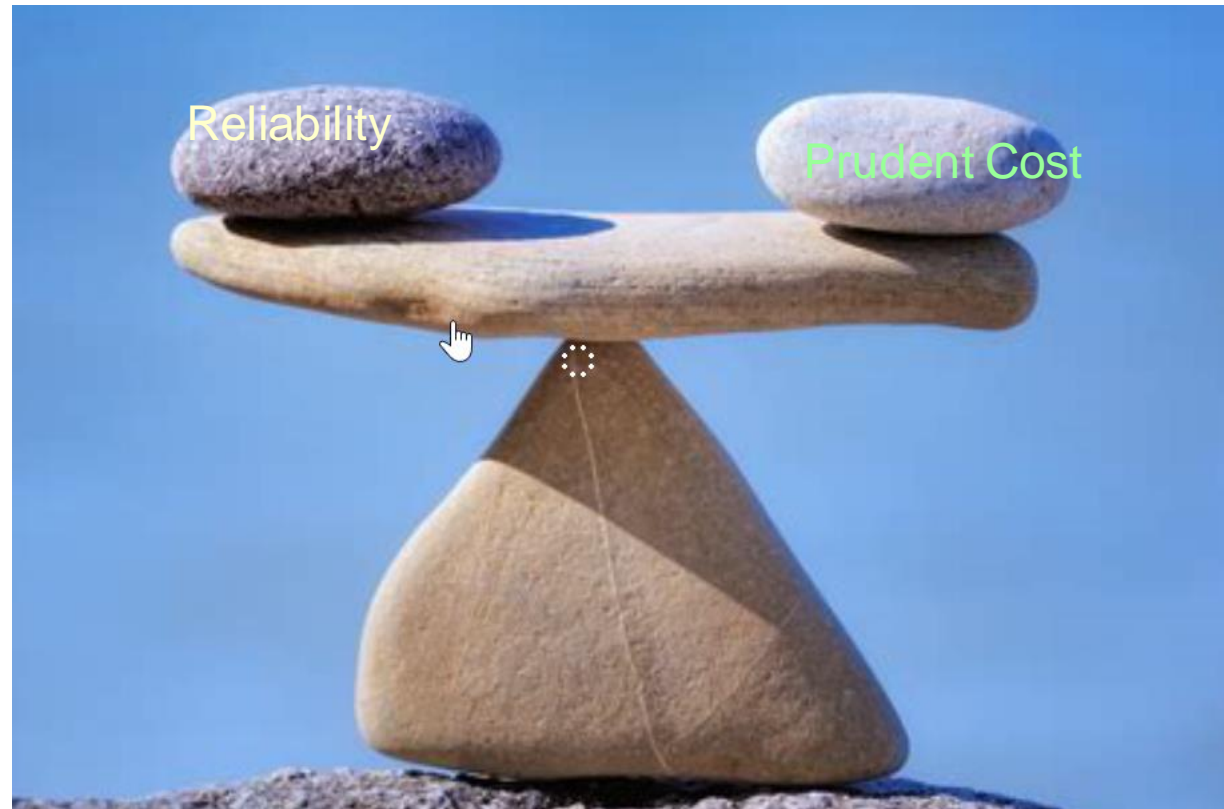


# Asset Renewal Program

**PRESENTED BY:**

Scott Adams, Justin Nettesheim

