



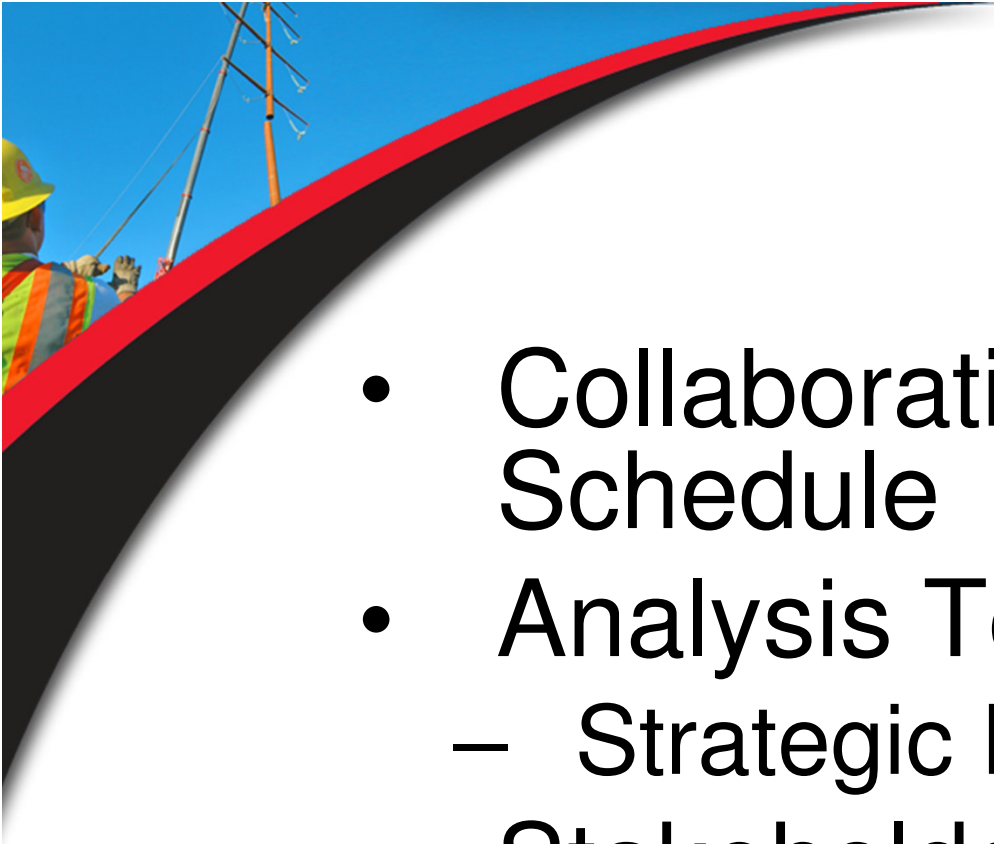
ATC Energy Collaborative – Michigan Needs Analysis Update

