U.P. Energy Task Force
ATC's U.P. Transmission System

PRESENTED BY

Ken Copp

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AMERICAN TRANSMISSION COMPANY®

OUR VISION

Connecting you with
a sustainable energy future

What is transmission?

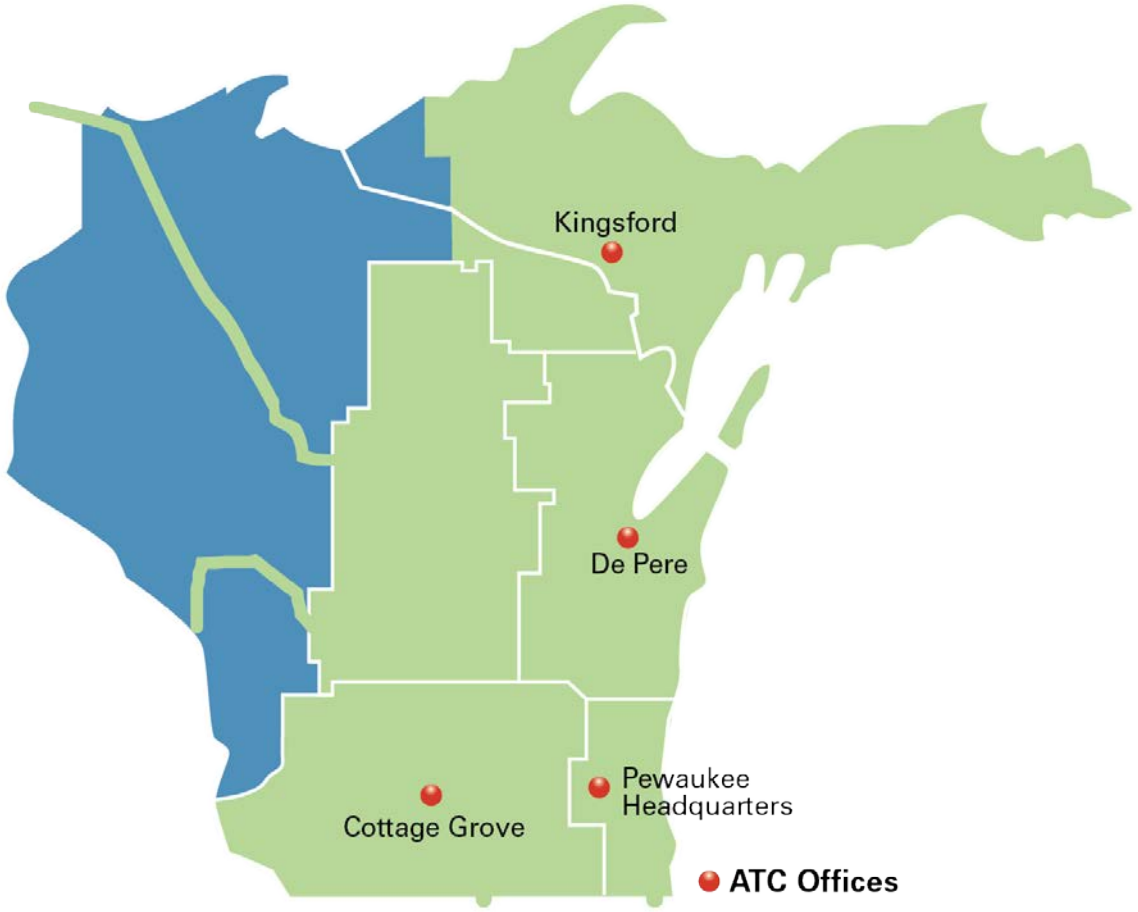
AMERICAN TRANSMISSION COMPANY®

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

Link to video on YouTube

Introducing American Transmission Co.

