

# 2022 10-Year Assessment Preliminary Solutions

*Stakeholder and Customer Webcast*

**PRESENTED BY**

Allison Bartz, Scott Adams, Justin Nettesheim, Yi Li, Jamal Khudai, Dani Hall

May 9, 2022



# Purpose – Allison Bartz

- 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.
  - Madison area reactive power
  - DPP-2019 generation projects
  - 2026 ISD asset renewal program
  - Milwaukee County project

# Madison Area Reactive Power Project

PRESENTED BY

**Yi Li**

Planning Engineer, P.E.  
Special Assessments and Studies  
[yli@atcllc.com](mailto:yli@atcllc.com)

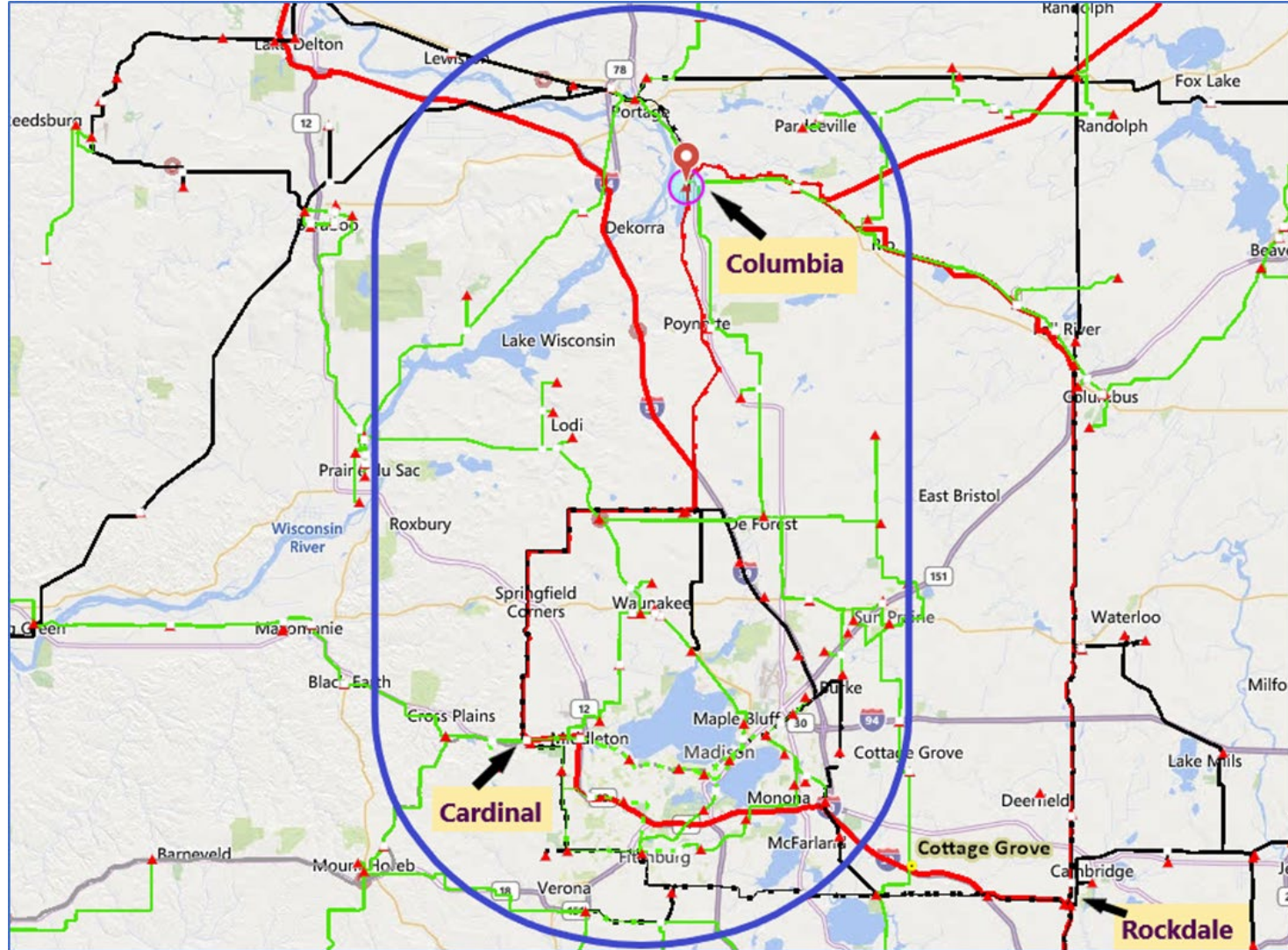
May 09, 2022



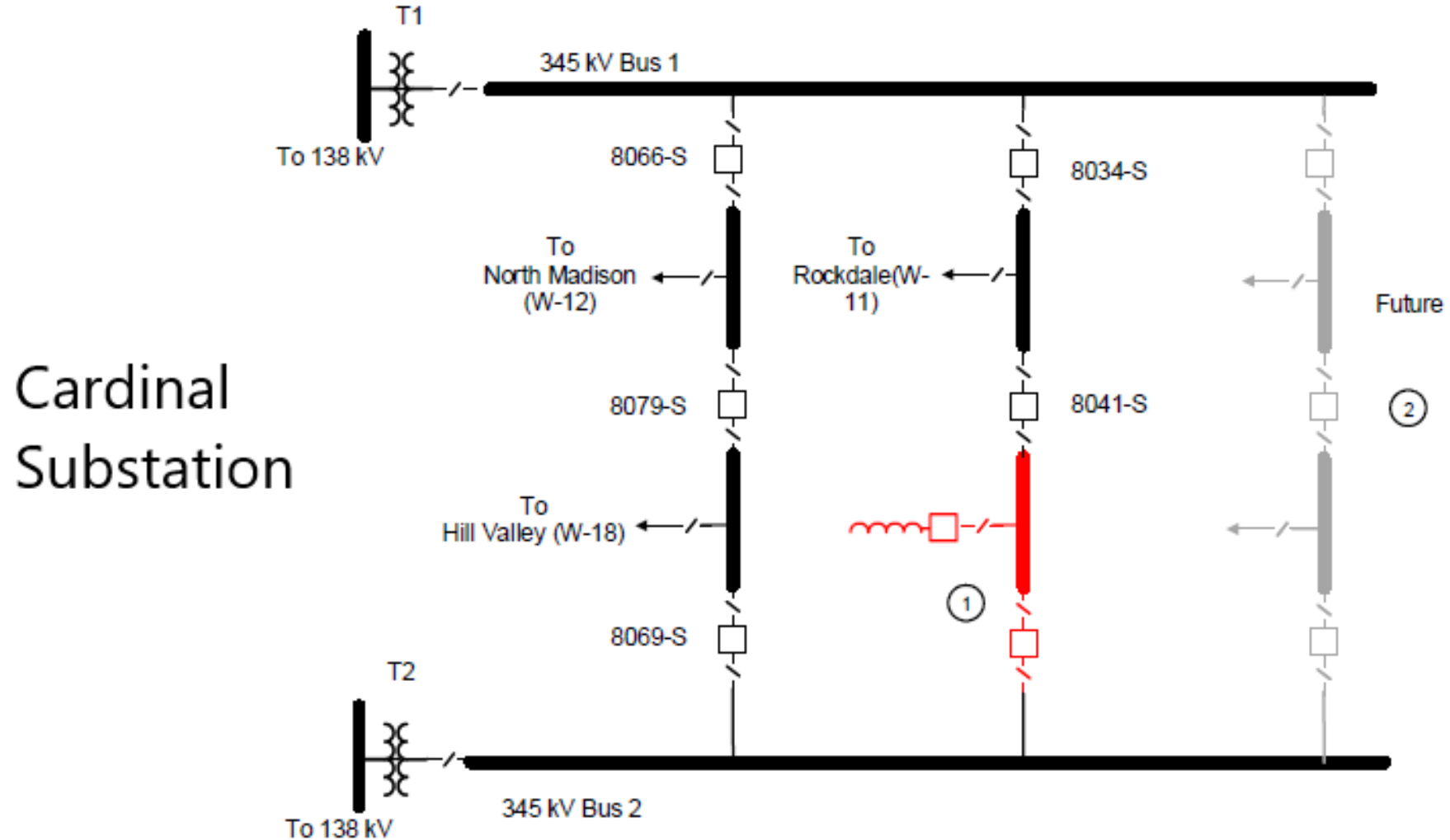
# Madison Area Reactive Power Project

- One new 80 MVA<sub>r</sub> shunt reactor at Cardinal Substation 345 kV
- In-Service-Date: June 2024
- MTEP ID 22003
- \$6.92 Million in 2024 dollars, currently under review and approval
- Benefit: Mitigate higher voltages in Madison area, especially after Columbia generators retire.

# Madison Area Reactive Power Project



# Madison Area Reactive Power Project



# MISO Generator Interconnection Cycle DPP-2019 Projects

PRESENTED BY

Jamal Khudai

May 09, 2022





# MISO Generator Interconnection Cycle DPP-2019 Projects



## Purpose

- Update on MISO Generator Interconnection Cycle “DPP-2019” Projects