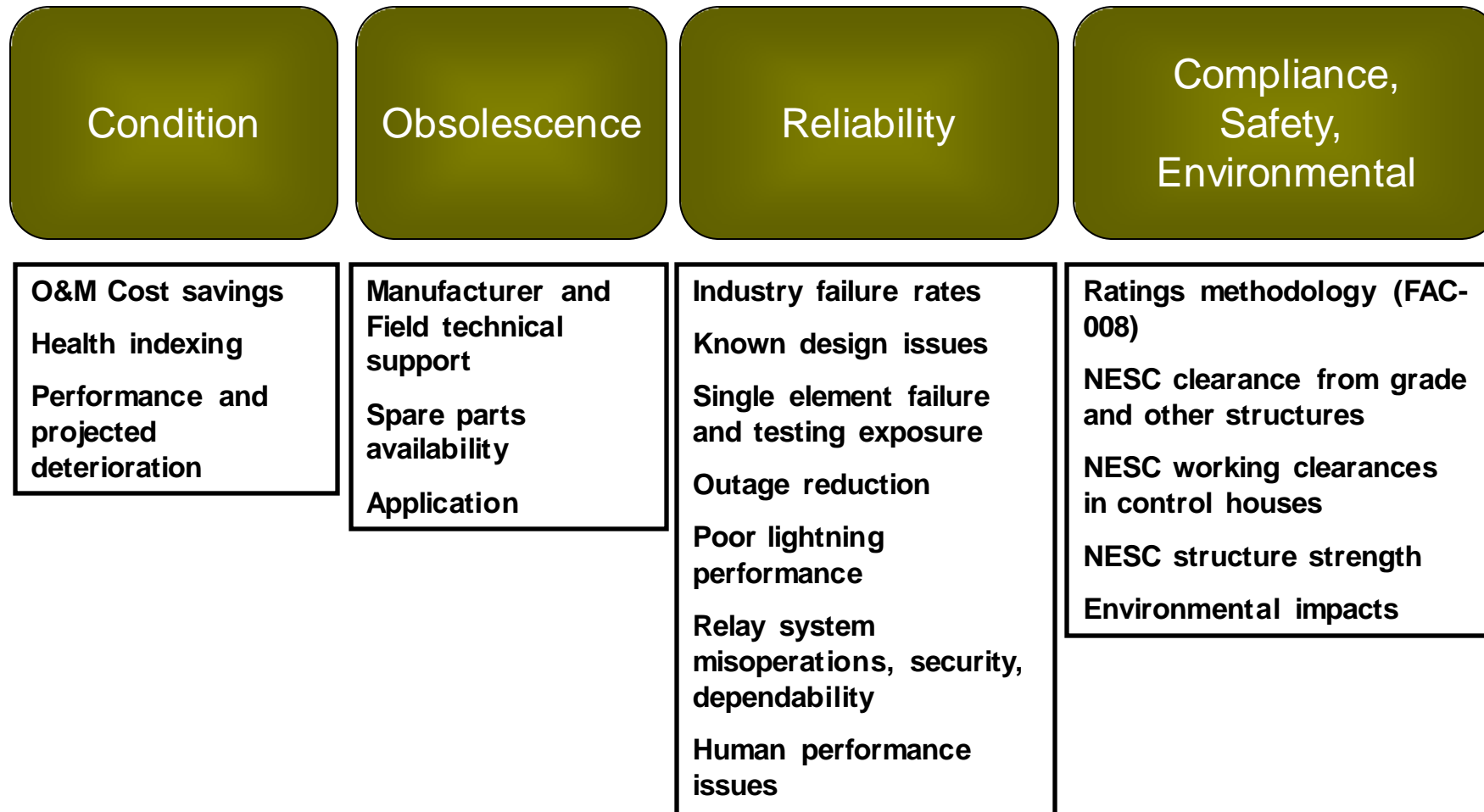
# “ATC’s Asset Renewal strategy is about balancing Asset Risk and Costs”



