



Helping to keep the lights on,
businesses running
and communities strong

2017 10-Year Assessment Preliminary Solutions

Stakeholder and Customer Presentation – April 27, 2017
Jeremy Voigt

Purpose

- Address Remaining Stakeholder Questions
- Summarize Asset Renewal Solution Identification Process
- Summarize Preliminary Changes to Solutions
- Solicit Input on Solutions
- Solicit Input on Public Policy Driven Solutions
- Review Next Steps

Stakeholder Questions/Comments

- Label the load forecast graph with annual rates and show five years prior.
- Are the changes in flows a continuing pattern? What might have caused the changes in flows?
- Add cost estimates to projects.

Flow Changes, Western Interface

- **Potential Causes**

- Quad Cities retirement assumed
- Effect of retirement compounded by firm transactions being modeled
- 5 year out shoulder model using new outside world modeling

Model	ATC Western Interface Flow			
	2014 Assessment	2015 Assessment	2016 Assessment	2017 Assessment
Year 1 Summer Peak	-465	-567	-555	-278
Year 5 Summer Peak	-547	-601	-635	-349
Year 10 Summer Peak	-565	-678	-735	-330
Year 5 Shoulder	-112	-82	-92	-654
Year 10 Shoulder	-685	-478	-537	-238



Flow Changes, Southern Interface

- **Potential Causes**

- Quad Cities retirement assumed
- Effect of retirement compounded by firm transactions being modeled
- 5 year out shoulder model using new outside world modeling

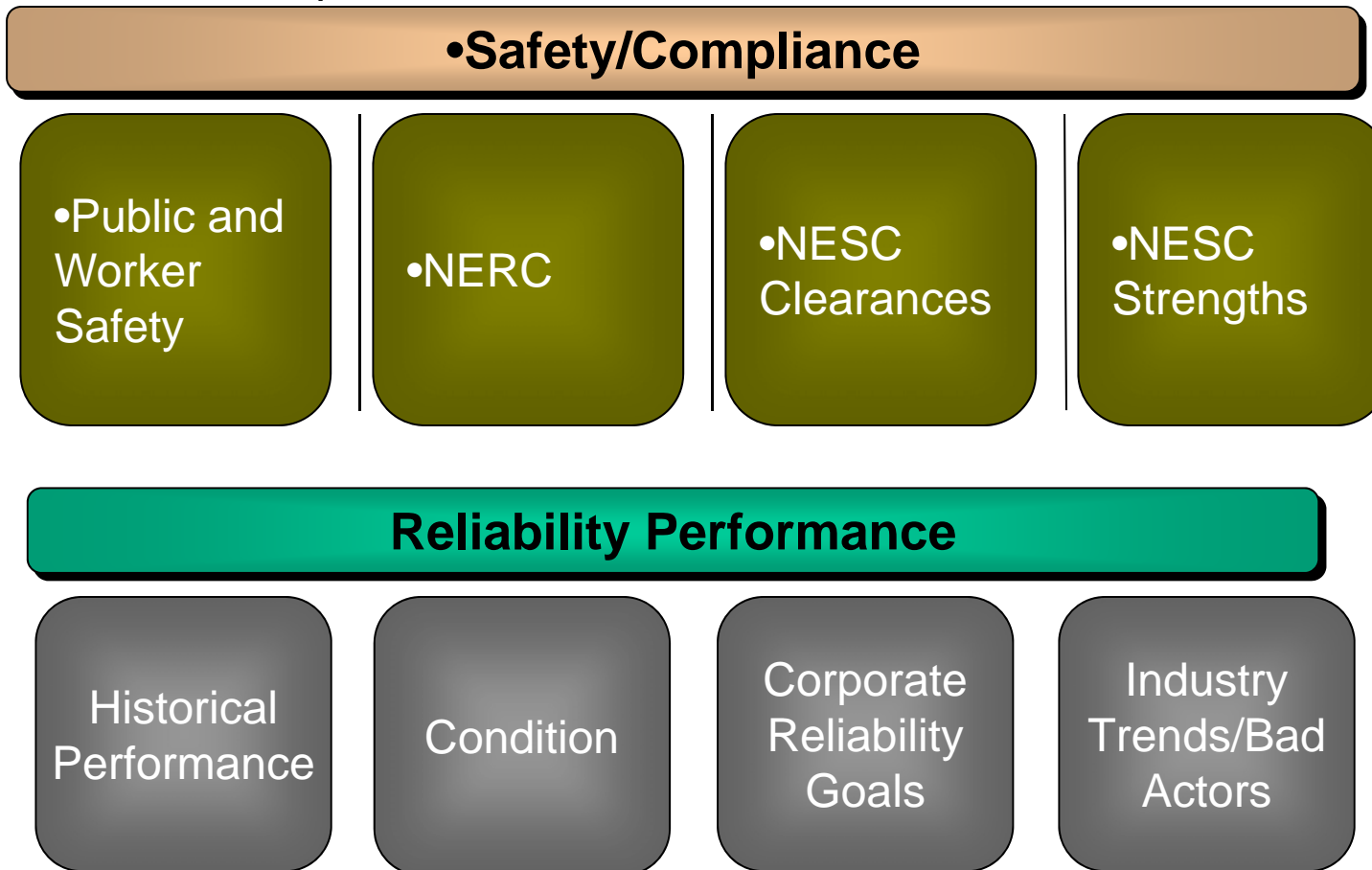
Model	ATC Southern Interface Flow			
	2014 Assessment	2015 Assessment	2016 Assessment	2017 Assessment
Year 1 Summer Peak	537	613	603	158
Year 5 Summer Peak	333	488	525	230
Year 10 Summer Peak	349	566	626	211
Year 5 Shoulder	-191	-117	-99	378
Year 10 Shoulder	362	280	347	16

