

2020 10-Year Assessment Summary

PRESENTED BY

System Planning

October 29, 2020



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Topics

- Messages
- Capital forecast
- Larger projects by zone

Messages

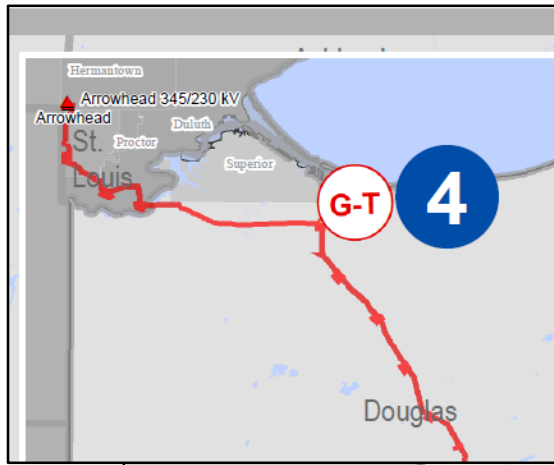
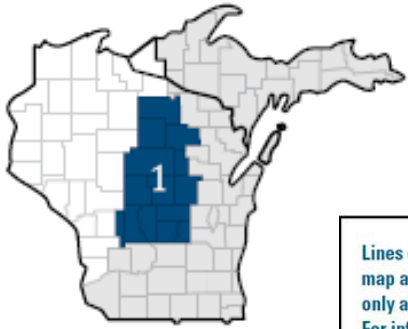
- Load forecast ~same growth rate as the 2019 Assessment
- Changing generation mix
 - ~8 GW of solar and 1.5 GW of wind in MISO's generation interconnection queue for ATC.
- Modest amount of new network projects
 - New customer interconnections main reason for new network projects
- Asset Renewal
 - Approximately half of all projects are dedicated to maintaining and reinforcing the system and improving its resiliency

Capital Forecast (10-Year)

Projections from past and current Transmission System Assessments

	2016	2017	2018	2019	2020
Specific Network Projects	\$1.3B	\$0.7B/\$1.0B	\$0.5B	\$0.4B	\$0.4B
Regional Multi-Value Projects	\$0.5B	\$0.4B	\$0.3B	\$0.2B	\$0.2B
Asset Maintenance	\$1.4B	\$1.4B	\$1.5B	\$1.7B	\$1.8B
Other Capital Categories	\$0.4B/\$1.2B	\$0.3B/\$0.8B	\$0.5/\$1.1B	\$0.6B/\$1.3B	\$0.5B/\$1.1B
Total 10-Year Capital Cost	\$3.6B/\$4.4B	\$2.8B/\$3.6B	\$2.8/\$3.4B	\$2.9B/\$3.6B	\$2.9B/\$3.5B

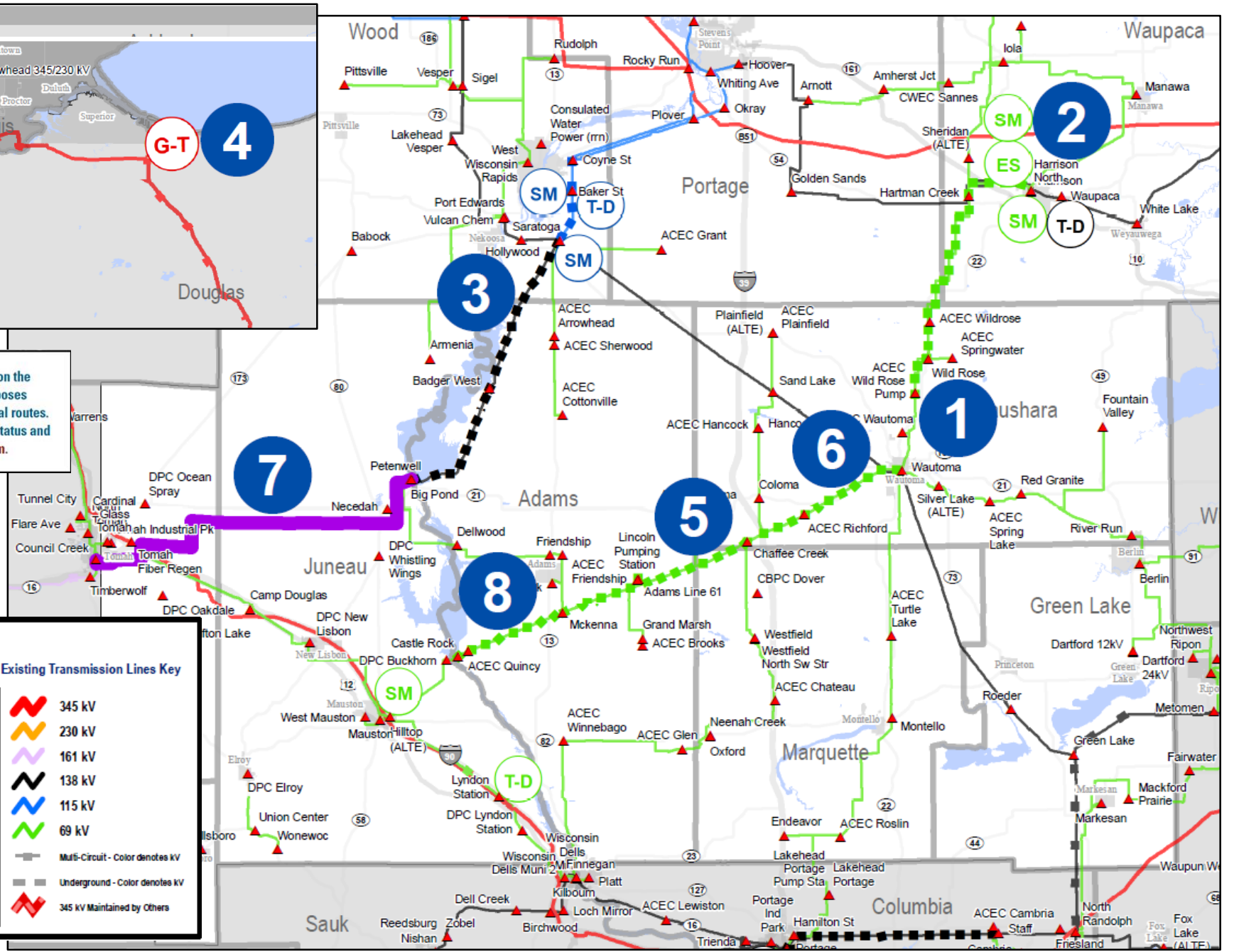
Zone 1



Lines of proposed projects on the map are for illustrative purposes only and do not reflect actual routes. For information on project status and routes, see atc-projects.com.