## Takeaways

- Capital Cost: \$159 million
- Eleven (13) Interconnection Requests
- Total: 1600 MW
- Six New Substations
- Eight (8) Transmission Network Projects
  - Six (6) line rebuilds
  - Two (2) line uprates

# DPP-2019 Status

- At the end of Phase 3
- MISO studies are complete
- Waiting completion of PJM studies
- Projects still could withdraw
- Costs, and Network Upgrades could change
- Network Upgrades Facility Studies and GIAs will be the next

# Preliminary Phase 3 Cost Allocation

No	MISO ID	Fuel	MW	POI	Total Cost Allocation (Exclude TOIF & Affected Systems)
1	J1214	Solar	300	Rockdale 345 kV	1,789,781
2	J1251	Solar	100	Perkins – Arnold 138 kV	7,623,741
3	J1253	Solar	100	South Fond du Lac – Fitzgerald 345 kV	28,029,564
4	J1304	Solar	65	Townline Road – Paddock 138 kV	13,273,700
5	J1305	Solar	50	Bass Creek – Albany – North Monroe 138 kV	11,042,948
6	J1316	Storage	50	Paris 138 kV	27,932,916
7	J1326	Storage	75	Rockdale 345 kV	1,494,299
8	J1374	Wind	67.2	Ebenezer 138 kV	1,201,495
9	J1377	Solar	98.56	Rockdale – Wempletown 345 kV	14,087,553
10	J1410	Solar	300	North Madison - Columbia 345 kV	11,394,728
11	J1411	Solar	75	North Madison - Columbia 345 kV	10,746,761
12	J1460	Solar	200	Sunrise 138 kV	28,423,542
13	J1483	Wind	99	Hill Valley 345 kV	1,613,040
<b>Total</b>					<b>158,654,068</b>