# 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

# Asset Renewal Program Criteria

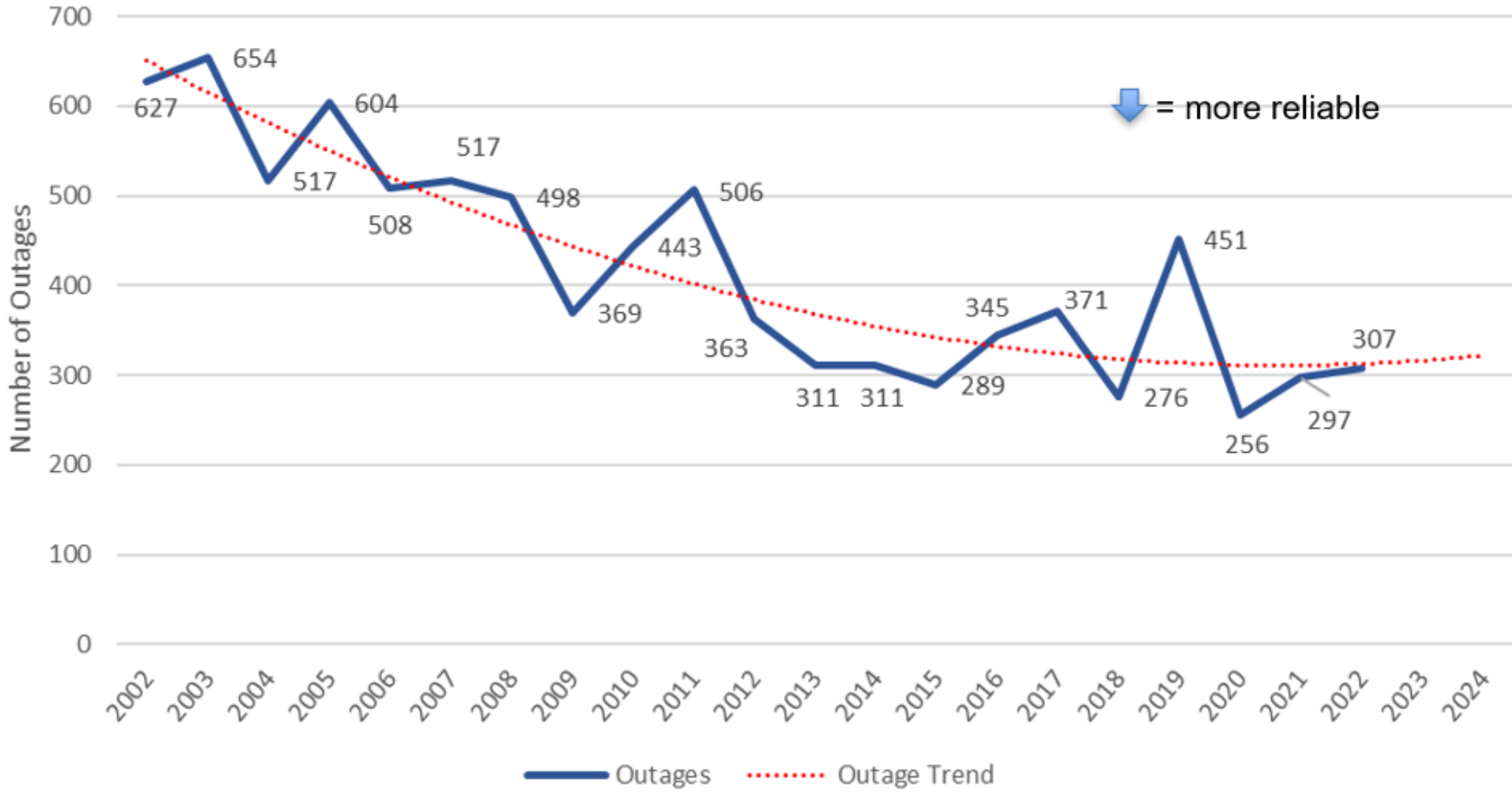




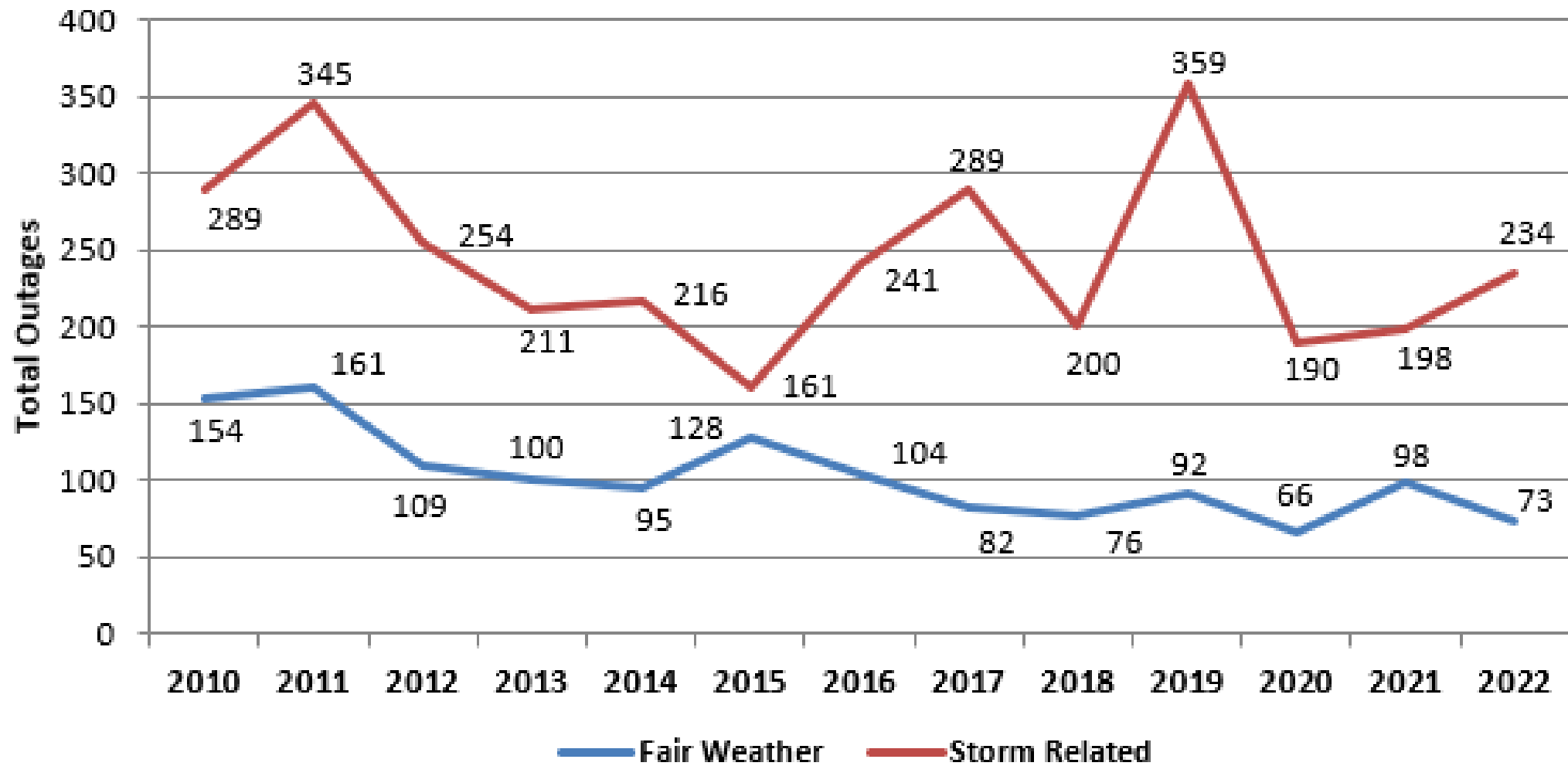
# Replacement is based on...