System Solutions Key

Substation Key	Transmission Line Key	Existing Transmission Lines Key
(C) Capacitor Bank or Reactor	(Solid line) New Transmission Line	(Red wavy) 345 kV
(SS) New Substation	(Dashed line) Rebuilt / Reconductored Transmission Line	(Orange wavy) 230 kV
(SM) Substation Modification	(Dotted line) Line Rating Upgrade	(Purple wavy) 161 kV
(T) Transformer	(Yellow line) Voltage Conversion	(Black wavy) 138 kV
(T-D) T-D Interconnection	(Purple line) Communication	(Blue wavy) 115 kV
(TL) Transmission Line		(Green wavy) 69 kV
(T-T) T-T Interconnection	Color denotes kV for both Substation and Transmission	(Grey dashed) Multi-Circuit - Color denotes kV
(ES) Energy Storage	To avoid clutter, map does not show 2026+ and some lower cost projects	(Grey solid) Underground - Color denotes kV
(G-T) G-T Interconnection		(Red diamond) 345 kV Maintained by Others



Zone 1 Projects

Zone 1 Planned Projects

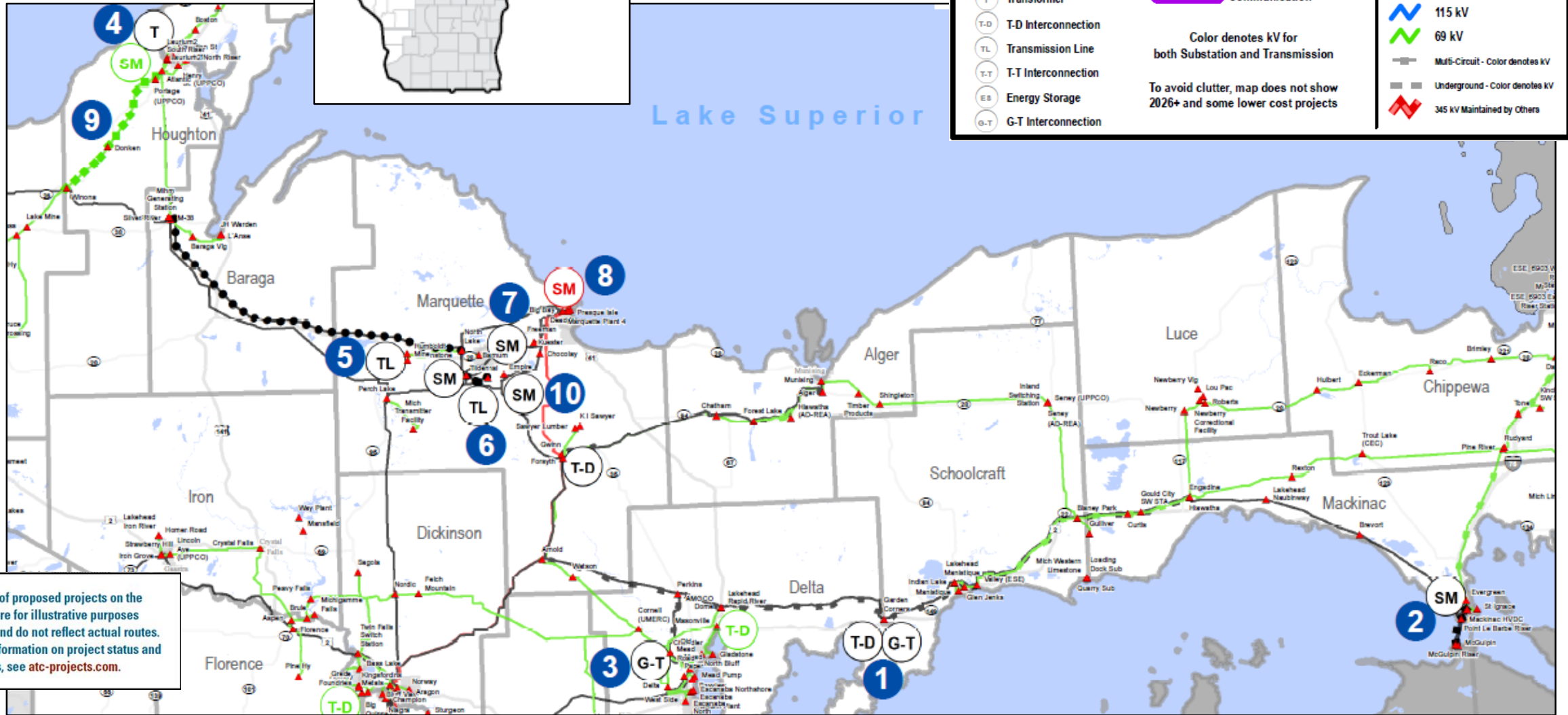
Project Description	Project #	In-service year	Need driver
Wild Rose – Harrison 69-kV line (Y-19) partial rebuild	1	2020	Condition and performance
Waupaca area energy storage project	2	2021	Reliability, Operational flexibility
Petenwell - Saratoga 138-kV line (X-43), rebuild	3	2022	Reliability and economic
J732 Superior SS Generator Interconnection Facilities and Network Upgrade	4	2023	G-T Interconnection
Chaffee Creek SS – Lincoln Pump Station 69-kV line (Y-18) rebuild	5	2023	Condition and performance
Wautoma – Chaffee Creek 69-kV line (Y-49) rebuild	6	2023	Condition and performance
Petenwell – Council Creek (X-40), OPGW Installation	7	2024	Communication
McKenna - Castle Rock 69-kV line (Y-47), rebuild	8	2025	Condition and performance

Waupaca Area Storage Project (#2)



- 2021 In-service Date
- MTEP19 Appendix A, ID 15947
- Status: Proposed
- Cost: \$8M
- Needs:
 - Reliability, operational flexibility
- Scope:
 - Install 2.5 MW/5 MWh battery at Harrison North substation
 - Install 8 MVAR capacitor bank at Arnott substation
 - Install 6 MVAR capacitor bank at Harrison North substation
 - Upgrade Wautoma – Wild Rose 69 kV line

Zone 2



System Solutions Key

Substation Key	Transmission Line Key	Existing Transmission Lines Key
(C) Capacitor Bank or Reactor	— New Transmission Line	⚡ 345 kV
(SS) New Substation	▨ Rebuilt / Reconductored Transmission Line	⚡ 230 kV
(SM) Substation Modification	●●●● Line Rating Upgrade	⚡ 161 kV
(T) Transformer	— Voltage Conversion	⚡ 138 kV
(T-D) T-D Interconnection	— Communication	⚡ 115 kV
(TL) Transmission Line		⚡ 69 kV
(T-T) T-T Interconnection		— MuS-Circuit - Color denotes kV
(ES) Energy Storage		— Underground - Color denotes kV
(G-T) G-T Interconnection		⚡ 345 kV Maintained by Others

Color denotes kV for both Substation and Transmission

To avoid clutter, map does not show 2026+ and some lower cost projects

Lines of proposed projects on the map are for illustrative purposes only and do not reflect actual routes. For information on project status and routes, see atc-projects.com.