# Interconnections at New Substations

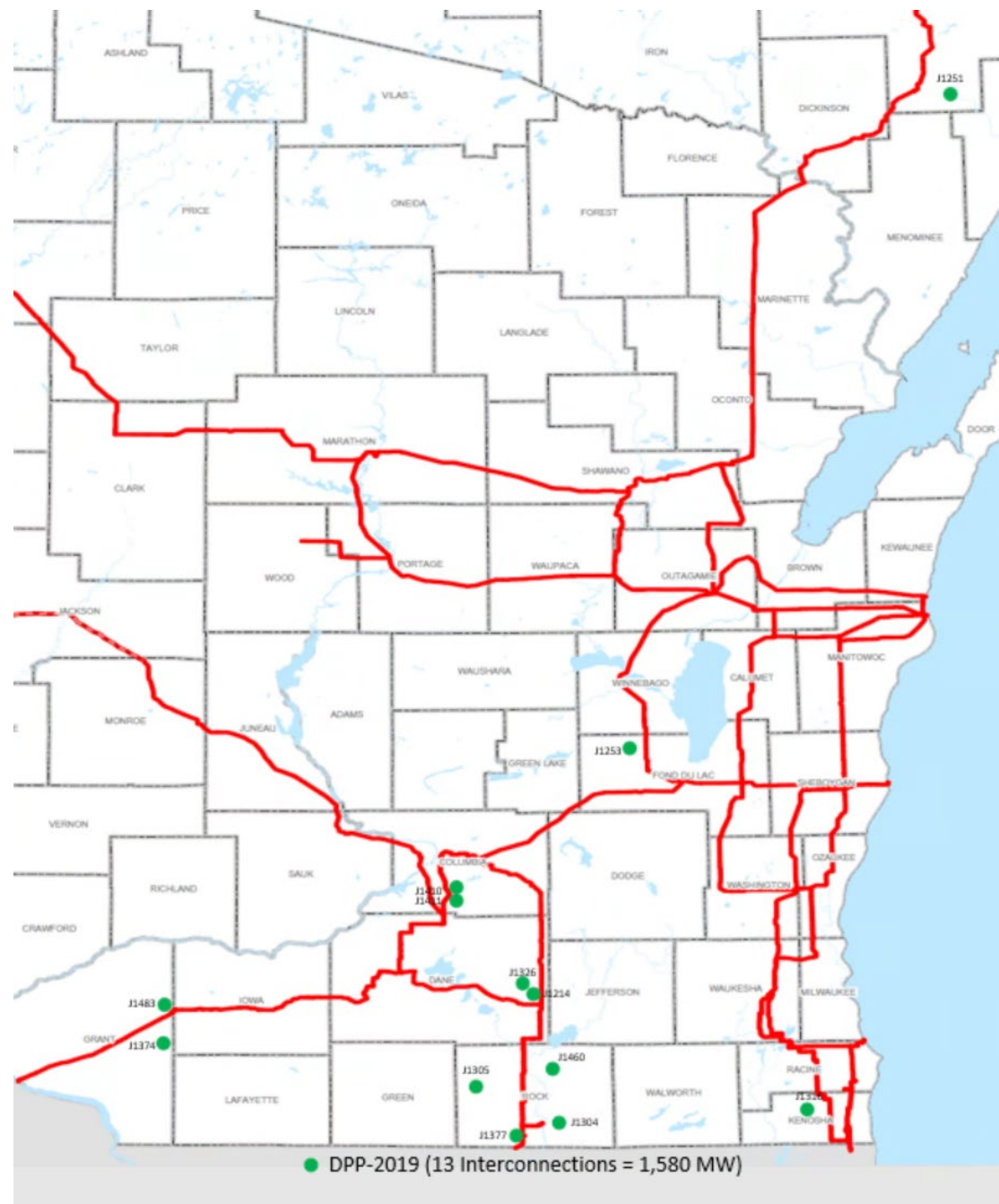
Count	Interconnection	Substation Name	kV	Cost
1	J1251	TBD	138-kV	7,623,741
2	J1253	TBD	345-kV	11,991,921
3	J1304	Big Hill Substation	138-kV	8,749,504
4	J1305	Norwegian Creek	138-kV	7,766,049
5	J1377	TBD	345-kV	13,937,272
6	J1410 and J1411	TBD	345-kV	\$22,143,280

# Transmission Network Upgrades

Network Upgrade	Study Type	Cost
Fox River – North Appleton 345 kV (NAPL121), Rebuild	NRIS <sup>1</sup>	27,932,916
Crawfish River – Concord 138 kV (9043), Uprate	NRIS	2,084,375
North Lake Geneva Tap – Burlington 138 kV (6541) 138 kV, Uprate	NRIS	4,309,017
University – Mukwonago 138 kV (UNIG52) 138 kV, Rebuild	NRIS	31,814,057
Neevin – Butte Des Morts 138 kV (43021) 138 kV, Rebuild	NRIS	1,556,274
North Fond du Lac – Aviation (G-111) 138 kV, Rebuild	ERIS <sup>2</sup>	12,443,358
Aviation – Progress Ave (X-50) 138 kV, Rebuild	ERIS	2,043,042
Progress Ave - Ellinwood (X-50) 138 kV, Rebuild	NRIS	764,858

<sup>1</sup> NRIS = Network Resource Interconnection Service

<sup>2</sup> ERIS = Energy Resource Interconnection Service



DPP-2019  
Approximate  
Interconnection  
Locations

# Other MISO Generation Interconnection Cycles

Cycle	Status	Comments
DPP-2020	DPP SIS Phase 2 almost done	Waiting completion of PJM Studies
DPP-2021	DPP SIS Phase 1	MISO model delays
DPP-2022	September 15, 2022	Application deadline