Asset Renewal Program Objectives

- Safety – Public and worker
- Minimize total life cycle cost
- Compliance
- Manage risk of aging infrastructure
- Reliability performance improvements
- Environmental performance improvements

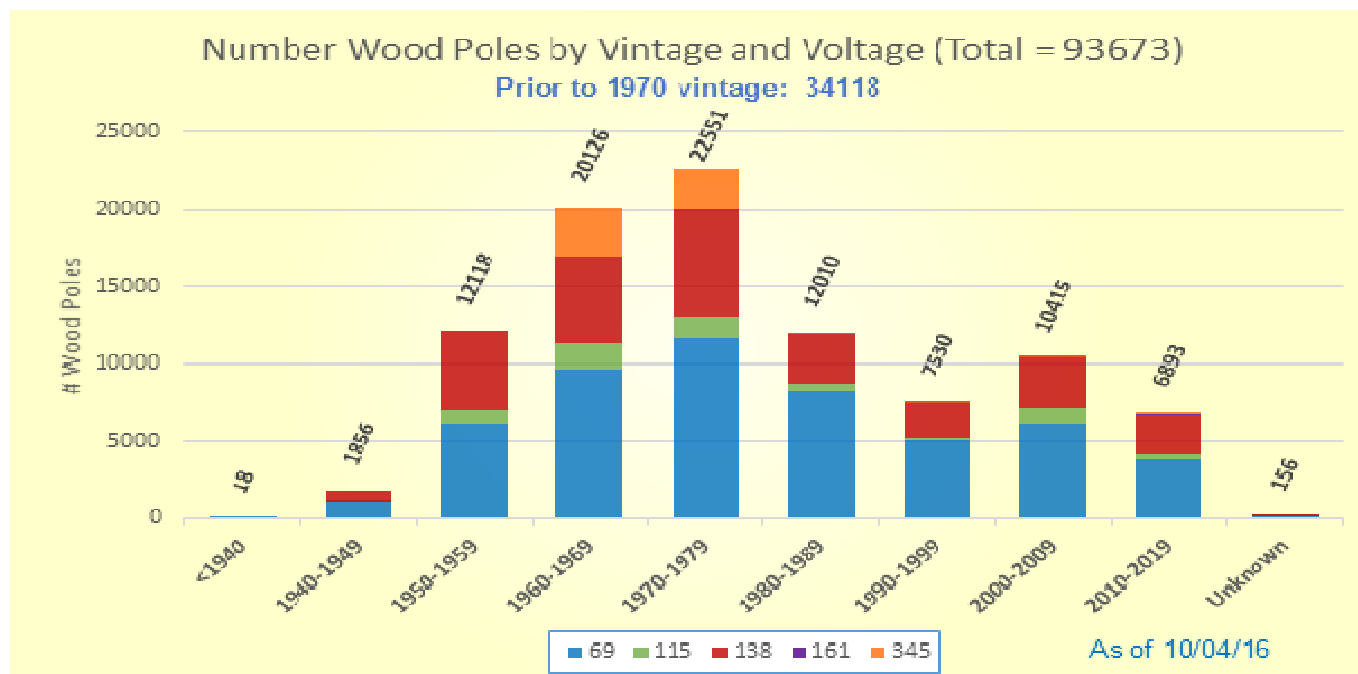
What is the ATC Asset Renewal Process?