Zone 2 Projects

Zone 2 Planned Projects

Project Description	Project #	In-service year	Need driver
J928 – Garden Corners SS, GIC Network Upgrade	1	2020	G-T Interconnection
Mackinac - McGulpin 138-kV line (9901 and 9903), submarine cable replacement	2	2021	Condition and performance
J849, Chandler SS Generator Interconnection Facilities and Network Upgrades	3	2022	G-T Interconnection
Atlantic SS, 138/69 kV Bus Reconfiguration and Transformer Addition	4	2022	Operational Flexibility, Asset Renewal
NLKG31 Tap – Greenstone 138-kV Line, Construct New Transmission Line	5	2022	Condition and T-D Interconnection
Presque Isle – Tilden 138-kV Line, Loop and Uprate	6	2022	Reliability
Tilden SS, Control House Replacement and Breaker & Relay Asset Renewal	7	2023	Condition and performance
Dead River SS – Control House and Breaker Replacement Asset Renewal	8	2024	Condition and performance

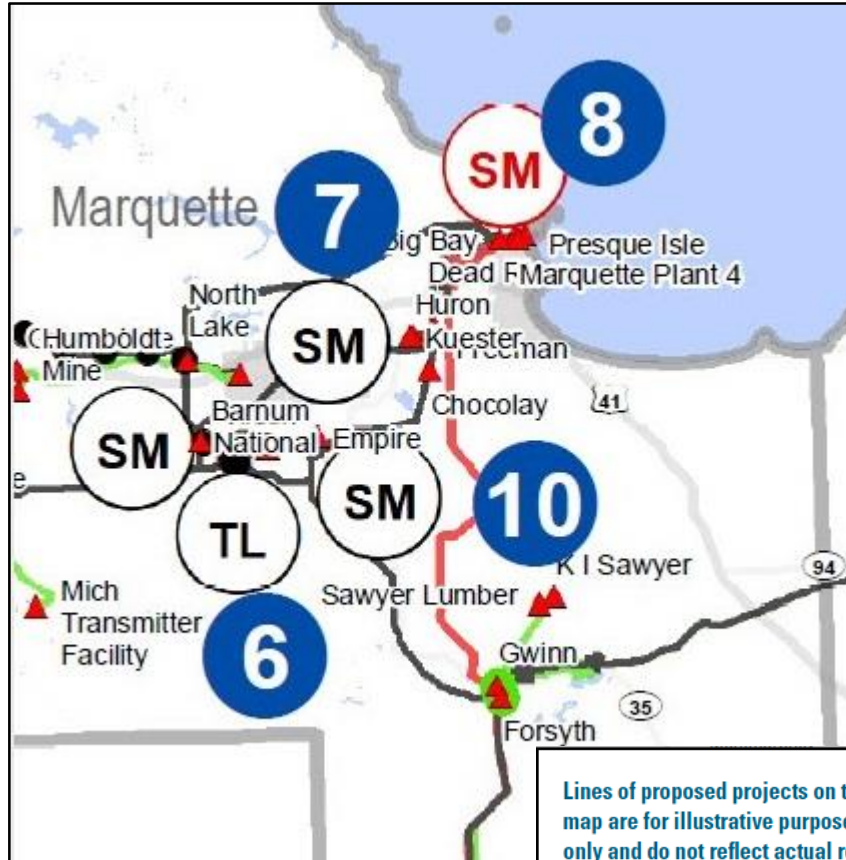
Zone 2 Proposed Projects

Project Description	Project #	In-service year	Need driver
Winona-Atlantic 69-kV (Winona69), rebuild	9	2024	Reliability

Zone 2 Provisional Projects

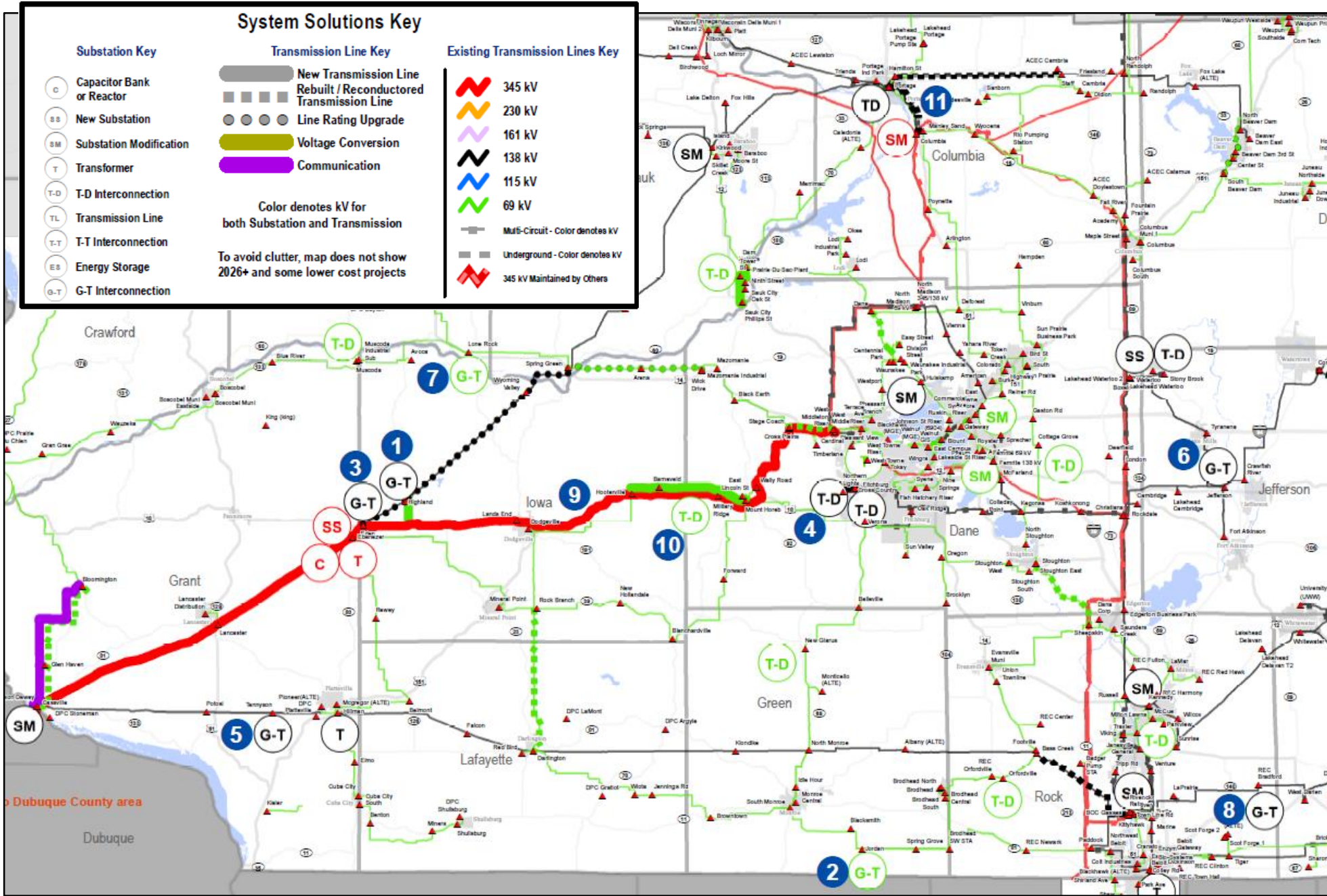
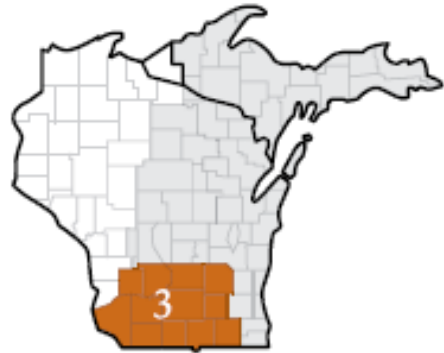
Project Description	Project #	In-service year	Need driver
Empire SS, Control House Replacement and Breaker & Relay Asset Renewal	10	2024	Condition and performance