- **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

# 2002 - 2022 Forced Outages



## 2010 - 2022 Fair Weather/Storm Outage Comparison



# Substation Asset Renewal Program Forecast – AIM Feb 2023

Equipment Classification / Replacement Year	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
[-] IT/OT/Fiber	\$5.1M	\$2.3M	\$2.3M	\$7.2M	\$7.3M	\$19.9M	\$7.6M	\$2.6M	\$9.3M	\$9.5M	\$73.1M
[+] IT/OT Equipment	\$2.2M	\$2.3M	\$2.3M	\$2.4M	\$2.4M	\$14.9M	\$2.5M	\$2.6M	\$9.3M	\$9.5M	\$50.5M
[+] OPGW Asset Renewal	\$2.8M	\$0.0M	\$0.0M	\$4.8M	\$4.9M	\$5.0M	\$5.1M				\$22.5M
[-] Substation	\$81.6M	\$126.1M	\$166.9M	\$85.3M	\$57.4M	\$104.6M	\$91.9M	\$83.5M	\$98.1M	\$90.1M	\$985.4M
[+] Arresters	\$0.3M	\$0.2M	\$0.3M	\$0.3M	\$0.2M	\$0.1M	\$0.3M	\$0.3M	\$0.1M	\$0.3M	\$2.6M
[+] Batteries and Chargers	\$2.4M	\$3.7M	\$2.8M	\$2.4M	\$2.3M	\$3.2M	\$1.4M	\$1.7M	\$5.1M	\$3.2M	\$28.1M
[+] Breakers and Switchers	\$13.3M	\$10.8M	\$14.7M	\$4.0M		\$1.3M	\$2.3M	\$1.7M	\$1.8M	\$2.1M	\$52.0M
[+] Capacitor Banks	\$1.6M	\$0.8M	\$4.1M	\$0.8M	\$2.2M	\$0.9M	\$0.4M		\$1.9M	\$0.5M	\$13.2M
[+] Control Houses (24x42')	\$6.0M	\$24.3M	\$18.6M	\$9.5M	\$3.2M	\$13.2M	\$3.4M	\$6.9M	\$7.0M	\$10.8M	\$103.0M
[+] GIS Station Asset Renewal			\$35.1M								\$35.1M
[+] HEMP Mitigation	\$2.2M	\$2.3M	\$2.3M	\$2.4M	\$2.4M	\$2.5M	\$2.5M	\$2.6M	\$2.7M	\$2.7M	\$24.7M
[+] Instrument Transformers	\$2.0M	\$1.8M	\$6.0M	\$3.6M	\$1.3M	\$3.6M	\$1.6M	\$1.4M	\$3.4M	\$4.1M	\$28.9M
[+] Mobile Equipment			\$2.3M								\$2.3M
[+] Online Monitoring	\$6.7M						\$1.9M	\$1.9M	\$2.0M	\$2.0M	\$14.6M
[+] Physical Security - Asset Renewal	\$3.2M	\$1.6M	\$1.0M	\$0.0M	\$0.0M	\$0.1M	\$0.1M	\$0.1M	\$0.0M	\$0.0M	\$6.1M
[+] Power Transformers	\$12.3M	\$27.4M	\$15.7M	\$11.8M	\$16.4M	\$21.1M	\$17.0M	\$17.4M	\$17.8M	\$13.3M	\$170.2M
[+] Reactors		\$2.3M									\$2.3M
[+] Relays	\$23.5M	\$39.3M	\$50.9M	\$38.8M	\$19.4M	\$30.8M	\$33.1M	\$24.2M	\$29.7M	\$28.0M	\$317.9M
[+] SCADA	\$2.1M	\$2.9M	\$4.6M	\$4.2M	\$5.3M	\$7.4M	\$5.4M	\$3.1M	\$6.2M	\$8.4M	\$49.5M
[+] SCADA (not a trigger)	\$0.9M	\$2.3M	\$0.9M	\$2.2M	\$1.0M	\$1.9M	\$7.1M	\$8.2M	\$7.0M	\$12.3M	\$43.8M
[+] SS InverterRenewal	\$1.1M	\$1.1M	\$1.2M	\$1.2M	\$1.2M	\$1.2M	\$1.3M	\$1.3M	\$1.3M	\$1.4M	\$12.3M
[+] SS Router Asset Renewal	\$0.0M	\$0.0M	\$0.0M	\$0.0M		\$11.2M	\$11.4M	\$11.7M	\$11.9M		\$46.3M
[+] Station Power Transformers	\$0.6M	\$1.8M	\$0.4M	\$0.4M	\$0.6M						\$3.7M
[+] Switches	\$3.4M	\$3.5M	\$5.8M	\$3.6M	\$1.9M	\$6.0M	\$2.5M	\$1.0M	\$0.2M	\$0.9M	\$28.7M