•Criteria is based upon:



Wood Poles

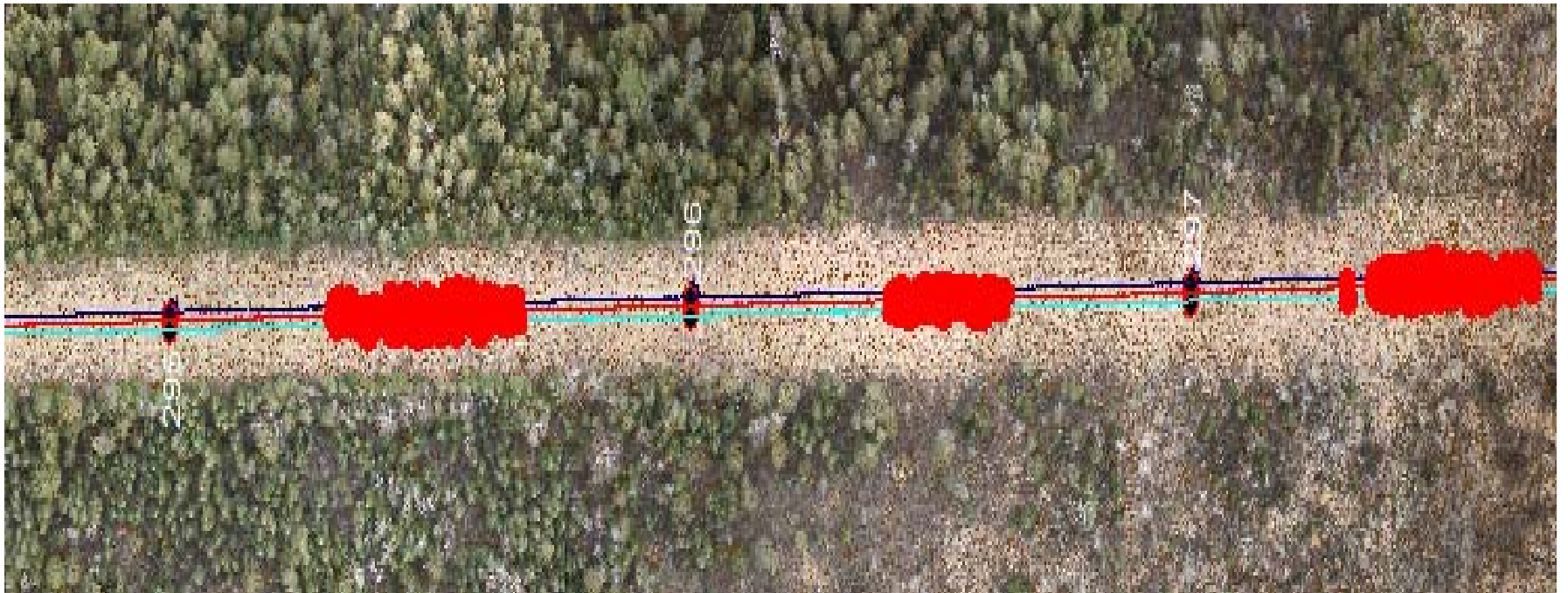
- Objective is to manage condition and preserve reliability and safety as these assets reach end of life.
- Approx. 93,673 wood Poles on the ATC Transmission System out of which approx. 34,118 are pre-1970 vintage. These wood poles are likely to be replaced in the next 20 - 25 years.



Project Example – Line 6950 (Nine Mile – Detour)



LiDAR Results



Line 6950 - Program Criteria Drivers

•Safety/Compliance

•Public and Worker Safety

•NERC

•NESC Clearances

•NESC Strengths

•Reliability Performance

•Historical Performance

•Condition

•Corporate Reliability Goals

•Industry Trends/Bad Actors



Rebuild Completely vs. Partial Rebuild?

- Perform Net Present Value (NPV) analysis:
 - Alternative 1: Partial rebuild in 2017; rebuild rest in 2023
 - Alternative 2: Complete rebuild in 2017
- Alternative 1 is the more cost effective alternative