Customer and Stakeholder Update Meeting

March 6, 2009

Pewaukee CR160





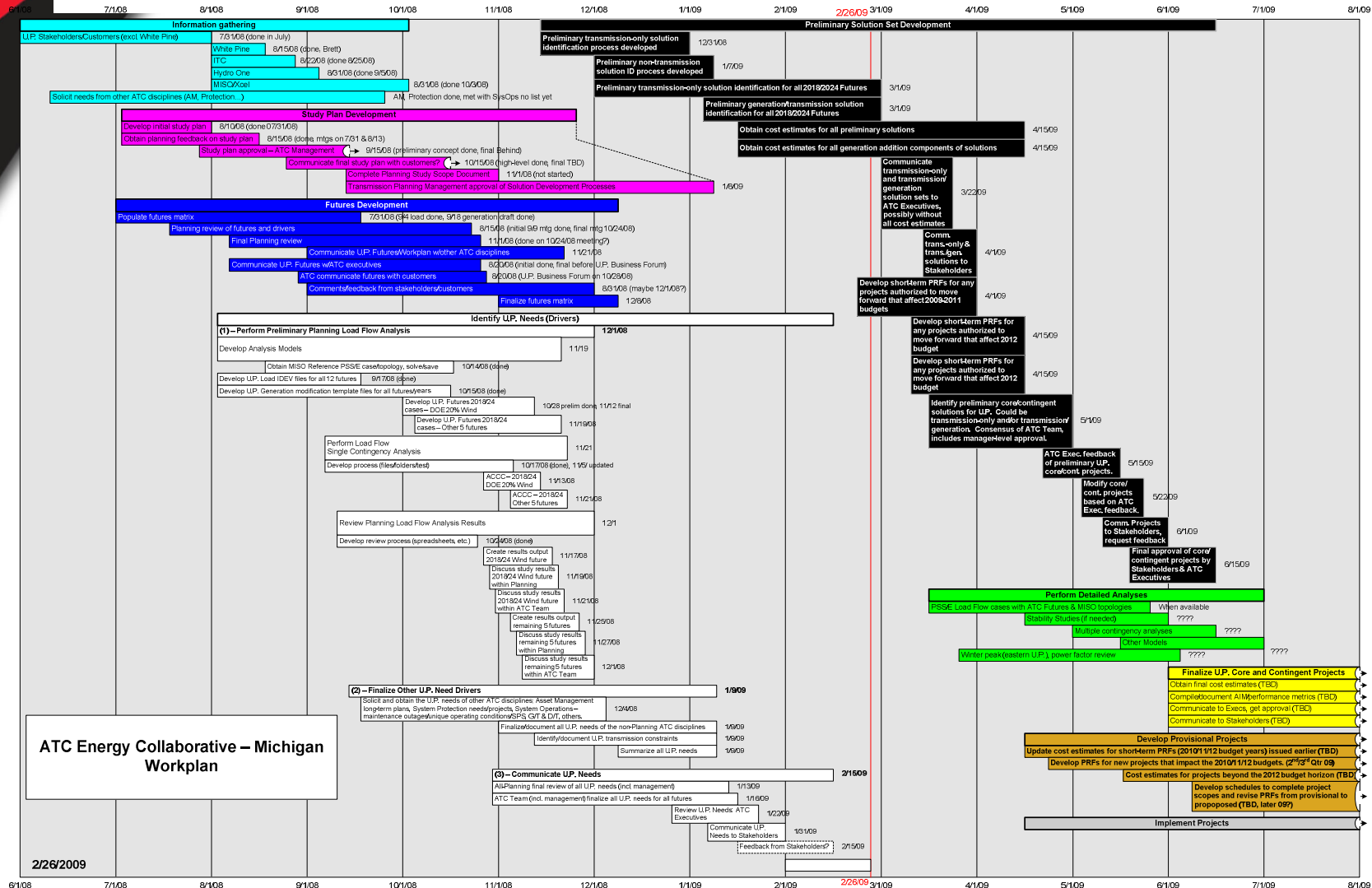
Summary

- Collaborative Goals and Schedule
- Analysis Technique
 - Strategic Flexibility
- Stakeholder Process
- Needs Update
- Next Steps
 - Solution Screening



Goals and Schedule

- Goal is to identify medium and long range needs for the UP transmission system





Analysis Technique

- Used the Strategic Flexibility process introduced in the Paddock – Rockdale study
- Developed six “Futures” based on MISO and ATC models
- Customized the Futures using UP specific drivers



Definition of Futures

- **Futures are:**

- Robust Economy -Slow Growth
- Environmental -High Retirements
- DOE 20% Wind -Fuel and Investment Limitations

- **Drivers are:**

- Demand and Energy Growth
 - Scalable and Point Loads
- Generation
 - Additions, Retirements and Dispatch of Existing Units
- Market Flows

Stakeholder Process

• Plausible Bounds for Drivers were Developed with Stakeholder Input

ATC Futures - ATC Energy Collaborative - Michigan
January 2, 2009 (ATC Internal Use Only Discussion) (Rev 4.0)