- Began in 2001
- Headquartered in Pewaukee, Wis.
- Nearly 600 employees



Introducing ATC

W E O P E R A T E

9,890+ miles of lines & 568 substations in

Wisconsin	**Michigan**
Minnesota	**Illinois**

Transmission is all we do…

- First multi-state, transmission-only utility in the U.S.
- Member of Midcontinent Independent System Operator
- Regulated by FERC (rates and tariffs) and states (siting)

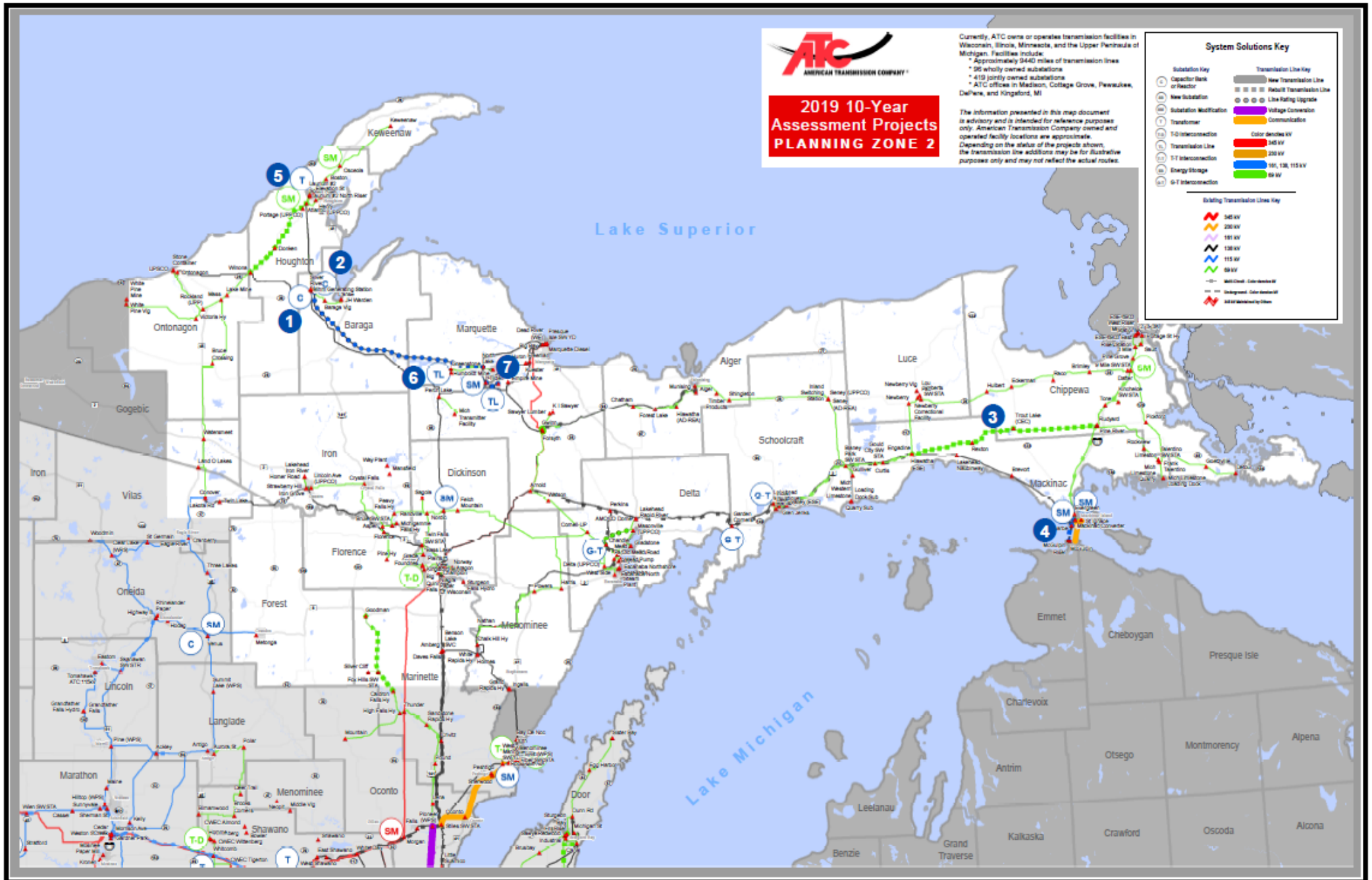
…and we do it well

- Grew from $550 million in assets (2001) to more than $5 billion
- Top performer in line reliability, ranking in the 2nd Quartile for both 69-kV and 100-161kV circuits, and best in class for 345- to 500-kV circuits in an industry reliability benchmarking study.
  (Source: 2018 NATF Benchmarking Study)
- Met peak demand of 12,499 megawatts and delivered 65,017 gigawatt hours of energy in 2019
- 100 percent project approval record from State Commissions