Asset Renewal Summary

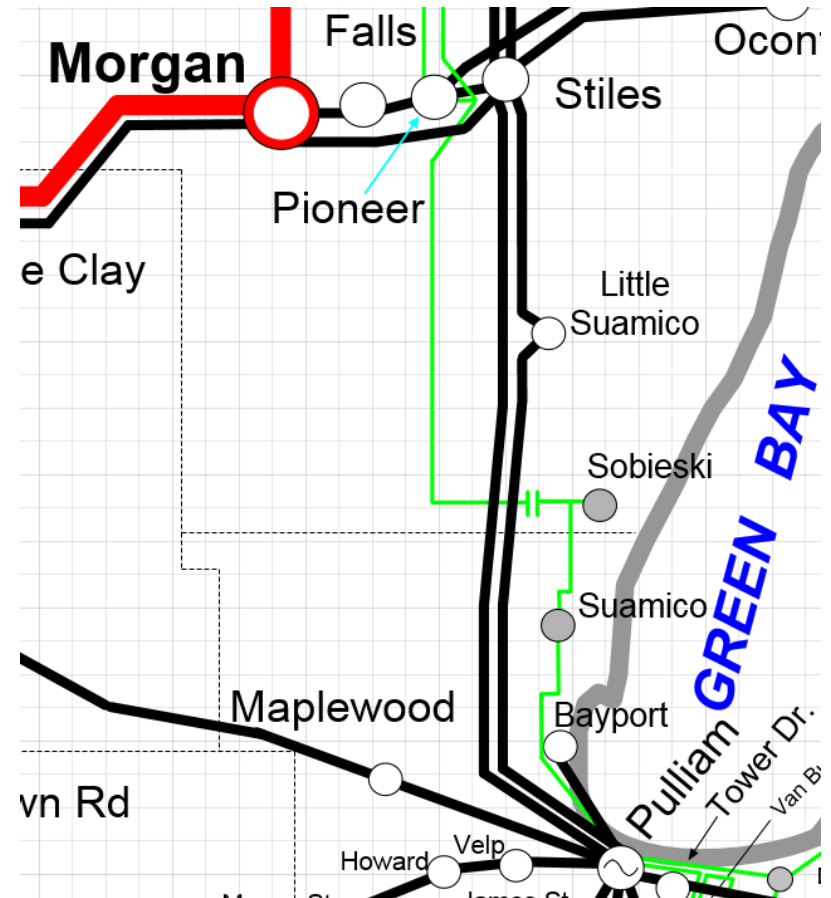
- Investing prudently using objective and defensible criteria
 - Safety/Compliance
 - Reliability
- Reliability improved over the last several years, in part, due to our asset renewal program

Removal Considerations: Process

- **Assess area needs**
 - Reasonable range of scenarios
- **Obtain cross-functional and customer input**
- **Consider removal of lines**
 - Full retirement of lines
 - Partial retirement of lines

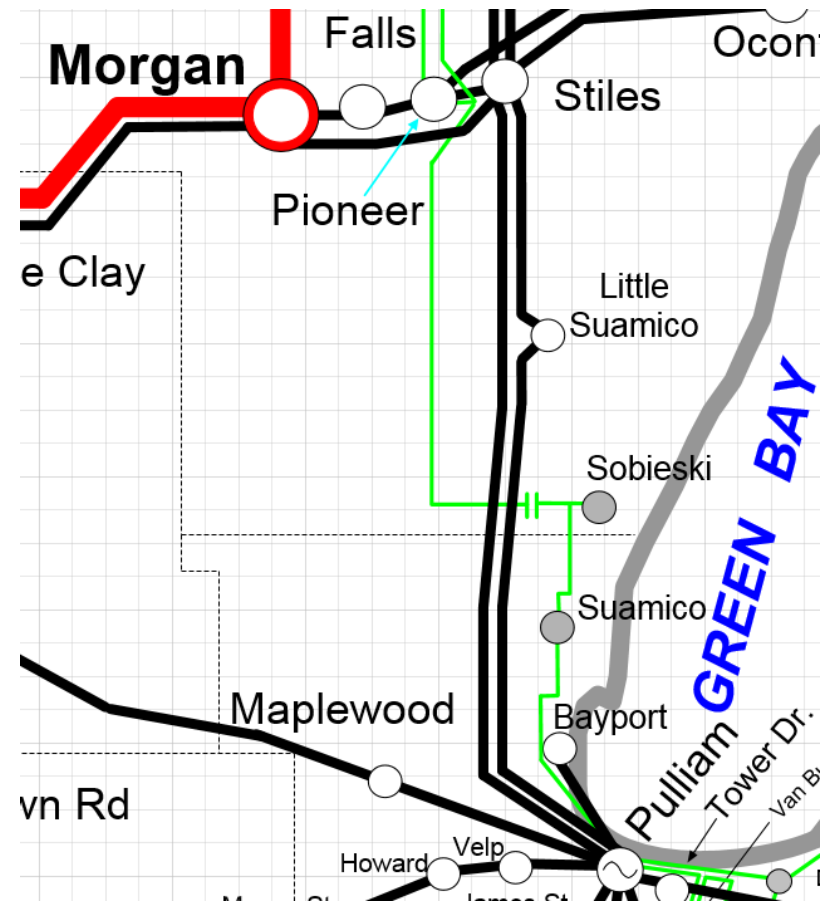
Removal Considerations – E-83/T-98 Example

- E-83/T-98: Bayport-Suamico-Sobieski-Stiles
 - Assessed area needs with cross-functional ATC team and impacted customers
- Discussed potential for full retirement of lines with impacted customers
 - Lines serve the Bayport, Suamico and Sobieski T-D interconnections
 - Likely that construction of new transmission lines would be required to serve these substations if existing lines retired.