UP Micro-Drivers	Load Assumptions											Generation Assumptions																		
	Demand Growth Within UP (Demand MWs)			Energy Growth Within UP (Energy MWhrs)			Total Point Loads MW added in the UP (2018/2024)			Total UP Growth (2018)	Total UP Growth (2024)	Demand Growth Outside UP (MWs)	Existing UP Generation Profiles (Note: U.P. generation on-line only if dictated by merit order dispatch, or unless noted below)			UP Generation Additions			UP Generation retirements			Wind Generation			New Generation in Northern Lower Michigan					
	West	Central	East	West	Central	East	West	Central	East	U.P.	U.P.	(MWs)	West	Central	East	West	Central	East	West	Central	East	West	Central	East						
Lower	-0.10%	0.08%	0.10%	-0.10%	0.08%	0.10%	-6 MW	-111 MW	-2 MW	-1.44%	-0.86%	0.5%	Fossil (-69MW Total) WP Mine1-2-3 (40) + SM-ST (11) + Warden (16)	Fossil (-151MW Total) PIS-6 Derate (40) + EISC 1-2 (20) + Neenah-MUN (5) + NP7 Plus (55) + MBLP (25)	9.4MW Diesel Available	5 MW	116 MW													
Mid-Lower	0.36%	0.48%	0.40%	0.36%	0.48%	0.40%	No Change	-40 MW	No Change	-0.24%	-0.05%	1.0%	(-51MW Total) WP Mine1-2-3 (40) + SM-ST (11)	Fossil (-134MW Total) PIS-6 Derate (40) + EISC 1-2 (20) + Neenah-MUN (5) + MBLP (25) + NP7 (38)																
Mid	0.73%	0.84%	0.75%	0.73%	0.84%	0.75%	+5 MW	+29 MW	+33 MW	1.14%	0.84%	1.75%	(+5 / 0)	(+29 / 0)	(+33 / 0)	-40MW Total) WP Mine1-2-3 (40)	Fossil (-65MW Total) PIS-6 Derate (40) + MBLP (25)	11.4MW Diesel Available	10MW	29 MW										
Mid-Upper	1.23%	1.25%	1.25%	1.23%	1.25%	1.25%	+19 MW	+99 MW	+40 MW	2.00%	1.60%	2.0%	(+16 / +3)	(+79 / +20)	(+35 / +5)	Fossil all available	Fossil (-40MW Total) P1 5-6 (40)	11.4MW Diesel Available	60MW	93MW										
Upper	1.93%	2.00%	2.00%	1.93%	2.00%	2.00%	+41 MW	+184 MW	+56 MW	3.00%	2.58%	3.0%	(+19 / +22)	(+134 / +50)	(+46 / +10)	Fossil all available	Fossil all available	16MW Diesel Available	110MW	101 MW										

2018 Futures

Descriptions

Robust Economy	(+1.93%)	(+2.00%)	(+2.00%)	(+1.93%)	(+2.00%)	(+2.00%)	(+19 MW)	(+134 MW)	(+46 MW)	(+3.00%)	3.0%	-0MW	-0MW	20MW Hydro	(none)	60MW	(+101 MW)	(none)	(-116 MW)	(none)	(-25 MW)	(+50 MW)	(+50 MW)	(+600 MW)
High Retirements	(+0.73%)	(+0.84%)	(+0.75%)	(+0.73%)	(+0.84%)	(+0.75%)	(+5 MW)	(+29 MW)	(+33 MW)	(+1.14%)	1.75%	-69MW	-151MW	32MW Hydro	(none)	(none)	(+29MW)	(none)	(-138 MW)	(none)	(+25 MW)	(+50 MW)	(+50 MW)	(+600 MW)
High Environmental	(+0.36%)	(+0.48%)	(+0.40%)	(+0.36%)	(+0.48%)	(+0.40%)	(no change)	(-40 MW)	(no change)	(-0.24%)	1.0%	-51MW	-134MW	20MW Hydro	(none)	(none)	(+5 MW)	(none)	(-116 MW)	(none)	(+50 MW)	(+100 MW)	(+100 MW)	(none)
Slow Growth	(+0.10%)	(+0.08%)	(+0.10%)	(+0.10%)	(+0.08%)	(+0.10%)	(-6 MW)	(-111 MW)	(-2 MW)	(-1.44%)	0.5%	-40MW	-65MW	44MW Hydro	(none)	10MW	(+5 MW)	(none)	(-116 MW)	(none)	(+100 MW)	(+200 MW)	(+200 MW)	(none)
DOE 20% Wind	(+1.23%)	(+1.25%)	(+1.25%)	(+1.23%)	(+1.25%)	(+1.25%)	(+16 MW)	(+79 MW)	(+35 MW)	(+2.00%)	2.0%	-69MW	-151MW	20MW Hydro	(none)	(none)	(+93 MW)	(none)	(-138 MW)	(none)	(+100 MW)	(+200 MW)	(+200 MW)	(+100 MW)
Fuel and Investment Limitations	(+0.73%)	(+0.84%)	(+0.75%)	(+0.73%)	(+0.84%)	(+0.75%)	(no change)	(+6 MW)	(no change)	(0.48%)	1.3%	-40MW	-65MW	0MW Hydro	(none)	10MW	(+5 MW)	(none)	(-116 MW)	(none)	(none)	(none)	(none)	(none)