# T-Line Asset Renewal Program Forecast – AIM Feb 2023

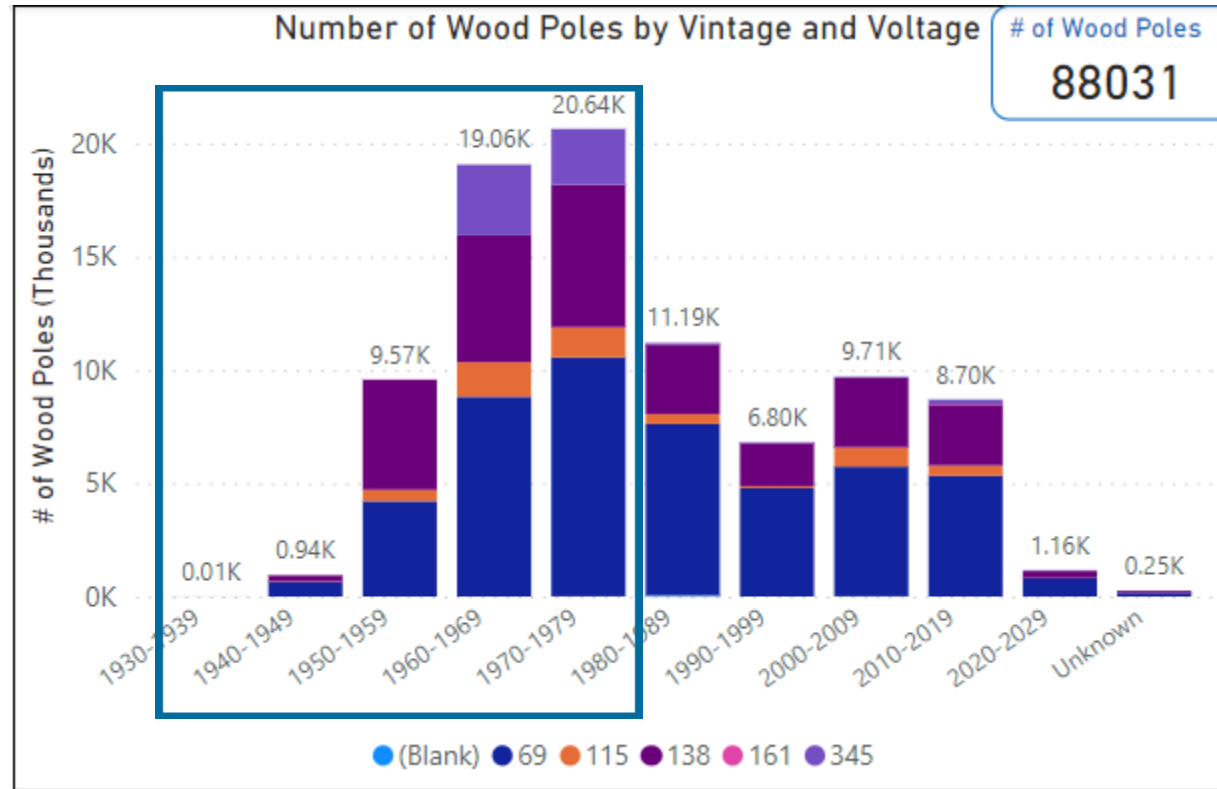
Escalated Cost											
Equipment Classification / Replacement Year	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
<input checked="" type="checkbox"/> <b>Transmission Line</b>	<b>\$189.4M</b>	<b>\$199.9M</b>	<b>\$220.9M</b>	<b>\$264.8M</b>	<b>\$237.4M</b>	<b>\$246.5M</b>	<b>\$246.0M</b>	<b>\$254.5M</b>	<b>\$259.9M</b>	<b>\$261.8M</b>	<b>\$2,381.1M</b>
<input checked="" type="checkbox"/> <b>Tline - OH</b>	<b>\$171.7M</b>	<b>\$187.0M</b>	<b>\$182.9M</b>	<b>\$231.5M</b>	<b>\$217.7M</b>	<b>\$227.9M</b>	<b>\$226.9M</b>	<b>\$235.1M</b>	<b>\$240.0M</b>	<b>\$241.5M</b>	<b>\$2,162.1M</b>
Placeholder - OH Projects	\$165.0M	\$0.0M	\$0.0M								\$165.0M
Placeholder - Reinsulate and Select Pole Projects	\$6.7M	\$6.9M	\$7.0M	\$7.2M	\$7.3M	\$7.5M	\$7.6M	\$7.8M	\$8.0M	\$8.1M	\$74.1M
Placeholder - Steel Lattice 138 kV				\$34.0M	\$34.7M	\$35.4M	\$36.2M	\$36.9M	\$37.7M	\$38.5M	\$253.4M
Placeholder - Steel Lattice 69 kV	\$0.0M	\$7.6M	\$0.0M	\$18.3M	\$0.0M	\$5.6M	\$0.0M	\$3.4M	\$3.4M	\$0.0M	\$38.3M
Placeholder - Structural	\$0.0M	\$12.0M	\$12.0M	\$4.8M	\$4.9M	\$5.0M	\$5.1M	\$5.2M	\$5.3M	\$5.4M	\$59.6M
Placeholder - Wood Pole	\$0.0M	\$160.5M	\$163.8M	\$167.3M	\$170.8M	\$174.4M	\$178.0M	\$181.8M	\$185.6M	\$189.5M	\$1,571.6M
<input checked="" type="checkbox"/> <b>Tline - UG</b>	<b>\$17.7M</b>	<b>\$12.9M</b>	<b>\$38.0M</b>	<b>\$33.3M</b>	<b>\$19.7M</b>	<b>\$18.7M</b>	<b>\$19.1M</b>	<b>\$19.5M</b>	<b>\$19.9M</b>	<b>\$20.3M</b>	<b>\$219.0M</b>
Placeholder - HPFF Line Pressurizing Renewals	\$2.7M	\$1.9M	\$2.0M	\$1.4M	\$1.4M						\$9.4M
Placeholder - UG HPFF Line Renewal	\$6.0M	\$11.0M	\$36.0M	\$17.9M	\$18.3M	\$18.7M	\$19.1M	\$19.5M	\$19.9M	\$20.3M	\$186.6M
Placeholder - UG Submarine Cable Renewal	\$9.0M										\$9.0M
Placeholder - UG XLPE Renewal				\$14.0M							\$14.0M