Removal Considerations – E-83/T-98 Example (continued)

- Discussed potential for partial retirement with impacted customers
 - Identified options that would allow portion of lines to be retired.
 - Placed options into buckets to narrow down options prior to discussion with customers
- Removal options dismissed due to following reasons:
 - Solutions require new lines on new rights-of-way to serve load
 - Additional land owner and environmental impact related to new rights-of-way
 - Customer and land owner impact related to moving substations away from the load center



Summary of Preliminary Solutions

- **Eliminated Solutions**
 - Contingency: 3
- **Needs discussed, but not confirmed**
 - 4
- **Solutions identified since the 2016 TYA**
 - Contingency: 4
 - Economic: 1
 - T-D: 13
 - G-T: 4
 - Asset Renewal: 3
- **Continuing Solutions**
 - Numerous

Looking for stakeholder input

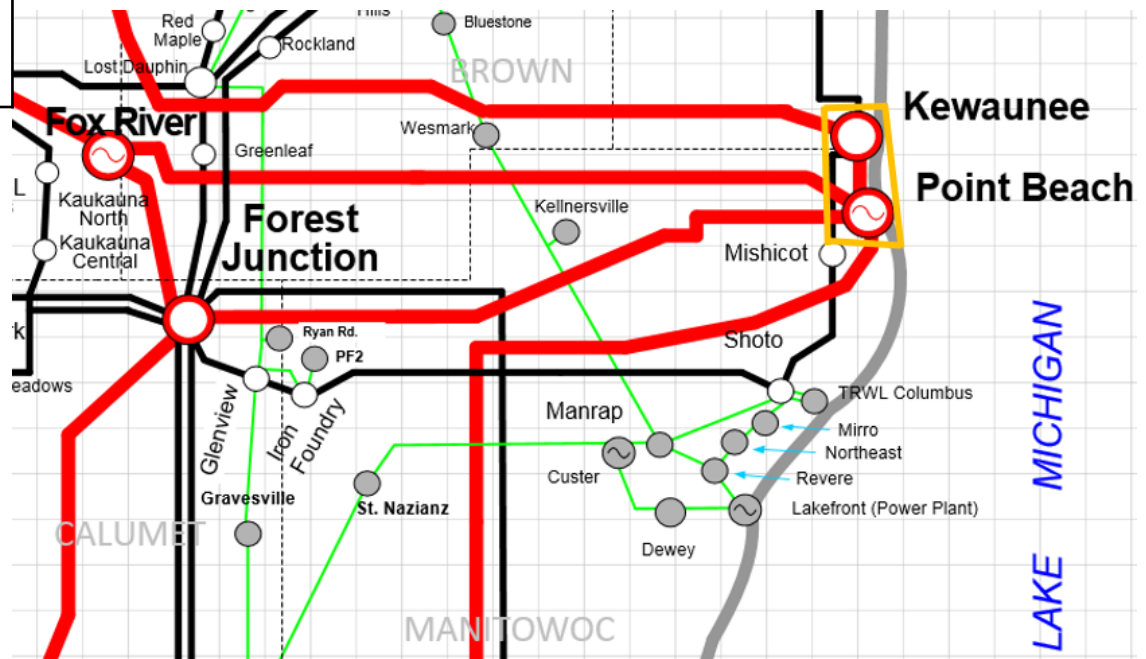
Cancelled Network Projects

System Addition	Previous Assessment Projected In-Service Year	Planning Zone	MISO MTEP 16 Appendix Status	MTEP PRJiD	MTEP Cost or Cost Range (M\$)
Wesmark Substation: Install 2-8 Mvar 69-kV capacitor banks	2020	4	B	9935	<10
Construct Shoto to Custer 138-kV line	2026	4	B	1719	22.9
Custer Substation: Install 138/69-kV transformer	2026	4	B	1718	4.9
Arcadian-Waukesha 138-kV lines KK9942/KK9962 rebuild	2025	5	A	1270	23.4