Presque Isle – Tilden 138-kV Line, Loop and Uprate (#6)



- 2022 In-service Date
- MTEP19 Appendix A, ID 15345
- Status: Planned
- Cost: \$15.3M
- Needs:
 - Reliability, operational flexibility, condition and performance (asset renewal)
- Scope:
 - National substation bus circuit breakers and line reconfigurations
 - Tie Presque Isle-Tilden 138-kV line to National, uprate line to Tilden
 - System protection upgrades
 - Substation asset renewal

Zone 3



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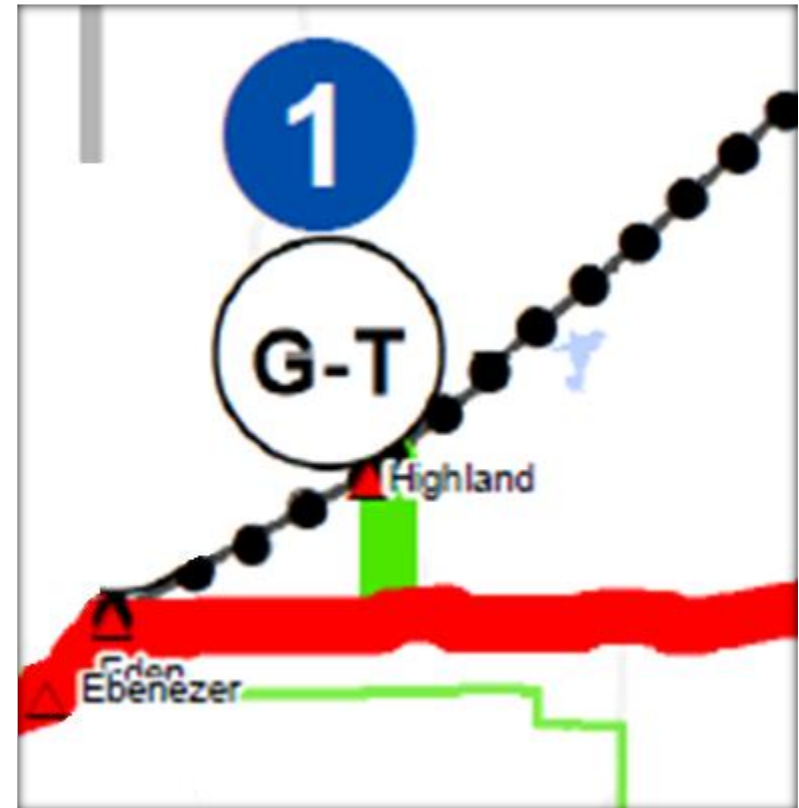
Zone 3 Projects

Zone 3 Planned Projects

Project Description	Project #	In-service year	Need driver
J870/J871 Badger Hollow Network Upgrade	1	2021	G-T interconnection
J584 GIC Jordan SS Generator Interconnection Facilities and Network Upgrades	2	2021	G-T interconnection
J855 GIC Ebenezer SS Generator Interconnection Facilities and Network Upgrades	3	2021	G-T interconnection
Northern Lights Substation, new T-D Interconnection	4	2021	T-D interconnection
J947 Tennyson SS, Generator Interconnection Facilities and Network Upgrades	5	2021	G-T interconnection
J818 Jefferson SS Generation Interconnection Facilities and Network Upgrades	6	2022	G-T interconnection
J864 Lone Rock SS Generator Interconnection Facilities and Network Upgrades	7	2022	G-T interconnection
J850 North Creek SS, Generator Interconnection Facilities and Network Upgrades	8	2022	G-T interconnection
Cardinal - Hickory Creek 345-kV, line construction	9	2023	Reliability, Economic and Policy
Barneveld SS, DIC, New Substation	10	2023	T-D interconnection
Portage – Columbia 138 kV (X-13/X-20), Rebuild Existing Double Circuit	11	2024	Reliability

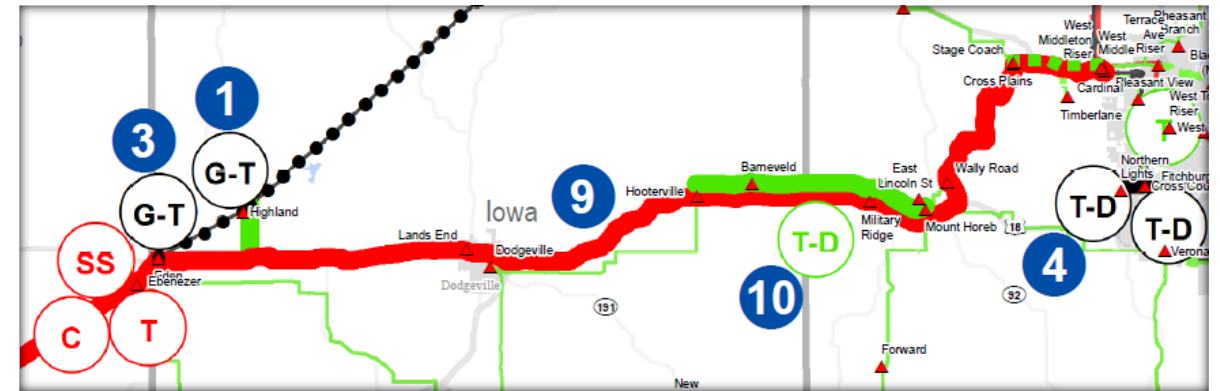
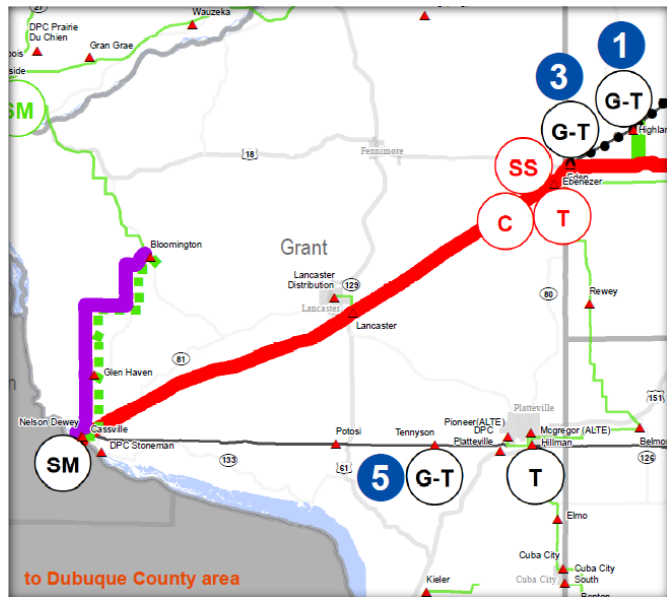
Badger Hollow Network Upgrade (#1)