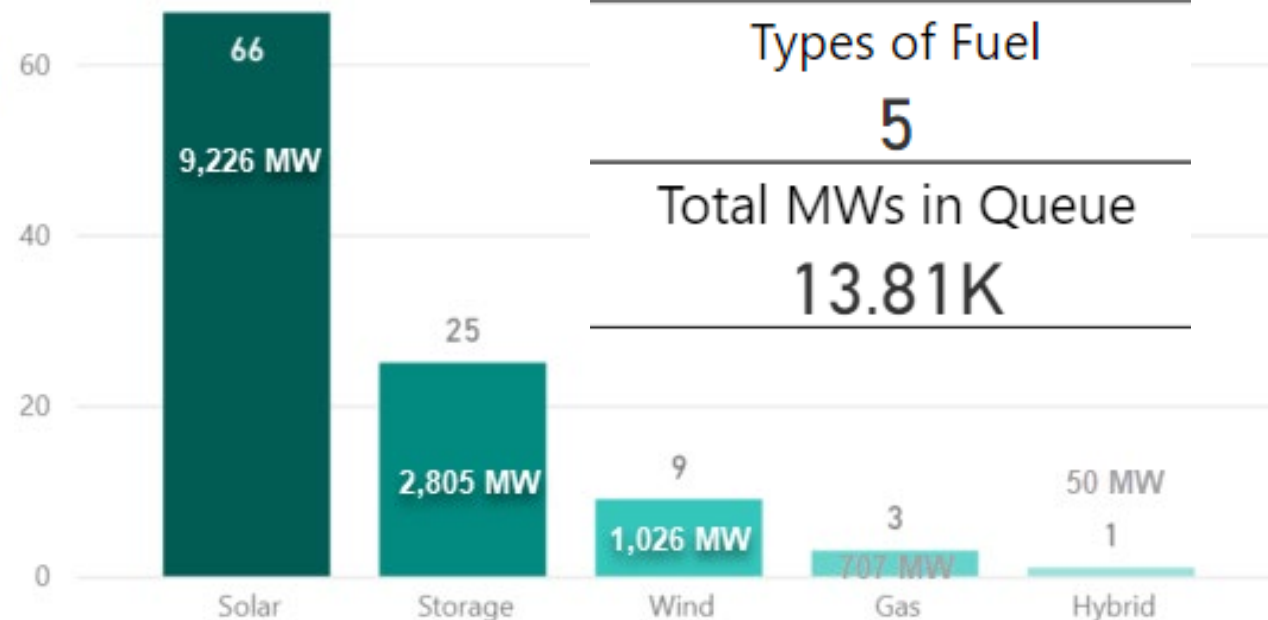
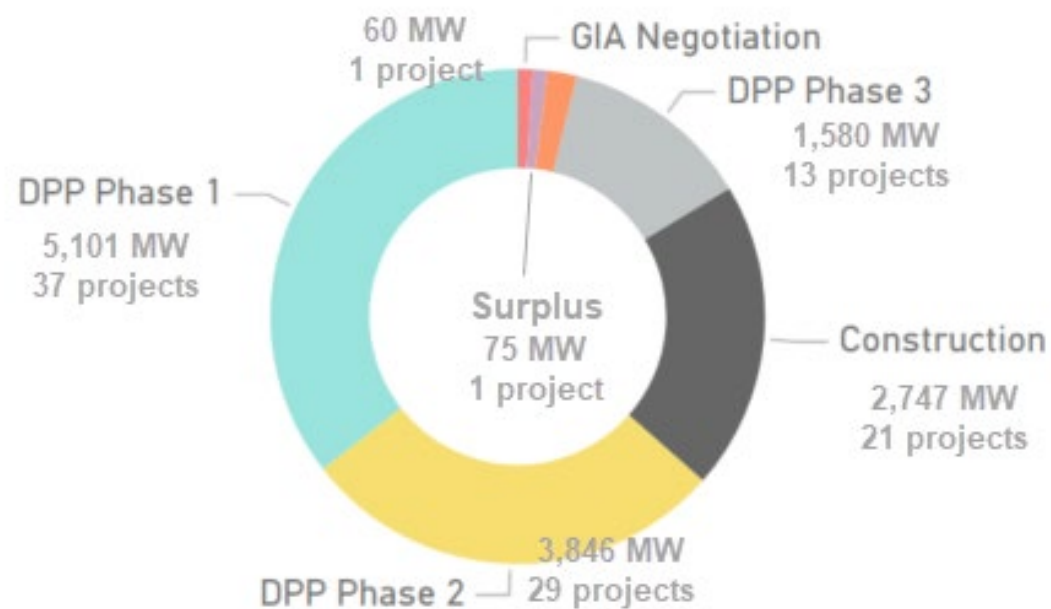
# Contact Information

- Jamal Khudai ([jkhudai@atcllc.com](mailto:jkhudai@atcllc.com))
- Paul Walter ([pwalter@atcllc.com](mailto:pwalter@atcllc.com))



# Generation Interconnections – Dani Hall

Phase ● GIA Negotiation ● Surplus ● Replacement ● DPP Phase 3 ● Construction ● DPP Phase 2



Active MISO GT Projects

104

Developers

34

Types of Fuel

5

Total MWs in Queue

13.81K

# Asset Renewal Program: Ten Year 2026 ISD Plan

Keep the Lights On at the Lowest Life Cycle Cost

PRESENTED BY

Scott Adams, Justin Nettesheim



OUR VISION

Connecting you with  
a sustainable energy future

# ATC's Asset Renewal strategy is about balancing Performance Risk and Life Cycle Costs



# Asset Renewal Program Objectives

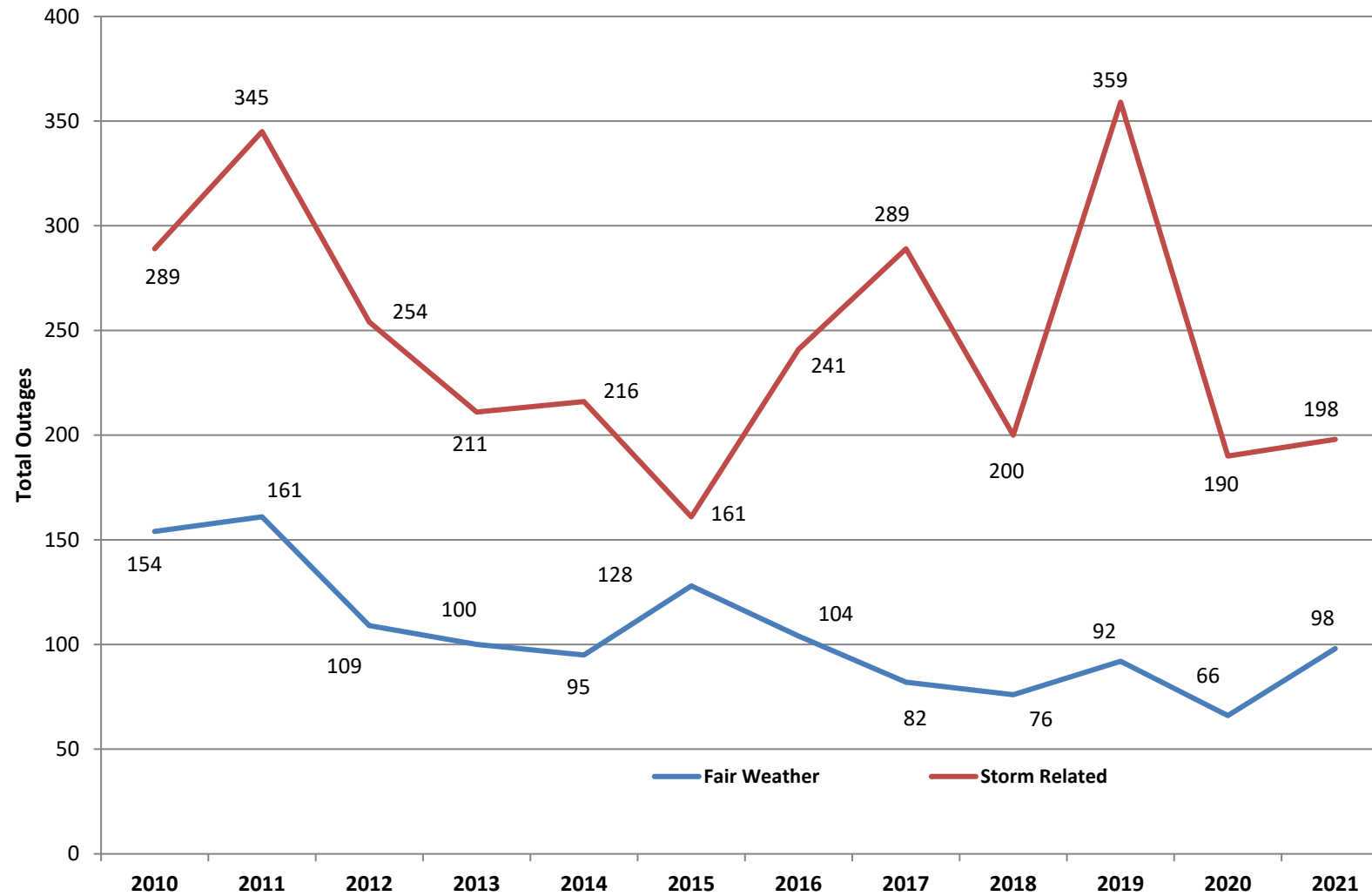
- Safety – public and worker
- Minimize total life cycle cost [Net Present Value of Revenue Requirements (NPV RR) from customer cost/rate perspective]
- Compliance
- Manage risk
- Reliable performance – maintain or improvement
- Environmental performance improvements
- Coordination with Stakeholders