Contingency Need: Point Beach to Kewaunee 345-kV Overload

- Solution: Generator Redispatch

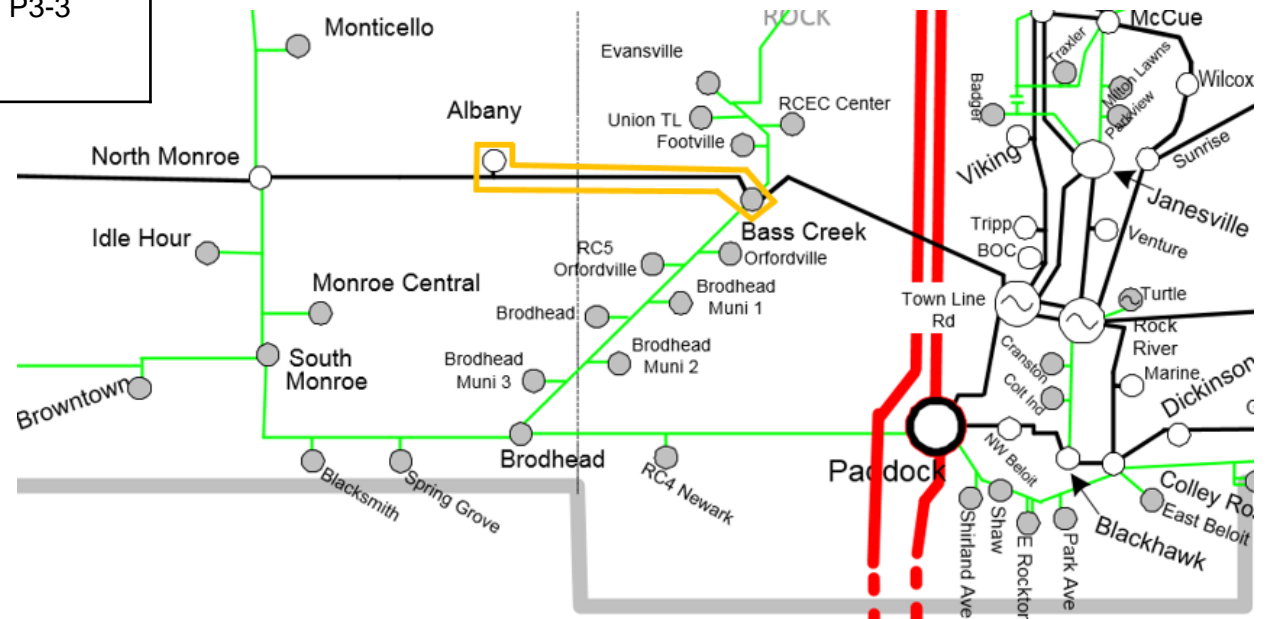
Model Year	Emergency Loading	Contingency Type
2018 Peak	97%	P3-2
2022 Peak	99%	
2027 Peak	102%	
2022 Shoulder	<95%	
2027 Shoulder	<95%	



Contingency Need: Albany to Bass Creek 138-kV Overload

- Solution: Cardinal – Hickory Creek Project; Generator Redispatch

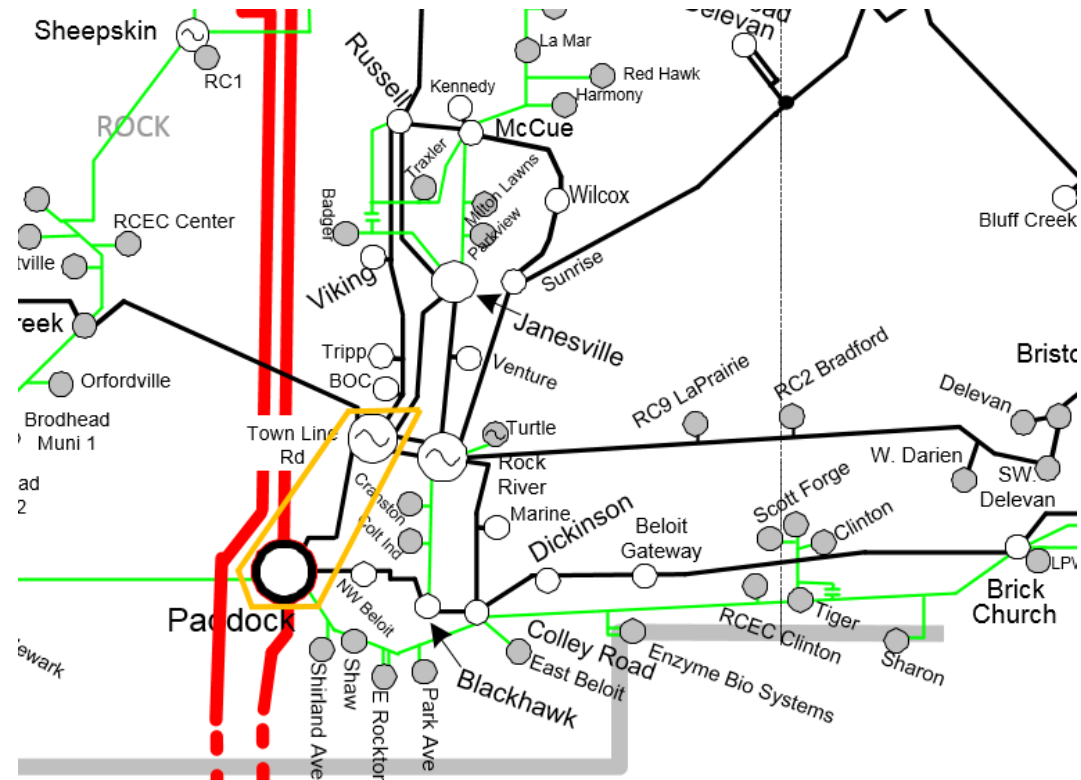
Model Year	Emergency Loading	Contingency Type
2018 Peak	<95%	P3-3
2022 Peak	<95%	
2027 Peak	101%	
2022 Shoulder	<95%	
2027 Shoulder	<95%	



