

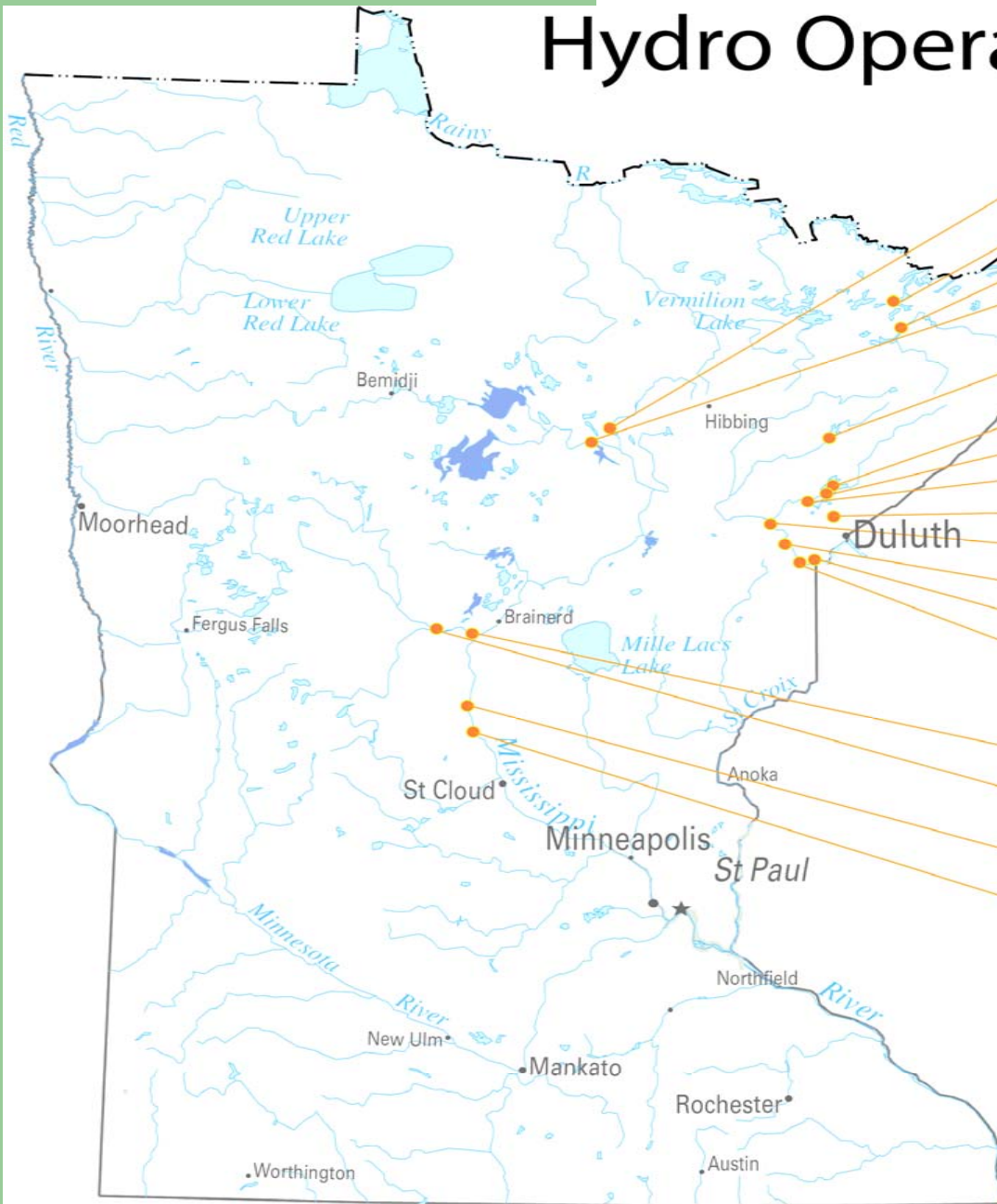
MINNESOTA RENEWABLE PORTFOLIO STANDARDS

Bonny L. Carlson

Hydro Operations Manager

Minnesota Power

Hydro Operations



- Prairie River Hydro
- Winton Hydro
- Birch Lake Reservoir
- Rapids Energy Center
- Whiteface Reservoir
- Boulder Lake Reservoir
- Island Lake Reservoir
- Fish Lake Reservoir
- Rice Lake Reservoir
- Knife Falls Hydro
- Scanlon Hydro
- Fond du Lac Hydro
- Thomson Hydro
- Sylvan Hydro
- Pillager Hydro
- Little Falls Hydro
- Blanchard Hydro



MINNESOTA POWER'S HYDRO SYSTEM

- 3 Separate Watersheds
 - St. Louis River
 - Mississippi River
 - Kawishiwi River
- 11 Hydro Generating Facilities
- 34 Generators
- 117 Total MW
- Thomson Station = 73 MW

MN RENEWABLE PORTFOLIO STANDARD

w/o Nuclear

- 2005 1%
- 2010 7%
- 2012 12%
- 2016 17%
- 2020 20%
- 2025 25%

w/ Nuclear

- 2010 15%
- 2012 18%
- 2016 25%
- 2020 30%
- (25% by wind)

MN “ELIGIBLE ENERGY TECHNOLOGY”

- Solar
- Wind
- Hydroelectric with capacity of <100 MW
- Hydrogen
- Biomass

MN “ELECTRIC UTILITY”

- Public Utility Providing Electric Service
- Generation & Transmission
- Cooperative Electrical Association
- Municipal Power Agency
- Power District

WI RENEWABLE PORTFOLIO STANDARD

- 2006 – 2009 Baseline from 2001 – 2003
 - Different for each utility
- 2010 – 2014 Increase 2% from Baseline
- 2015 + Increase 6% from Baseline

WI “QUALIFYING RESOURCE”

- Wind
- Biomass
- Hydroelectric (<60 MW)
- Solar (photovoltaic & thermal electric)
- Geothermal
- Tidal or Wave Power
- Fuel Cell (using renewable fuel)

WI “COVERED UTILITIES”

- Investor-Owned Retailers
- Cooperatives
- Municipal Utilities

RENEWABLE ENERGY CREDITS

- Program established January 2008 in MN
- Credits are bankable (4-year shelf life) & can be used only once
- Must treat all eligible technology equally
- Technology with which energy was generated does not affect credits
- Commission shall facilitate trading of credits between utilities & states

COMPLIANCE

- Commission can order utility to:
 - Construct facilities
 - Purchase energy generated by eligible technology
 - Purchase Renewable Energy Credits
- Utilities required to:
 - Annually retire renewable energy credits
 - Issue report to Public Utilities Commission

MIDWEST RENEWABLE ENERGY TRACKING SYSTEM (M-RETS)

- System tracks renewable generation of registered generators for both IPPs & utilities
- Membership from states correlating to the MISO footprint: MN, WI, IA, ND, SD, IL, MT
- Use of hydro credits is variable based upon individual states' renewable energy requirements
 - MN = <100 MW
 - WI = <60 MW

HYDRO CHALLENGES

- Environmental Opposition to New Impoundments
 - Wind Installations Are Looked at Favorably
- Permitting Requirements/Time Factors
- Time & Cost to Develop and Construct
- Incremental Capacity Factors at Existing Facilities are Limited

HYDRO OPPORTUNITIES

- Review Operating Efficiencies
- Efficiency Upgrades – Mechanical
- New Technologies
- Pumped Storage