# 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

2010 - 2021 Fair Weather/Storm Outage Comparison





# Asset Renewal Program Forecast

Equipment Classification / Replacement Year	2026	2027	2028	2029	2030	2031	2032	Total
<b>IT/OT/Fiber</b>	<b>\$3.4M</b>	<b>\$2.3M</b>	<b>\$2.4M</b>	<b>\$2.4M</b>	<b>\$7.5M</b>	<b>\$7.7M</b>	<b>\$7.9M</b>	<b>\$33.6M</b>
IT/OT Equipment	\$2.3M	\$2.3M	\$2.4M	\$2.4M	\$2.5M	\$2.6M	\$2.6M	<b>\$17.1M</b>
OPGW Asset Renewal	\$1.1M	\$0.0M	\$0.0M	\$0.0M	\$5.0M	\$5.1M	\$5.2M	<b>\$16.5M</b>
<b>Substation</b>	<b>\$87.1M</b>	<b>\$72.1M</b>	<b>\$98.3M</b>	<b>\$163.1M</b>	<b>\$76.1M</b>	<b>\$52.0M</b>	<b>\$100.5M</b>	<b>\$649.2M</b>
Arresters	\$0.1M	\$0.3M	\$0.1M	\$0.3M	\$0.3M	\$0.3M	\$0.1M	<b>\$1.5M</b>
Batteries and Chargers	\$2.5M	\$1.7M	\$3.3M	\$2.5M	\$2.2M	\$2.1M	\$2.7M	<b>\$17.1M</b>
Breakers and Switchers	\$9.3M	\$12.3M	\$11.4M	\$12.0M	\$2.9M		\$2.0M	<b>\$49.9M</b>
Capacitor Banks	\$2.1M	\$1.1M	\$0.7M	\$3.7M	\$0.8M	\$2.0M	\$0.8M	<b>\$11.1M</b>
Control Houses (24x42')	\$13.1M	\$2.7M	\$16.5M	\$16.9M	\$5.8M	\$3.0M	\$15.1M	<b>\$72.9M</b>
GIS Station Asset Renewal				\$48.7M				<b>\$48.7M</b>
Instrument Transformers	\$0.7M	\$2.5M	\$1.6M	\$5.4M	\$2.4M	\$1.2M	\$3.8M	<b>\$17.5M</b>
Online Monitoring	\$5.7M	\$5.8M						<b>\$11.5M</b>
Power Transformers	\$13.5M	\$13.5M	\$18.2M	\$14.2M	\$14.6M	\$14.9M	\$15.3M	<b>\$104.2M</b>
Reactors			\$2.1M	\$0.7M				<b>\$2.8M</b>
Relays	\$31.9M	\$22.2M	\$34.3M	\$46.8M	\$36.6M	\$18.9M	\$34.2M	<b>\$224.8M</b>
SCADA	\$2.4M	\$2.6M	\$2.6M	\$4.2M	\$4.0M	\$4.5M	\$6.6M	<b>\$26.8M</b>
SCADA (not a trigger)	\$1.1M	\$0.9M	\$2.0M	\$0.7M	\$2.0M	\$0.9M	\$1.8M	<b>\$9.5M</b>
SS InverterRenewal	\$2.3M	\$2.3M	\$2.4M	\$2.4M	\$2.5M	\$2.6M	\$2.6M	<b>\$17.1M</b>
SS Router Asset Renewal	\$0.0M	\$0.0M	\$0.0M	\$0.0M	\$0.0M		\$11.8M	<b>\$11.8M</b>
Station Power Transformers	\$0.2M	\$0.9M	\$0.9M	\$0.5M		\$0.6M	\$0.4M	<b>\$3.4M</b>
Switches	\$2.5M	\$3.2M	\$2.2M	\$3.9M	\$2.2M	\$1.2M	\$3.3M	<b>\$18.6M</b>
<b>Transmission Line</b>	<b>\$197.4M</b>	<b>\$169.3M</b>	<b>\$163.1M</b>	<b>\$205.9M</b>	<b>\$219.2M</b>	<b>\$210.6M</b>	<b>\$218.8M</b>	<b>\$1,384.3M</b>
Tline - OH	\$135.3M	\$163.5M	\$152.2M	\$156.0M	\$199.3M	\$190.1M	\$199.1M	<b>\$1,195.3M</b>
Tline - UG	\$62.1M	\$5.8M	\$10.9M	\$50.0M	\$20.0M	\$20.5M	\$19.7M	<b>\$189.0M</b>
<b>Total</b>	<b>\$287.9M</b>	<b>\$243.7M</b>	<b>\$263.8M</b>	<b>\$371.4M</b>	<b>\$302.8M</b>	<b>\$270.3M</b>	<b>\$327.2M</b>	<b>\$2,067.1M</b>

Future year projections are based on "age", actual replacement is based on "performance criteria"