Contingency Need: Paddock to Townline Road 138-kV

- Solution: Cardinal – Hickory Creek Project; Generator Redispatch

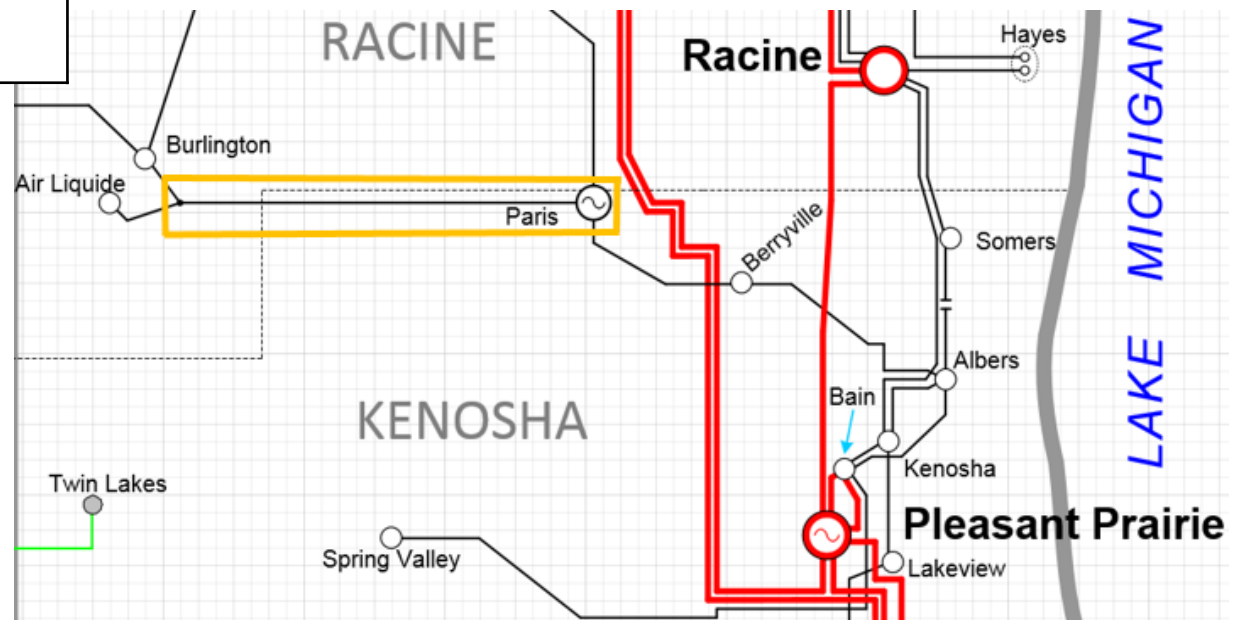
Model Year	Emergency Loading	Contingency Type
2018 Peak	<95%	P3-2
2022 Peak	<95%	
2027 Peak	101%	
2022 Shoulder	<95%	
2027 Shoulder	<95%	