ATC's U.P. System Model Details

- ATC Has Invested $810 Million in the U.P.
- Transmission Lines
  - 345-kV 77 Miles
  - 138-kV 915 Miles
  - 69 kV 1088 Miles
- Substations
  - Joint ATC/Customer 58
  - ATC Only 25
- ATC Planning Model (Summer Peak 2022)*
  - Load 780 MW
  - U.P. Generation on line 370 MW
  - Max U.P. Import Capability 620 MW

*MPSC Case No. U-18197


2019 10-Year Assessment Projects
PLANNING ZONE 2
Currently, ATC owns or operates transmission facilities in Wisconsin, Illinois, Minnesota, and the Upper Peninsula of Michigan. Facilities include:
* Approximately 9440 miles of transmission lines
* 96 wholly owned substations
* 419 jointly owned substations
* ATC offices in Madison, Cottage Grove, Pewaukee, DePere, and Kingsford, MI
The information presented in this map document is advisory and is intended for reference purposes only. American Transmission Company owned and operated facility locations are approximate. Depending on the status of the projects shown, the transmission line additions may be for illustrative purposes only and may not reflect the actual routes.
System Solutions Key
Substation Key
Capacitor Bank or Reactor
New Substation
Substation Modification
Transformer
T-D Interconnection
Transmission Line
T-T Interconnection
Energy Storage
G-T Interconnection
Transmission Line Key
New Transmission Line
Rebuilt Transmission Line
Line Rating Upgrade
Voltage Conversion
Communication
Color denotes kV
345 kV
230 kV
161, 138, 115 kV
69 kV
Existing Transmission Lines Key
345 kV
230 kV
161 kV
138 kV
115 kV
69 kV
Multi-Circuit - Color denotes kV
Underground - Color denotes kV
Jointly Owned - Color denotes kV
Not All Maintained by ATC
Lake Superior
Lake Michigan
Keweenaw
Houghton
Ontonagon
Baraga
Marquette
Gogebic
Iron
Vilas
Dickinson
Florence
Forest
Oneida
Menominee
Marinette
Lincoln
Langlade
Marathon
Shawano
Oconto
Door
Alger
Schoolcraft
Delta
Luce
Chippewa
Mackinac
Emmet
Cheboygan
Presque Isle
Charlevoix
Antrim
Otsego
Montmorency
Alpena
Leelanau
Benzie
Grand Traverse
Kalkaska
Crawford
Oscoda
Alcona
1
2
3
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5
6
7