# 2026 In-Service Date Projects by Station

Location	Cost	Location	Cost	Location	Cost
Kirkwood	\$8,130,239	Spring Green	\$599,840	Cedar Ridge Wind Generation	\$138,584
South Fond du Lac	\$6,210,360	Lone Rock	\$500,718	Canal	\$131,105
North Beaver Dam	\$5,874,135	North Appleton	\$459,920	Cranberry	\$131,105
McCue	\$5,221,929	Fredonia	\$424,416	Dead River	\$131,105
Blount	\$4,966,775	Brick Church	\$406,024	Femrite 138 kV	\$131,105
Park Hill	\$4,407,455	Shaw	\$394,778	Rubicon	\$131,105
Sycamore	\$4,066,906	Kilbourn	\$352,485	Stage Coach	\$131,105
Walnut GIS	\$3,865,356	Racine	\$307,969	Arcadian	\$128,528
Shoto	\$3,838,231	Walworth	\$299,920	ATC Cottage Grove Office	\$113,593
East Campus	\$3,370,125	Pleasant Prairie	\$264,750	Gardner Park	\$106,104
Ohmstead	\$3,340,530	North Madison 345/138 kV	\$263,392	Oak Creek	\$67,884
Bain	\$2,147,398	Mount Pleasant	\$262,939	Elm Road	\$54,308
Brodhead	\$1,563,447	Kittyhawk	\$262,713	Columbia	\$40,482
North Fond du Lac	\$1,388,229	Stone Lake	\$262,210	Egg Harbor	\$39,742
Ruskin	\$1,354,148	Rockdale	\$258,414	Cypress	\$28,568
Saukville (Cedarsauk)	\$1,273,249	Rapids	\$246,913	Glenview	\$28,568
Arrowhead 345/230 kV	\$1,249,626	Bluemound	\$223,566	Hubbard	\$28,568
Wien	\$1,199,624	Silver River	\$217,457	Neevin	\$28,568
Werner	\$1,052,606	Shorewood	\$213,873	North Lake	\$28,568
Blackhawk (MGE)	\$991,836	Maes	\$212,208	Sheboygan Energy Center	\$28,568
Perch Lake	\$948,000	Maple	\$212,208	Whitewater	\$28,568
Northwest Ripon	\$941,536	Red Maple	\$212,208	Woodenshoe	\$28,568
Highway V	\$893,912	Forest Junction	\$192,792	Port Washington	\$22,402
Wingra	\$742,728	North Madison 69 kV	\$187,814	Fox River SW YD	\$9,956
Apple Hills	\$652,764	Arpin	\$154,098	Highway 22	\$9,956
Werner West	\$629,647	Paddock	\$154,098	Paris	\$9,956
Dodgeville	\$599,840	Conover	\$141,389	<b>Total</b>	<b>\$80,366,412</b>



# Madison Area Substation - Relays

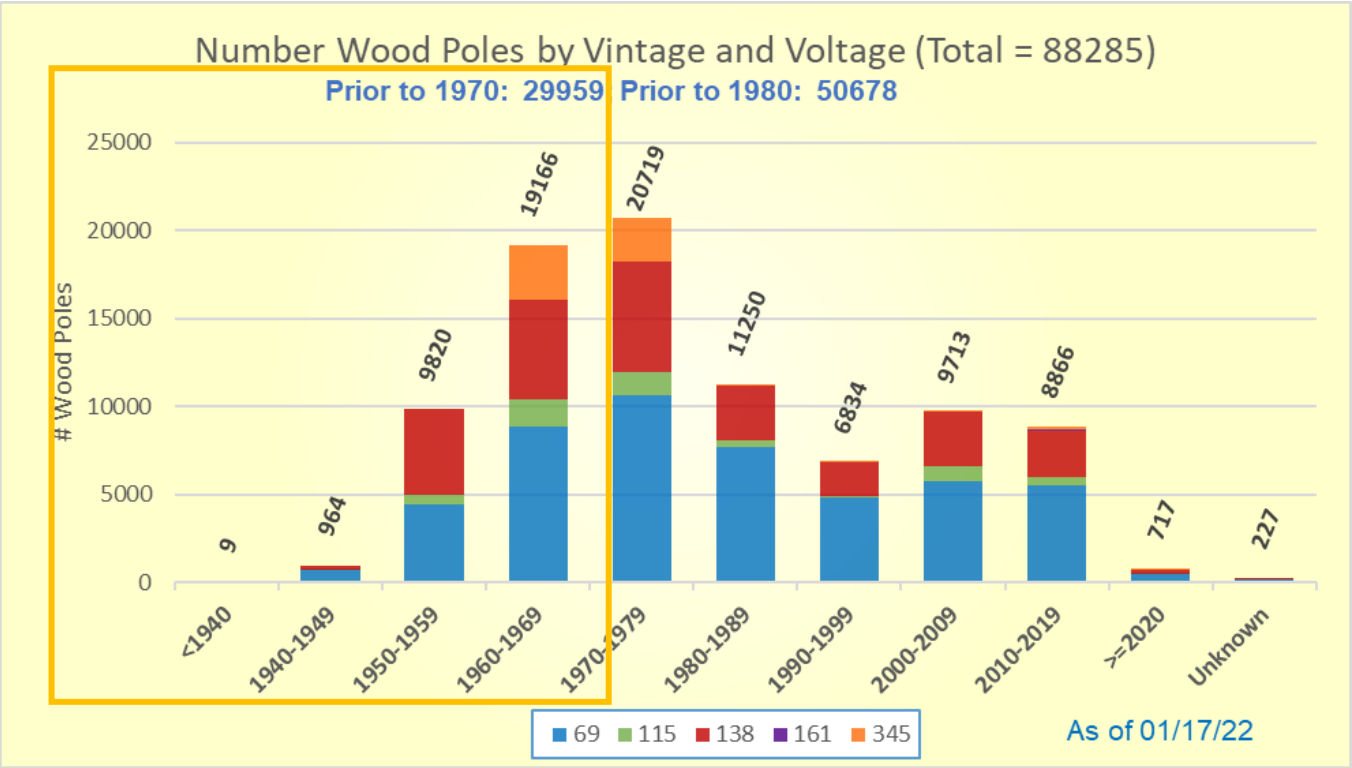
- Ensure performance and reliability – relays at end-of-life.
- Stations
  - Blackhawk
  - Blount
  - East Campus
  - Femrite
  - Ruskin
  - Sycamore
  - Walnut
  - Wingra