2024 Futures

Descriptions

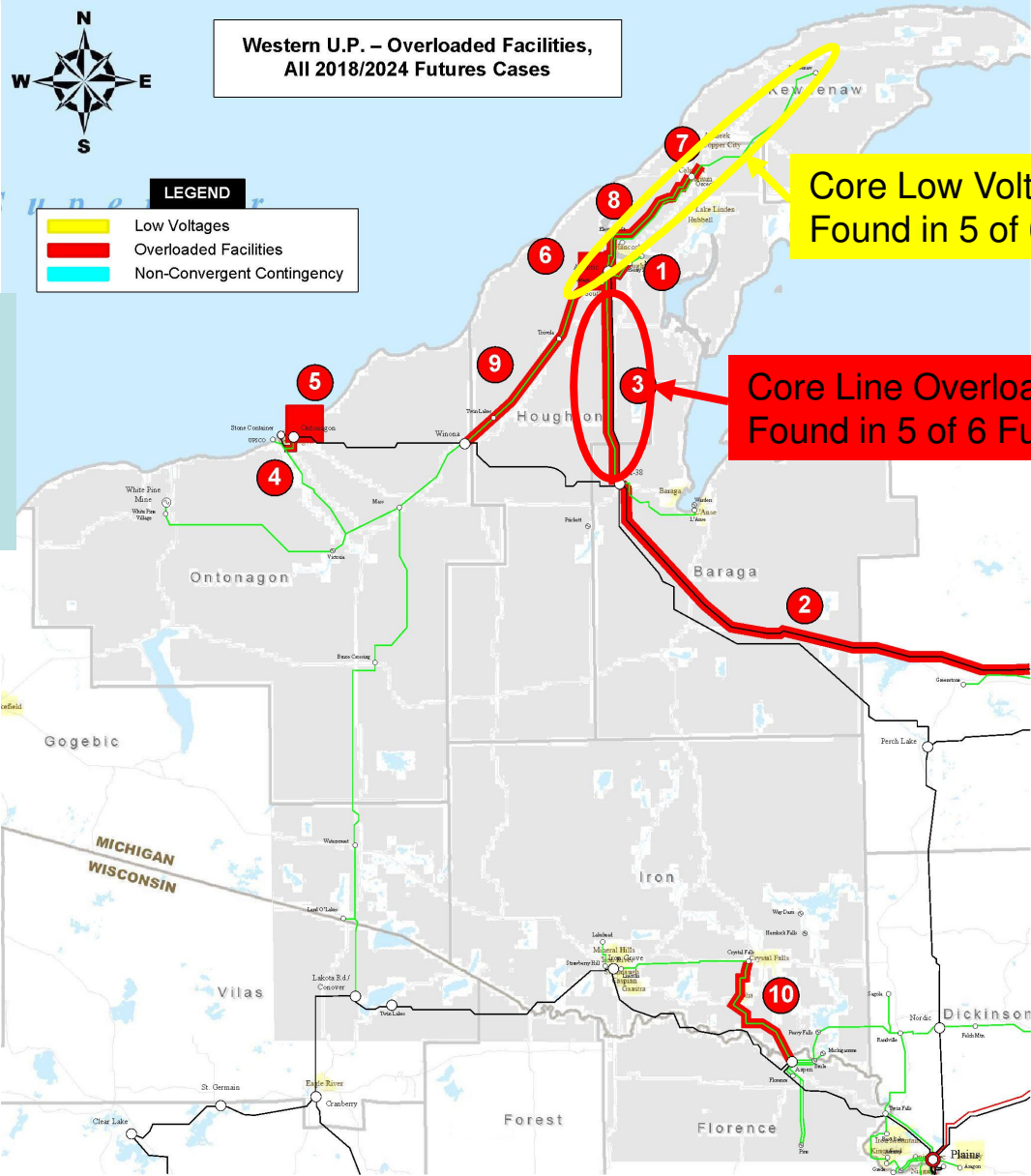
Robust Economy	(+1.93%)	(+2.00%)	(+2.00%)	(+1.93%)	(+2.00%)	(+2.00%)	(+41 MW)	(+184 MW)	(+56 MW)	(+3.00%)	3.0%	-0MW	-0MW	20MW Hydro	(none)	110MW	(+101 MW)	(none)	(-116 MW)	(none)	(+25 MW)	(+50 MW)	(+50 MW)	(+600 MW)
High Retirements	(+0.73%)	(+0.84%)	(+0.75%)	(+0.73%)	(+0.84%)	(+0.75%)	(+5 MW)	(+29 MW)	(+33 MW)	(+1.14%)	1.75%	-69MW	-151MW	32MW Hydro	(none)	(none)	(+29MW)	(none)	(-138 MW)	(none)	(+25 MW)	(+50 MW)	(+50 MW)	(+600 MW)
High Environmental	(+0.36%)	(+0.48%)	(+0.40%)	(+0.36%)	(+0.48%)	(+0.40%)	(no change)	(-40 MW)	(no change)	(-0.24%)	1.0%	-51MW	-134MW	20MW Hydro	(none)	(none)	(+5 MW)	(none)	(-116 MW)	(none)	(+50 MW)	(+100 MW)	(+100 MW)	(none)
Slow Growth	(+0.10%)	(+0.08%)	(+0.10%)	(+0.10%)	(+0.08%)	(+0.10%)	(-6 MW)	(-111 MW)	(-2 MW)	(-1.44%)	0.5%	-40MW	-65MW	44MW Hydro	(none)	10MW	(+5 MW)	(none)	(-116 MW)	(none)	(+100 MW)	(+200 MW)	(+200 MW)	(none)
DOE 20% Wind	(+1.23%)	(+1.25%)	(+1.25%)	(+1.23%)	(+1.25%)	(+1.25%)	(+16 MW)	(+79 MW)	(+35 MW)	(+2.00%)	2.0%	-69MW	-151MW	20MW Hydro	(none)	(none)	(+93 MW)	(none)	(-138 MW)	(none)	(+100 MW)	(+200 MW)	(+200 MW)	(+100 MW)
Fuel and Investment Limitations	(+0.73%)	(+0.84%)	(+0.75%)	(+0.73%)	(+0.84%)	(+0.75%)	(no change)	(+6 MW)	(no change)	(0.48%)	1.3%	-40MW	-65MW	0MW Hydro	(none)	10MW	(+5 MW)	(none)	(-116 MW)	(none)	(none)	(none)	(none)	(none)