Contingency Need: Paris to Air Liquide Tap 138-kV

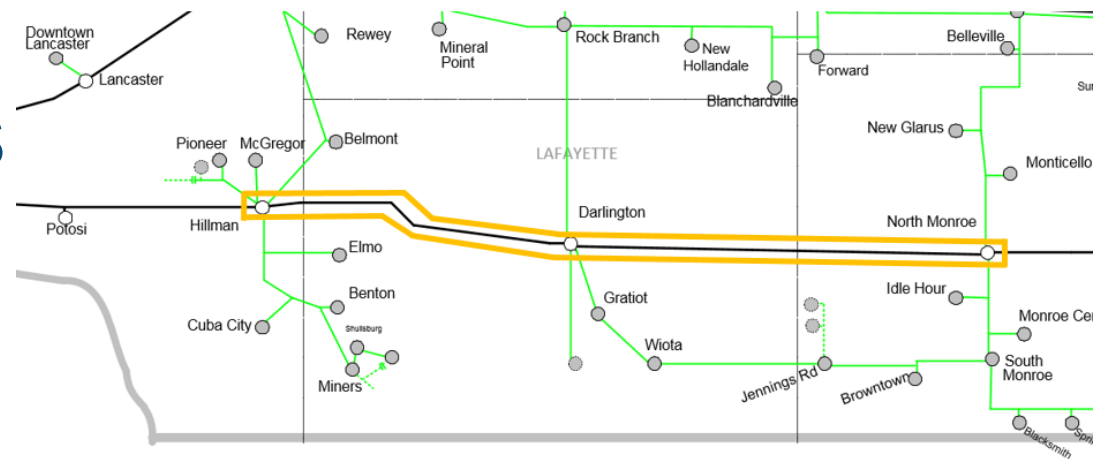
- Solution: Generator Redispatch

Model Year	Emergency Loading	Contingency Type
2018 Peak	<95%	P3-3
2022 Peak	<95%	
2027 Peak	101%	
2022 Shoulder	<95%	
2027 Shoulder	<95%	



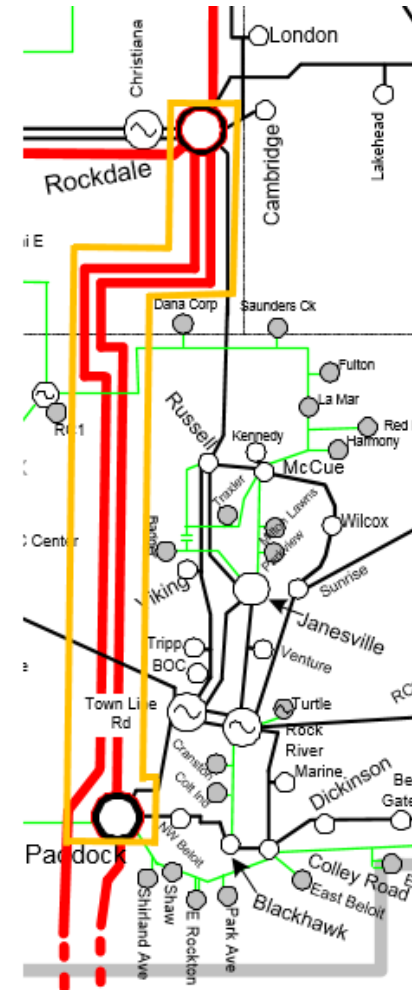
G-T Need: J395 Quilt Block Wind

- Solution: New Falcon Substation looped in and out of Hillman to Darlington 138-kV line X-14; Uprate Darlington to North Monroe 138-kV line X-49
- MTEP PID: 12284; Targeted A MTEP17
- ISD – 2017/19
- MTEP Cost : 18.6M\$



G-T Need: J390 Riverside Energy Center

- Solution: New Kittyhawk Substation looped in and out of Paddock to Rockdale 345-kV line W-10
- MTEP PID: 13103; Targeted A MTEP17
- ISD: 2019
- MTEP Cost: 49.6M\$



T-D Need: New 138/24.9-kV Transformers west of Madison

- Solution: New Dane County Substation looped in and out of line 13898
- MTEP PID: 12346; Targeted A MTEP17
- ISD: 2020
- MTEP Cost: 26M\$

T-D Need: New 138/13.2-kV Transformers east of Milwaukee River

- Solution: New Juneautown Substation looped in and out of line 247K81
- MTEP PID: 13104; Targeted B MTEP17
- ISD: 2020
- MTEP Cost: 43M\$

Continuing Solutions

- See Preliminary Network & AR Tables

Public Policy Requirements – Comments?

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

Assessment Status

- **Completed**

- Requested load forecast from LDCs
- Sent final load forecast back to LDCs
- Process and assumptions meeting
- Preliminary needs meeting

- **Next Steps**

- Solutions comments - **due May 26**
- Develop cost estimates - **June**
- Finish sensitivity studies - **May**
- Complete multiple outage study - **June**
- Draft study write-up - **July**
- ATC review/approval - **August**
- 2016 Assessment publication - **September**

Questions?

For more information, please contact

Jeremy Voigt

Phone: 262-832-8742

Email: jvoigt@atcllc.com