# 2027 In-Service Date Projects by Station (\$81.6M)

> \$750k		\$250k - \$750k		\$150k - \$250k		< \$250k	
Location	Cost_Escalated	Location	Cost_Escalated	Location	Cost_Escalated	Location	Cost_Escalated
Presque Isle	\$10,461,696	Lost Dauphin	\$726,407	Lake Park	\$242,136	Aspen	\$149,594
Mullet River	\$8,295,292	Tecumseh Rd	\$704,082	Melissa	\$242,136	Forward Energy Center	\$149,594
Straits	\$6,104,986	North Bluff	\$633,865	Stiles	\$242,136	Hubbard	\$149,594
Forest Junction	\$4,274,433	Waunakee	\$583,436	White Clay	\$242,136	Lakota Rd	\$149,594
East Krok	\$4,107,955	Harrison North	\$484,271	Gardner Park	\$224,741	Plains	\$149,594
Pioneer (WPS)	\$3,544,982	Hartman Creek	\$484,271	Nelson Dewey	\$220,700	Yahara River	\$149,594
Mobile Equipment	\$2,978,576	West Wisconsin Rapids	\$473,062	Sycamore	\$215,985	Petenwell	\$147,956
Artesian	\$2,784,559	Benson Lake SVC	\$450,143	Canal	\$215,760	Winneconne	\$132,140
Indian Lake	\$2,739,470	New Holstein	\$434,569	Arrowhead 345/230 kV	\$214,862	Chalk Hill	\$126,145
Howard	\$1,628,814	Dunn Rd	\$405,159	Wildwood (MEWD)	\$209,862	Kilbourn	\$121,239
Whitcomb	\$1,538,209	St Lawrence	\$397,307	Rocky Run	\$192,453	Sandstone Rapids	\$88,093
Kaukauna Central	\$1,035,159	Thunder	\$363,203	Hiawatha	\$188,818	Granville	\$78,711
Gran Grae	\$1,005,602	Lone Rock	\$329,199	Garden Corners	\$179,838	Reedsburg	\$63,073
Royster	\$1,005,602	Cypress	\$299,188	Oconto	\$179,206	ATC Pewaukee Office	\$53,884
Baraboo	\$900,429	Jefferson	\$295,464	Caroline	\$177,939	ATC De Pere Office	\$47,620
Manistique	\$857,629	Maine	\$285,461	Point Beach	\$170,857	Hoover	\$44,047
Birchwood	\$847,474	South Fond du Lac	\$261,562	Concord	\$158,128	Lincoln Pumping Station	\$44,047
Gladstone	\$832,368			Curtis	\$158,128	Poynette	\$44,047
Russell	\$826,489			Hume	\$158,128	University (UWGB)	\$40,817
Blackhawk (ALTE)	\$797,284			Jennings Rd	\$158,128	Bain	\$28,345
Three Lakes	\$794,614			Zobel	\$158,128	Ellinwood	\$28,345
				Crivitz	\$152,896	Shoto	\$28,345
				ATC Cottage Grove Office	\$150,853	2nd St	\$10,204
						Rockdale	\$9,879
						Branch River	\$1,361