Sycamore SS 69kV circa 1969

# Overhead Transmission Lines – Wood Pole Lines 20 year Outlook

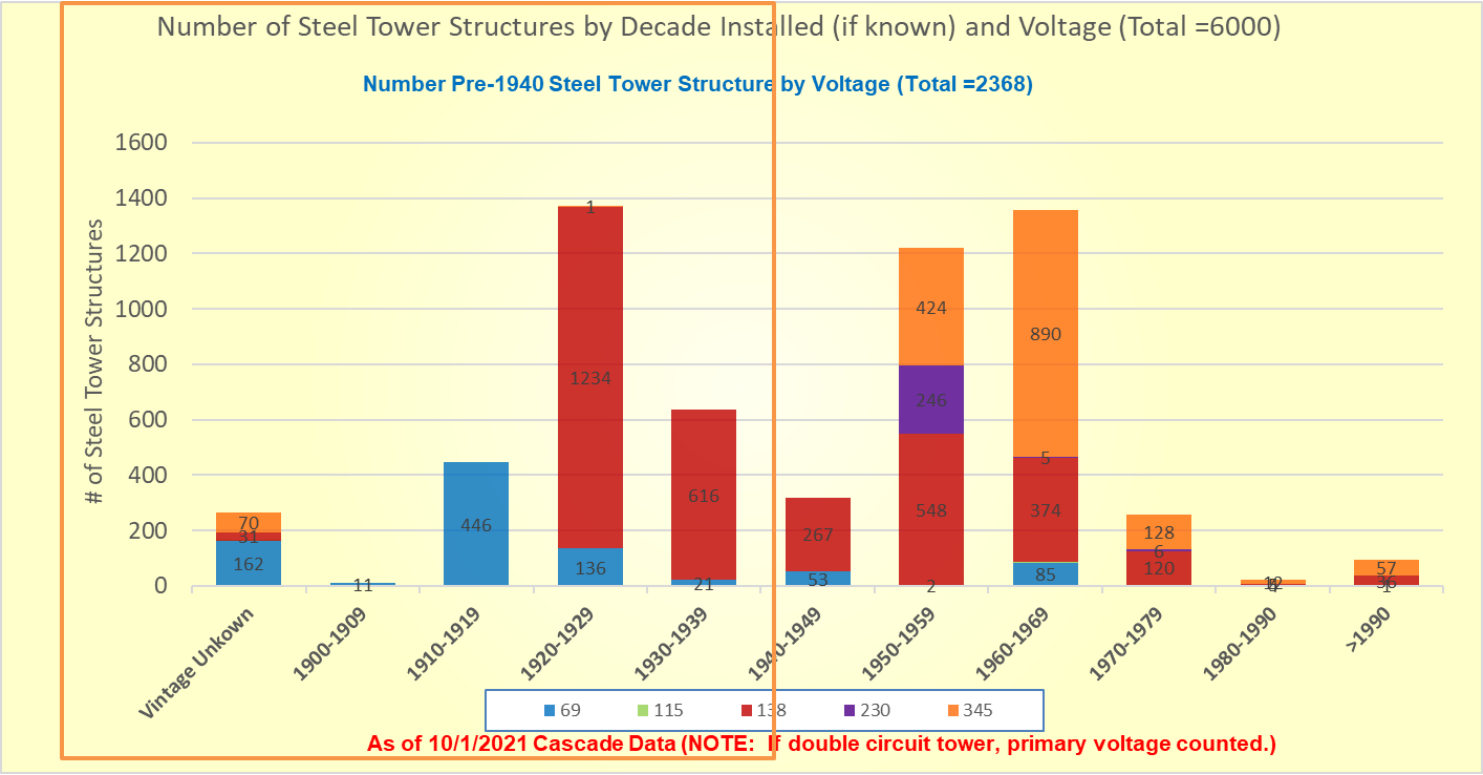
- Objective is to manage condition and preserve reliability and safety as these assets reach end of life.
- Pre-1970 to 1980 vintage wood poles are likely to be replaced in the next 20 - 25 years.



Voltage Class	Grand Total Number of Wood Poles	Grand Total Number of Wood Structures	Number of Miles per Year Next 20 Year
69	13978	13225	39
115	2053	999	6
138	10802	5667	35
345	3126	1519	14
Grand Total	29959	21411	94
round to			100

# 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.



Pre-1940 Lattice Tower Structures			
Voltage Class	~Miles total pre-1940	~Miles per year assumed (2026-2035)	Ranges
69	56	2.3	2026-2035
115/138	236	16	2030-2040+

# T-Line Projects

Project Name	Preliminary Estimate with Escalation	ISD
Rocky Run - Werner West 345 kV (WERWL41), Rebuild	\$130,000,000	2028
Russel Terminal - Harbor 138 kV (893K11), Replace Underground Cable	\$61,000,000	2026
Werner West - North Appleton 345 kV (NAPL31), Rebuild	\$55,000,000	2030
Mich Limestone Loading Dock - Pine River 69 kV (ESE_6906), Rebuild	\$30,000,000	2027
Falcon - Hillman 138 kV (X-14), Rebuild	\$22,100,000	2028
Cornell Tap - Watson Tap 69 kV (Chandler), Partial Rebuild	\$20,000,000	2026
High Falls Hy - Mountain 69 kV (Y-77), Rebuild	\$19,000,000	2026
Koch Oil Tap - South Fond Du Lac 69 kV (Y-25), Partial Rebuild	\$16,000,000	2026
Harrison Tap - Iola 69 kV (Y-70), Rebuild	\$13,000,000	2026
Darlington - Falcon 138 kV (X-101), Rebuild	\$12,100,000	2027
Sigel - Pittsville 69 kV (Y-108), Rebuild	\$12,000,000	2025
96th St - Park Hill 138 kV (96SG41), Partial Rebuild	\$10,800,000	2026
Rosholt (ALTE) SW STR - Rosholt (ATC) Tap 69 kV (Y-71), Partial Rebuild	\$8,000,000	2026
Pine Hy Tap - Pine Hy 69 kV (ASPY31-1), Rebuild	\$6,500,000	2027
Delta - Chandler 69 kV (Delta1), Partial Rebuild	\$6,400,000	2026
Pine River - Nine Mile 69 kV (6921), Re-insulate	\$5,870,000	2025
Perch Lake - Presque Isle SW YD 138 kV (468), Re-insulate	\$5,000,000	2024
South Beaver Dam - North Beaver Dam 69 kV (Y-59), Rebuild	\$5,000,000	2026
Portage St - 3 Mile 69 kV (6901/6902), Re-insulate	\$4,000,000	2025
Blaney Park - Mich Limestone Quarry Tap 69 kV (6914), Partial Rebuild	\$4,000,000	2025
Pulliam - Tower Dr 138 kV (V-100), Replace Select Poles	\$2,000,000	2024
Van Buren St - Finger Rd 69 kV (F-32), Replace Select Poles	\$500,000	2025
- De Pere SS 138 kV (), Pumping Plant Addition	\$500,000	2025
- Red Maple SS 138 kV (), Pumping Plant Addition	\$500,000	2025
- Center SS 138 kV (), Pumping Plant Upgrade	\$500,000	2025
- Lincoln SS 138 kV (), Pumping Plant Upgrade	\$500,000	2025
<b>Total</b>	<b>\$450,270,000</b>	