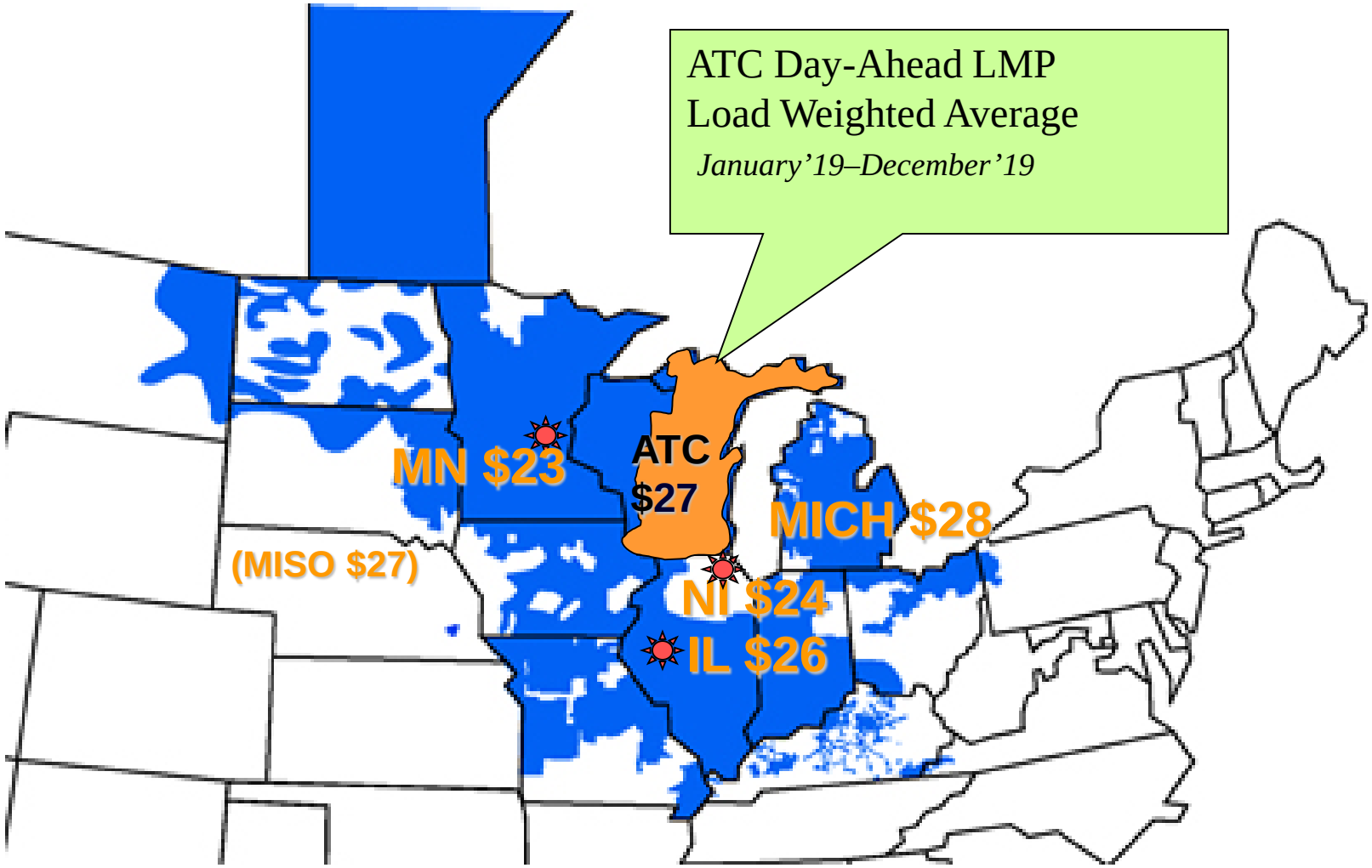
Major ATC System Improvement Projects First Decade (2001-2010)

- Northern Umbrella Reliability Project
  - Green Bay - Iron Mountain 138 kV Double Circuit Rebuild
  - Eagle River- Conover 115/138 kV, New Line
  - Conover – Iron River - Iron Mountain 138 kV, New Line
- Eastern U.P. Reliability Project
  - Manistique - Engadine Double Circuit 138 kV, New Lines

Major ATC System Improvement Projects Second Decade (2011-2020)

- ATC U.P. Collaborative Projects
  - Delta County
    - Chandler- Escanaba Double Circuit 138 and 69 kV, New Line
    - Holmes – Escanaba 138 kV, New Line
    - Arnold SS New 345 to 138 kV Transformer
  - Mackinac 138 kV HVDC Flow Control Project
- Presque Isle Power Plant Retirement Projects
  - N. Appleton – Morgan 345 and 138 kV New Lines
  - Benson Lake Static Var Compensator (SVC)
  - Huron SS – Generation Interconnection for RICE Units
  - Silver River SS - Generation Interconnection for RICE Units

MISO Energy Market, Day-Ahead LMP and System Flow Impacts



MISO Energy Market Transmission Benefits or Limitations

- Locational Marginal Price
  - LMP=Marginal Energy Component + M.CongestionCmp.+M.LossCmp
  - Distance (MLC) Matters in the U.P.
- Narrow Constrained Areas
  - WUMS
  - Northern WUMS (U.P.)
- Reliability Projects Have An Economic Value
  - ATC's Customer Benefit Metric
- Voltage and Local Reliability (VLR)
  - Charges to customers settled outside of the Energy Market

Transmission Planning
What Comes Next?

- Capacity Impacts of Emerging Resources
  - Retiring Coal Fired Resources - 90-95% Capacity Credit
  - Wind Resources – 15.6% Capacity Credit
  - Solar Resources – 50% Capacity Credit
    - Winter Peak Capacity Credit will be less
  - Transmission System Import & Export Capability
- Inverter Connected Resource Control Stability
  - Single Event Loss of Resources
  - Inertia and Fault Current Decreases Increase the Issue
- Transmission Planning Becomes More Complex

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