- 2021 In-service Date
- MTEP20 Target Appendix A, ID 17525
- Status: Proposed
- Cost: \$15.6 M
- Need:
 - Generation to Transmission (G-T) interconnection
- Scope:
 - Loop Y-138 Eden - Dodgeville 69 kV into Highland Substation and install a 138/69 kV transformer
 - Upgrade X-17 Highland - Wyoming Valley - Spring Green 138 kV line



Cardinal - Hickory Creek 345-kV, line construction (#9)

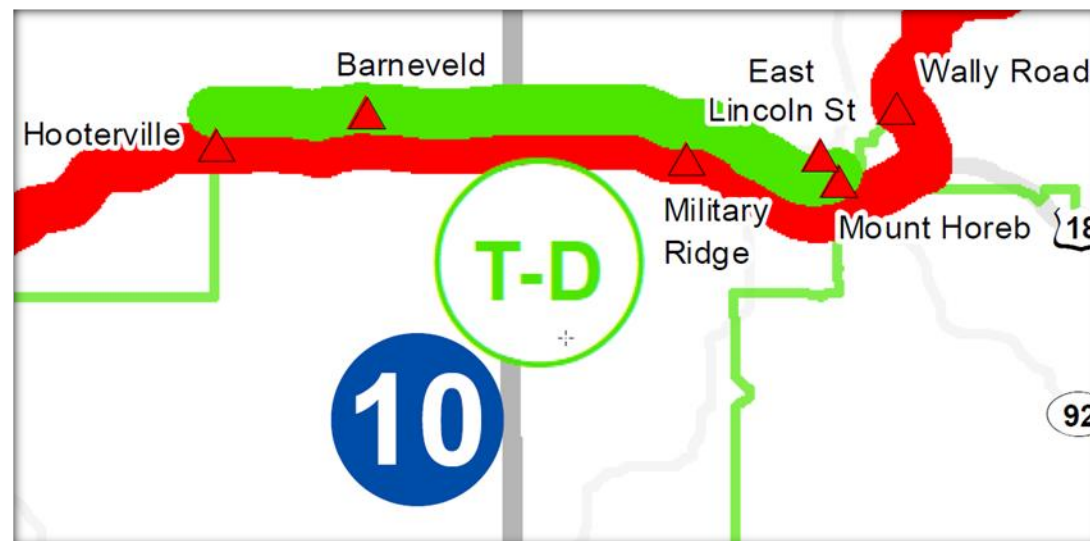
- 2023 In-service Date
- MTEP Appendix A, ID 3127
- Status: Planned
- Cost: \$492M
- Scope:
 - Hickory Creek – Hill Valley – Cardinal 345 kV line (~102 miles).
 - New Hill Valley 345/138 kV Substation.



- Benefits:
 - Enable up to 30 gigawatts of cost effective, renewable energy to be delivered across the region
 - Providing \$23 million to \$350 million in net economic benefits to Wisconsin customers
 - Improve local and regional electric system reliability.
- Other Information:
 - ATC, ITC Midwest, and Dairyland Power Cooperative project.
 - Approved by the PSCW in 2019.
 - Regulatory approvals from Rural Utilities Service, Iowa Utilities Board, U.S. Fish and Wildlife, and U.S. Army Corps of Engineers in 2020.

Barneveld SS, DIC, new substation (#10)

- 2023 In-service Date
- MTEP20 Target Appendix A, ID 18052
- Status: Proposed
- Cost: \$12.3 M
- Need:
 - Transmission to Distribution (T-D) interconnection
- Scope:
 - New 69 kV line from Hooterville to Mount Horeb
 - ◆ In CHC open tower position
 - Expand Mount Horeb Substation
 - New 69 kV Barneveld Substation with line breakers (Alliant)
 - New 69 kV Military Ridge Substation tap (Mount Horeb Utilities)