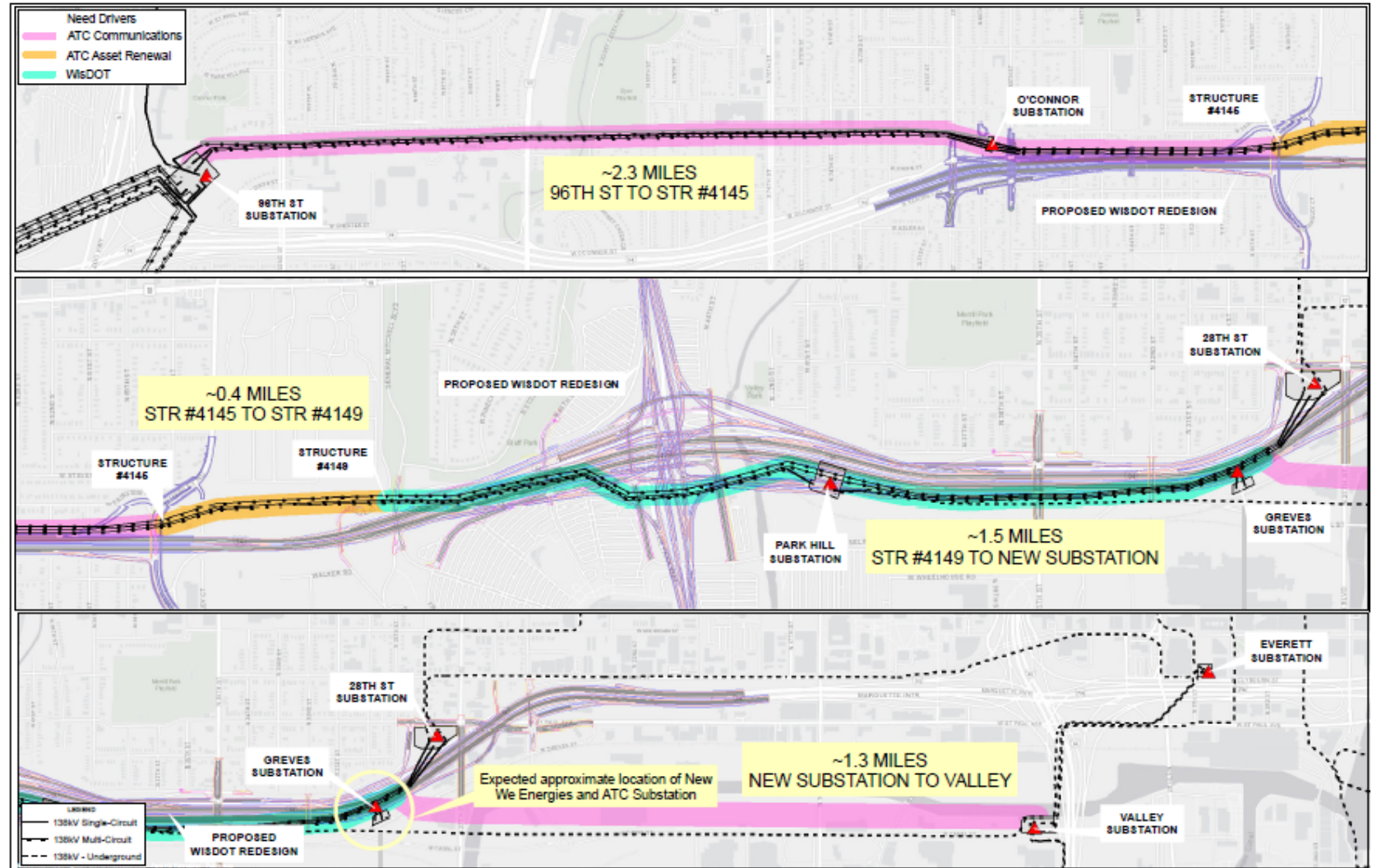
# Milwaukee County I-94 Stadium - Background

1. WisDOT has been studying the rebuild of the I-94 East/West corridor in Milwaukee County since before 2013.
2. WisDOT is now preparing to issue contracts to relocate ATC's assets within the corridor.
3. ATC also looking to address select asset renewal and communications work due to efficiencies.
4. Targeting MTEP 2022 Appendix A as one project, 3 different facilities.



# Milwaukee County I-94 Stadium - Overview

- 3 Projects
  1. I-94 Stadium Project Communications – Fiber Installation (~ 4 miles in Pink)
  2. I-94 Stadium Project Asset Renewal (~.5 miles in Orange)
  3. WisDOT I-94 E/W Relocation (~1.5 miles in aqua)
- Preliminary Estimated Cost
  - \$60M-\$80M (majority of this is for WisDOT Relocation)
- Expected In-service Date:
  - December 2026 based on WisDOT's current schedule.



WisDOT design shown in overlay is preliminary

# Assessment Status – Allison Bartz

- 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



# Public Policy Requirements – Comments?

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

Are there any additional questions?



# Contacts

Allison Bartz (TYA)

Email: [abartz@atcllc.com](mailto:abartz@atcllc.com)

Jamal Khudai or Dani Hall (Interconnections)

Email: [jkhudai@atcllc.com](mailto:jkhudai@atcllc.com) or [dhall@atcllc.com](mailto:dhall@atcllc.com)

Scott Adams (Asset Management Substation) or Justin Nettesheim  
(AR T-line)

Email: [sadams@atcllc.com](mailto:sadams@atcllc.com) or [jnettesheim@atcllc.com](mailto:jnettesheim@atcllc.com)