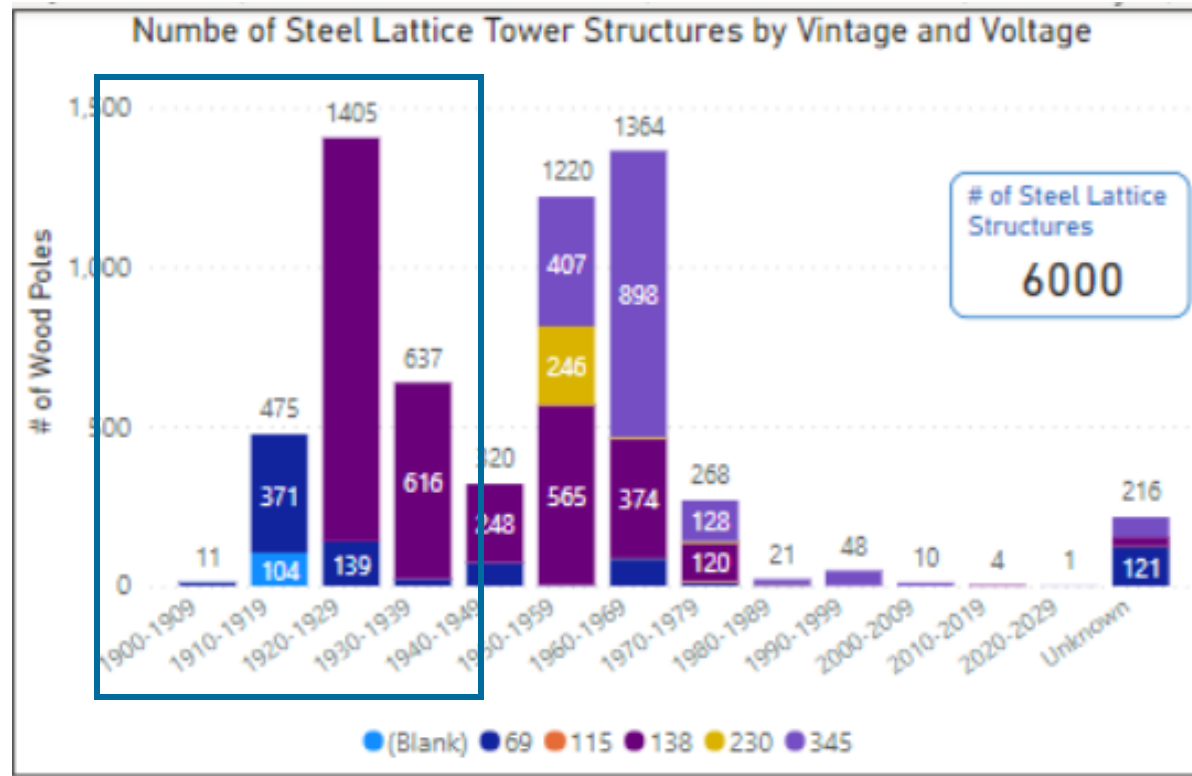
# Overhead Transmission Lines – Wood Pole Lines 20-year Outlook

- 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

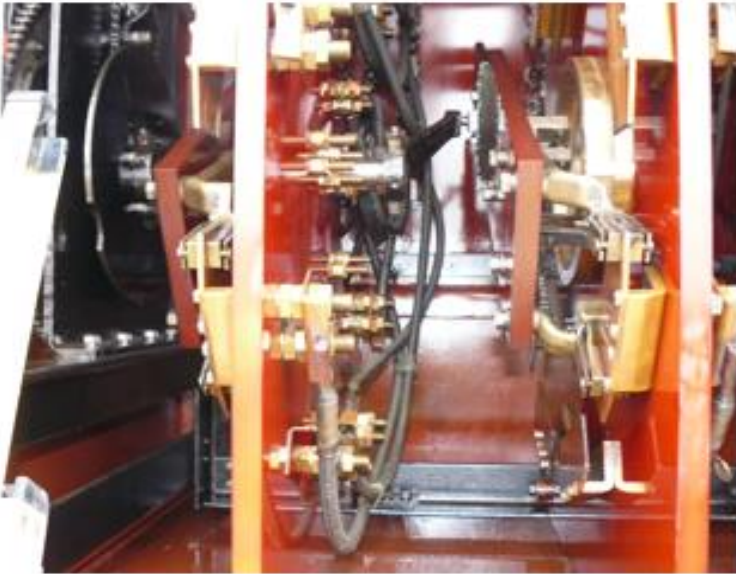
- Objective is to manage condition and preserve reliability and safety as these pre-1940's assets reach end of life.
- Pre-1940 vintage lattice tower structures are likely to be replaced in the next 20 - 25 years.





# Lancaster Power Transformer – Life Extension

- Allis Chalmers Power Transformer
- Built in Milwaukee in 1954
- Life Extension – 2015
  - High Voltage Bushings
  - Low Tap Changer bypass
  - Oil Seal Gaskets
- Planned Retirement 2025



# 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, actual 192kA strike)



# Ten Year Assessment Status – Ted Weber

- Next Steps
  - Solutions comments – due June 1
  - Start drafting TYA online report – May
  - Finish sensitivity studies – May
  - Develop new or revised scope and cost estimates – June
  - ATC internal review/approval – August
  - 2022 Assessment publication – October/November



## Webinar Series: Inverter-Based Resources

June 6 – July 13, 2023 | 4:00 – 5:00 pm Eastern Time



[Series Flyer](#) – [Webinar Registration Link](#)

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Q&A