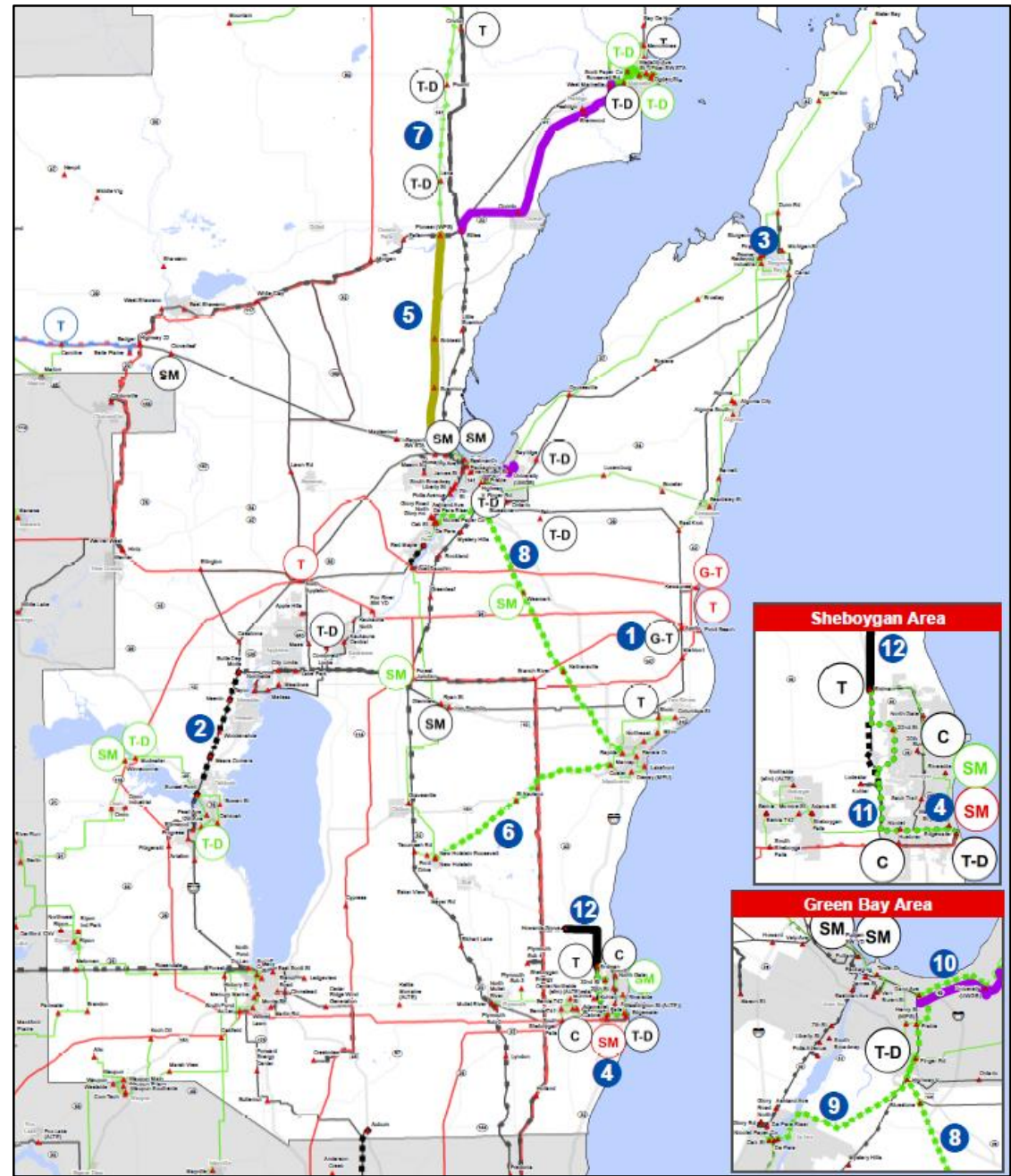


Zone 4



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System Solutions Key	
Substation Key	Transmission Line Key
(C) Capacitor Bank or Reactor	(Solid Grey) New Transmission Line
(SS) New Substation	(Dashed Grey) Rebuilt / Reconstructed Transmission Line
(SM) Substation Modification	(Grey Circle) Line Rating Upgrade
(T) Transformer	(Yellow) Voltage Conversion
(T-D) T-D Interconnection	(Purple) Communication
(TL) Transmission Line	
(T-T) T-T Interconnection	
(ES) Energy Storage	
(G-T) G-T Interconnection	
	Existing Transmission Lines Key
	(Red) 345 kV
	(Orange) 230 kV
	(Yellow) 161 kV
	(Black) 138 kV
	(Blue) 115 kV
	(Green) 69 kV
	(Grey) Multi-Circuit - Color denotes kV
	(Grey) Underground - Color denotes kV
	(Red) 345 kV Maintained by Others
	Color denotes kV for both Substation and Transmission
	To avoid clutter, map does not show 2026+ and some lower cost projects



Zone 4 Projects

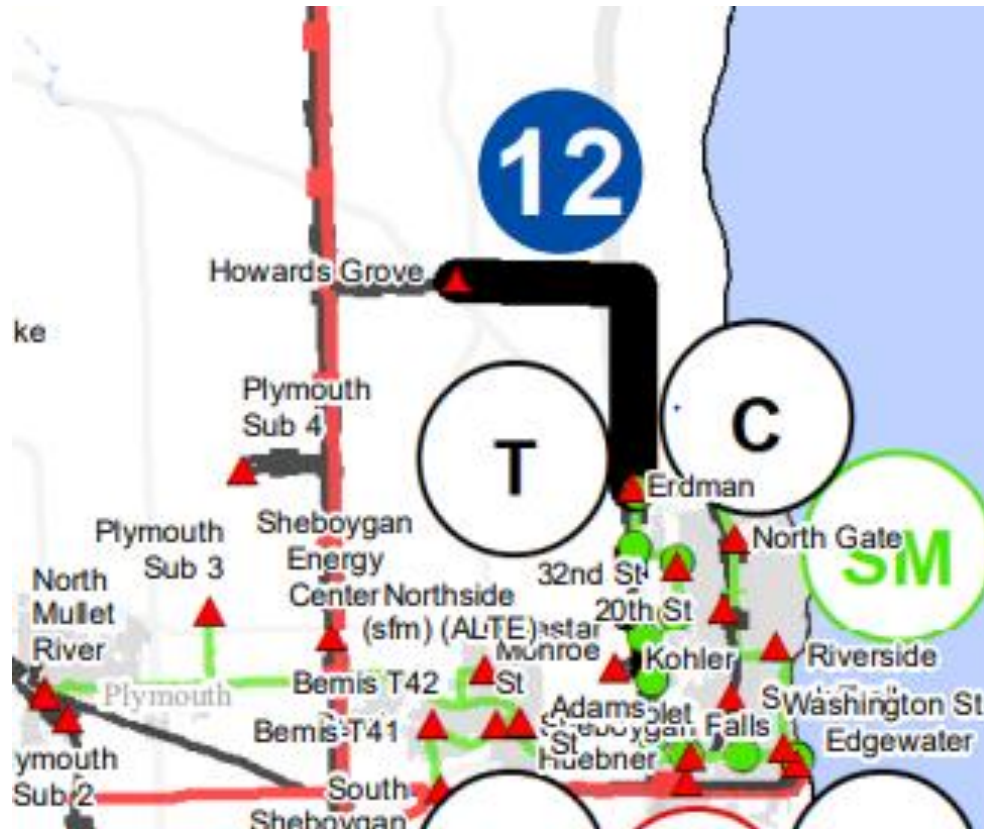
Zone 4 Planned Projects

Project Description	Project #	In-service year	Need driver
J505 GIC Apollo SS Generator Interconnection Facilities and Network Upgrades	1	2021	G-T interconnections
Butte Des Morts - Sunset Point (40321, 80952, A-79, MCRG21) 138-kV line, rebuild	2	2021	Condition and performance
Redwood - First Ave. 69-kV line (T-46), replace the submarine cable	3	2021	Condition and performance
Edgewater SS, 345-kV bus reconfiguration	4	2022	Condition and performance
Bayport - Pioneer 138kV, rebuild as a double-circuit and operate as one circuit initially	5	2022	Condition and performance
New Holstein - Custer 69-kV line (P-68), Rebuild	6	2022	Condition and performance
Pioneer – Crivitz 138-kV Line (E-83/B-2), Retire 69-kV and Reconfigure Load to 138-kV	7	2022	Condition and performance, T-D interconnection
Finger Road SW STA - Wesmark- Rapids, 69-kV line (FIRY11/R-44), rebuild	8	2023	Condition and performance
Oak St - Hwy V 69-kV line (Z-26), rebuild	9	2025	Condition and performance

Zone 4 Proposed Projects

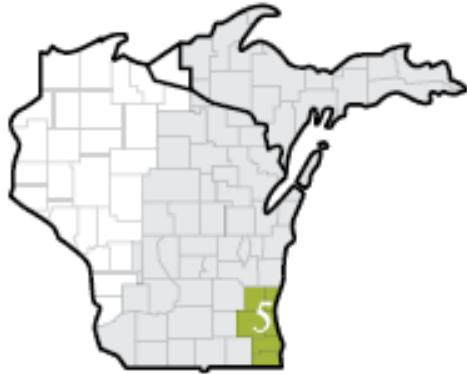
Project Description	Project #	In-service year	Need driver
Danz Ave. SW STA - University (WPS) 69-kV line (O-15), underground rebuild & OPGW	10	2023	Condition and performance
Edgewater - Lodestar 138 kV (X-48/Y-31), underground cable rebuild	11	2023	Condition and performance
Howards Grove – Erdman 138 kV line, new	12	2023	Reliability

Howards Grove-Erdman 138 kV line (#12)