UP Need Summary

- **Aggregation of ATC Need Drivers**
 - Planning Studies
 - Line Loadings and Voltages
 - System Operations
 - Special Operating Guides
 - Asset Management
 - Poor Line Performance
 - Transformers, Circuit Breakers and Relays
 - New Interconnections
 - 14 Load Requests under Study
 - 2 Wind Generation Studies in progress
 - Smart Grid Initiatives
 - Fiber Optic corridor additions
 - RTU and SCADA projects

Western UP Load and Voltage Needs



Ten Line Overloads Found in the Various Futures
 Core Line Overloads and Low Voltages are Highlighted

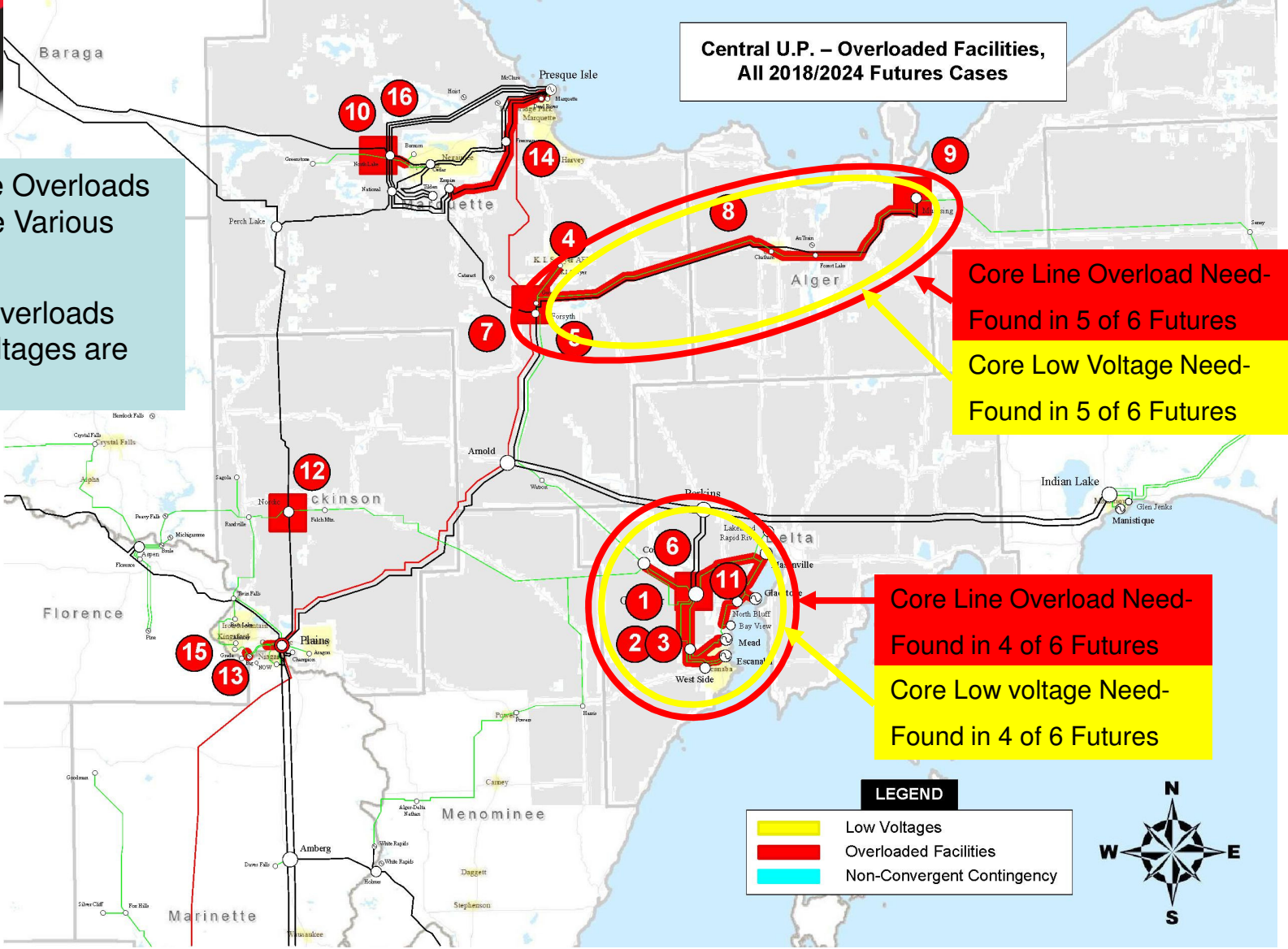
Core Low Voltage Need- Found in 5 of 6 Futures

Core Line Overload Need- Found in 5 of 6 Futures

Central UP Load and Voltage Needs



Sixteen Line Overloads Found in the Various Futures
 Core Line Overloads and Low Voltages are Highlighted