- 2023 In-service Date
- MTEP20 Appendix A, ID 18568
- Status: Proposed
- Cost: \$25M
- Needs:
 - Reliability, generation retirement
- Scope:
 - Construct new 6.6-mile 138 kV line from Howards Grove to Erdman
 - Expand Howards Grove to a 4-position ring bus
 - Substation modifications at Erdman to accommodate new line

Zone 5



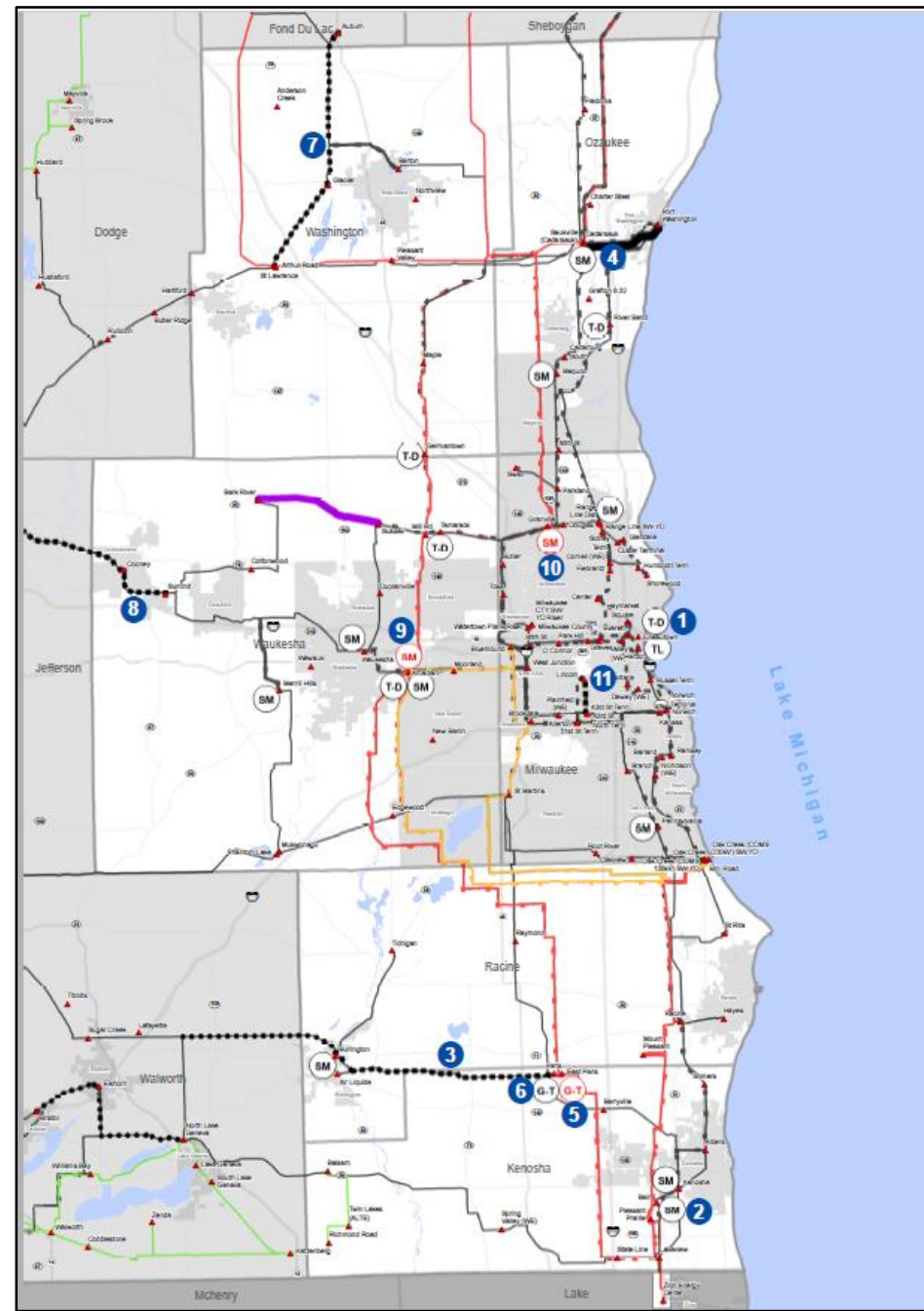
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System Solutions Key

Substation Key		Transmission Line Key		Existing Transmission Lines Key	
(C)	Capacitor Bank or Reactor	▬	New Transmission Line	⚡	345 kV
(SS)	New Substation	▬▬▬	Rebuilt / Reconductored Transmission Line	⚡	230 kV
(SM)	Substation Modification	●●●●	Line Rating Upgrade	⚡	161 kV
(T)	Transformer	▬	Voltage Conversion	⚡	138 kV
(T-D)	T-D Interconnection	▬	Communication	⚡	115 kV
(TL)	Transmission Line	▬		⚡	69 kV
(T-T)	T-T Interconnection			▬	Multicircuit - Color denotes kV
(ES)	Energy Storage			▬	Underground - Color denotes kV
(G-T)	G-T Interconnection			⚡	345 kV Maintained by Others

Color denotes kV for both Substation and Transmission

To avoid clutter, map does not show 2026+ and some lower cost projects



Zone 5 Projects

Zone 5 Planned Projects

Project Description	Project #	In-service year	Need driver
Juneautown SS, new T-D interconnection	1	2020	T-D interconnection
Bain SS, Control House and Breaker Asset Renewal	2	2021	Condition and performance
Paris - Burlington 138-kV (8962), rebuild	3	2021	Condition and performance
Port Washington - Saukville 138-kV line (762), Rebuild to a double circuit	4	2021	Reliability
J850/J878 MPFCA East Paris New Substation	5	2022	G-T interconnection
J878 Paris SS Generator Interconnection Facilities and Network Upgrades	6	2022	G-T interconnection
St. Lawrence-Barton-Auburn 138-kV lines (8032/9752), partial rebuild	7	2022	Condition and performance
Summit - Cooney 138-kV line (6431), rebuild	8	2022	Condition and performance
Arcadian SS, power transformer and control house replacement and asset renewal	9	2023	Condition and performance/Reliability

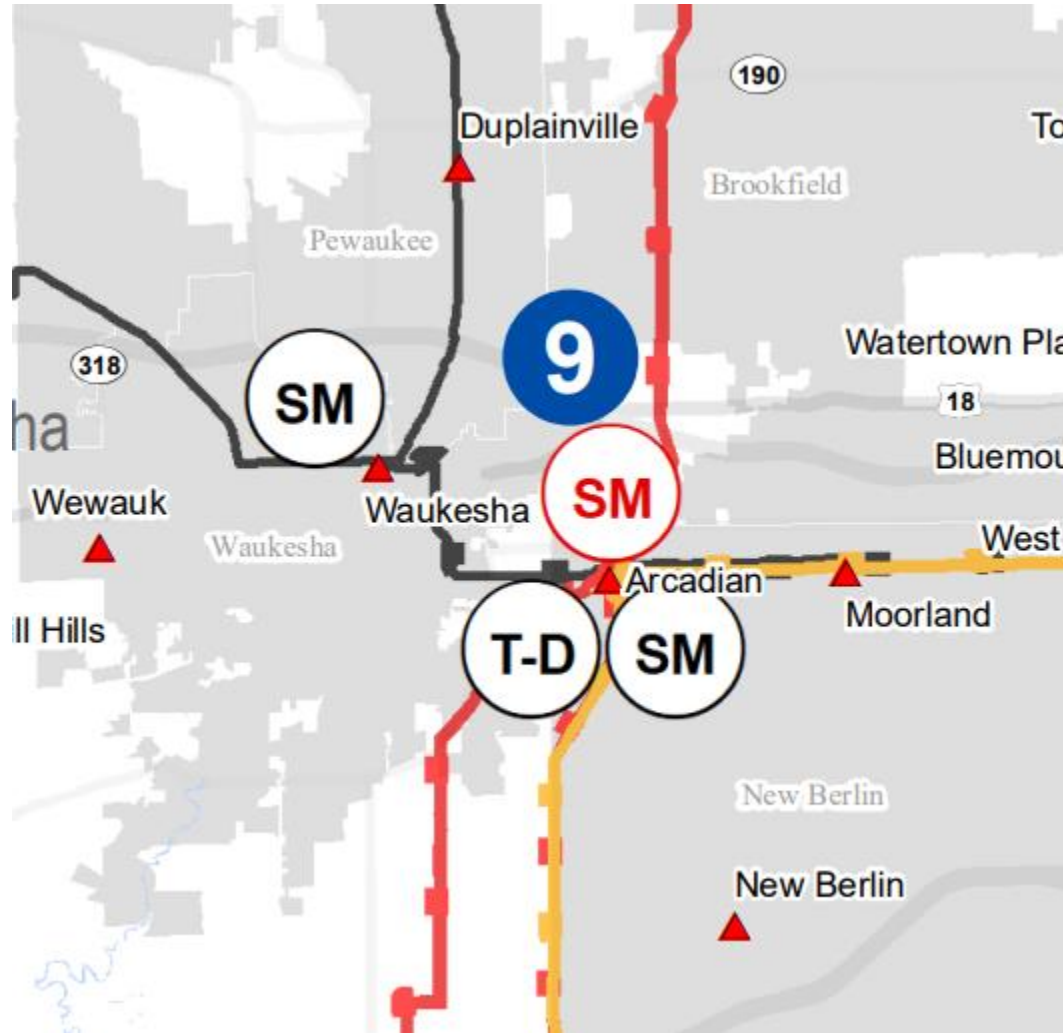
Zone 5 Proposed Projects

Project Description	Project #	In-service year	Need driver
Granville SS, Control House and Relay Replacement and Asset Renewal	10	2024	Condition and performance

Zone 5 Provisional Projects

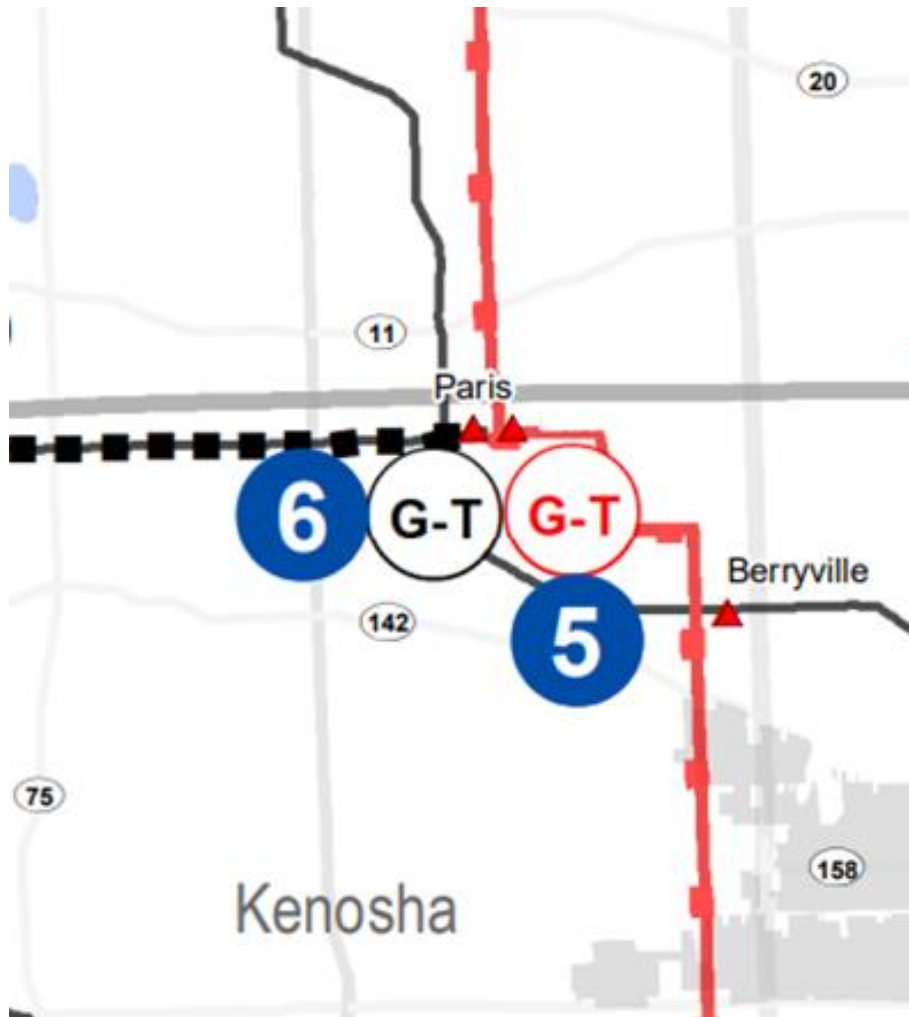
Project Description	Project #	In-service year	Need driver
Lincoln – Bluemound (43rd St) 138kV (5053), replace underground cable	11	2024	Condition and Performance

Arcadian SS, Power Transformer and Control House Replacement and Asset Renewal (#9)



- 2023 In-service Date
- MTEP20 Appendix A, ID 16486
- Status: Planned
- Cost: \$40M
- Needs:
 - Condition and performance, reliability
- Scope:
 - Replace a significant quantity of 138-kV and 345-kV equipment that is poorly-performing and/or obsolete
 - Reconfigure the 345-kV bus from a straight bus to a breaker-and-a-half design
 - Reconfigure transmission line terminals to interface with the new 345-kV bus configuration

J850/J878 new Paris 345 kV SS and 345/138kV transformer (#5)



- 2022 In-service Date
- MTEP20 Appendix A, ID 18985
- Status: Planned
- Cost: \$24.9M
- Need:
 - G-T interconnection
- Scope:
 - Build new 345 kV Substation east of existing Paris 138 kV Substation
 - Add a 138/345 kV transformer to connect existing and new substations
 - Reconfigure transmission line 2222 to connect both line terminals to the new substation

For More Information

Visit the ATC 10-Year Assessment website:
www.atc10yearplan.com

Or contact

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