Eastern UP Load and Voltage Needs



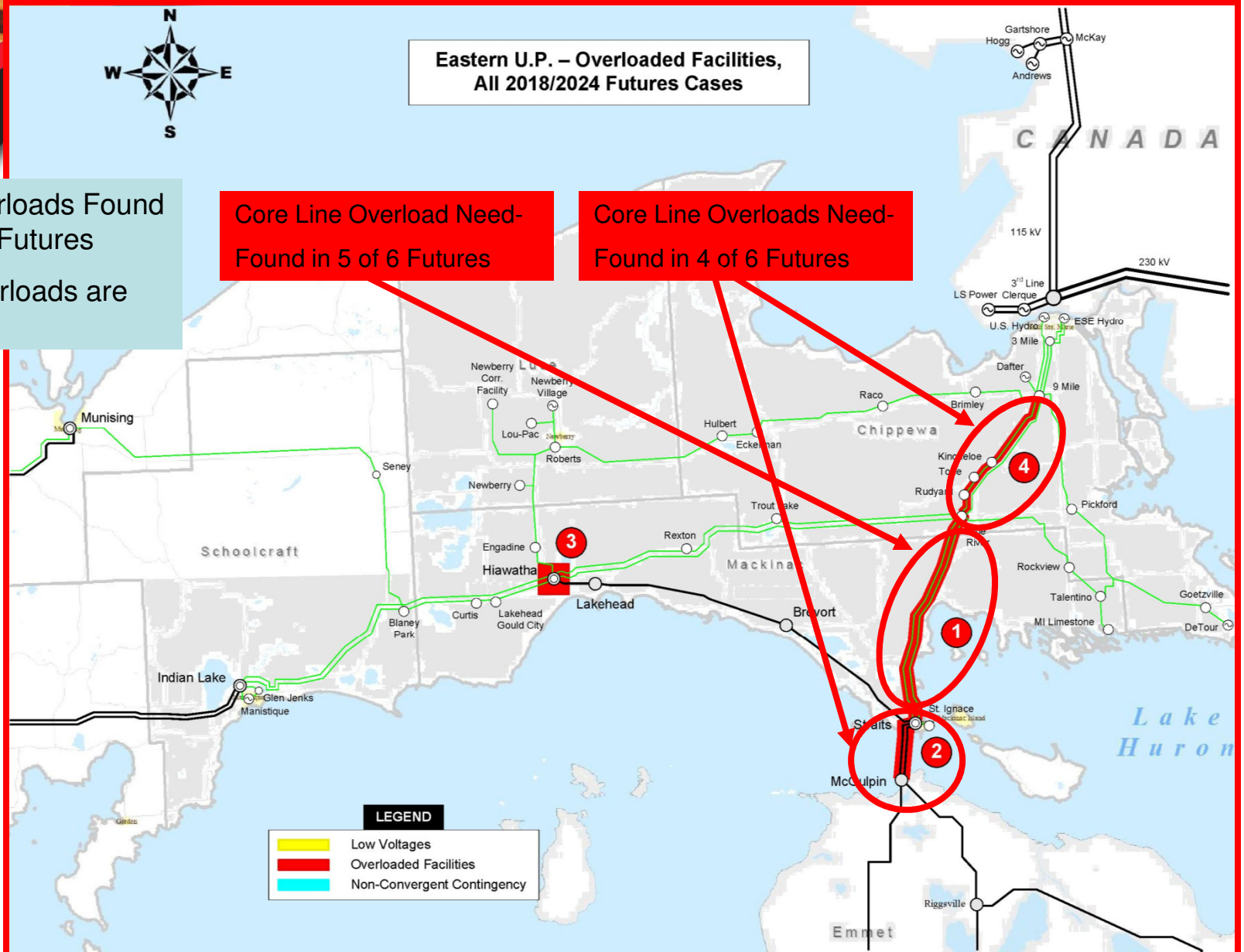
Eastern U.P. – Overloaded Facilities,
All 2018/2024 Futures Cases

Four Line Overloads Found
in the Various Futures

Core Line Overloads are
Highlighted

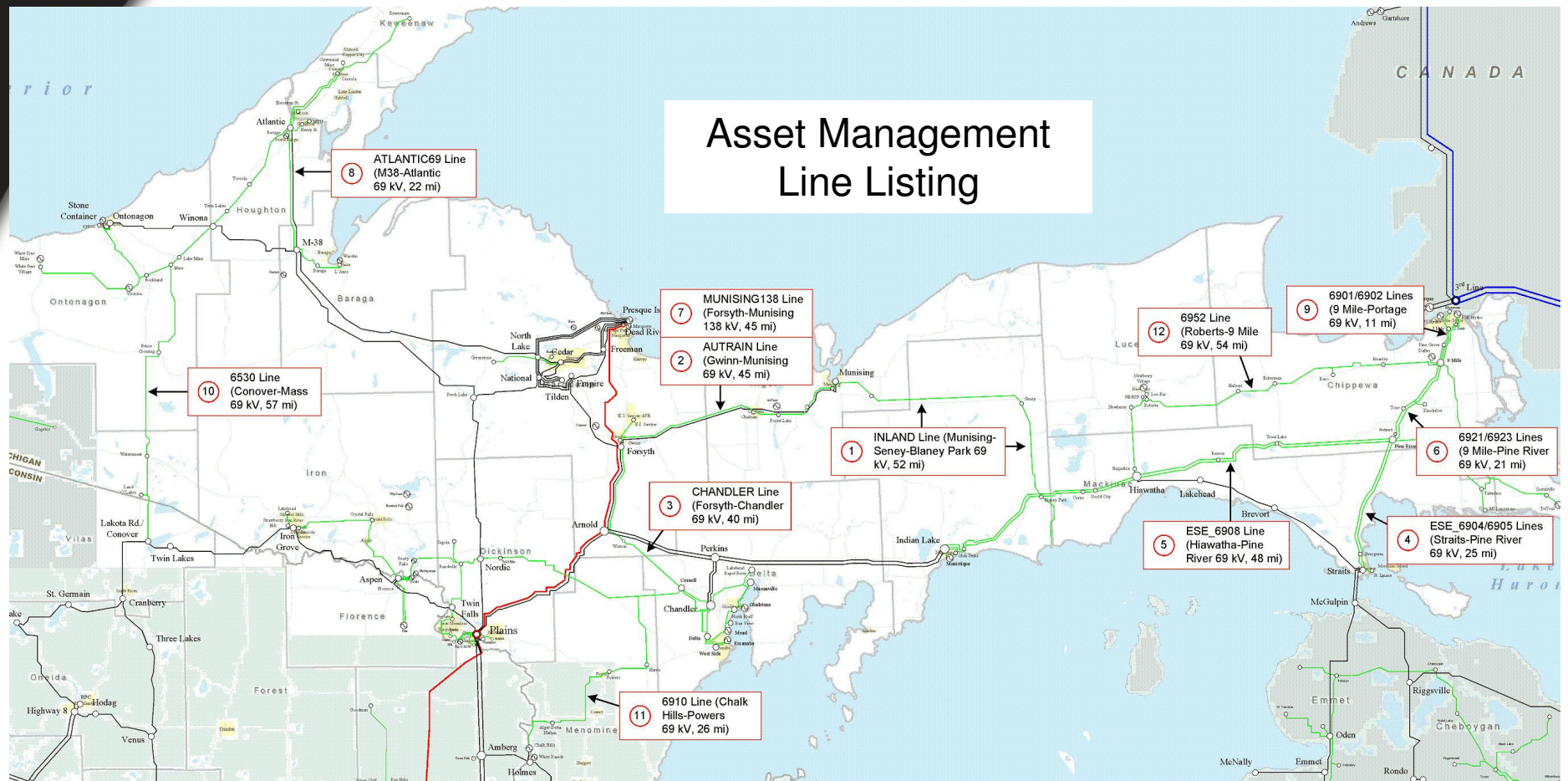
Core Line Overload Need-
Found in 5 of 6 Futures

Core Line Overloads Need-
Found in 4 of 6 Futures



UP Lines with Asset Management Need Drivers

Asset Management Line Listing





Next Steps

- Needs Summary Communication with Stakeholders
- Solution Development Process
 - Joint Meetings with Planning, Asset Management, System Operations and Project Management
 - Solicit Non-Transmission Solutions from Stakeholders
 - Right size, Right Place Generation
 - Demand Response
- 2010/2011 Budget Inputs



Questions?