

Challenges and Opportunities in Clean Electricity Trade



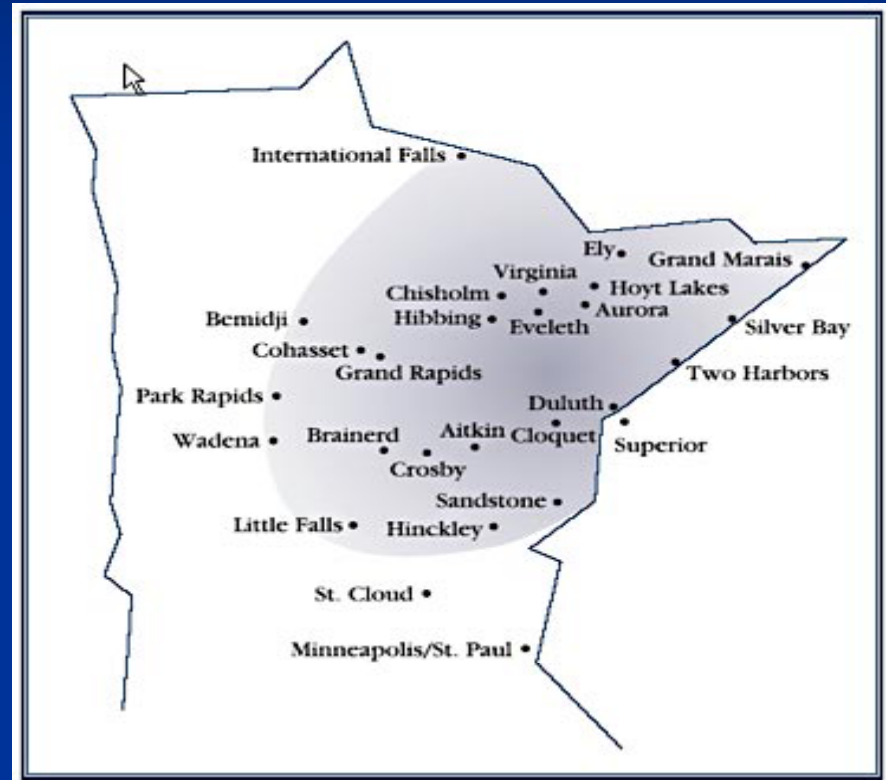
Eric Norberg

May 19, 2010

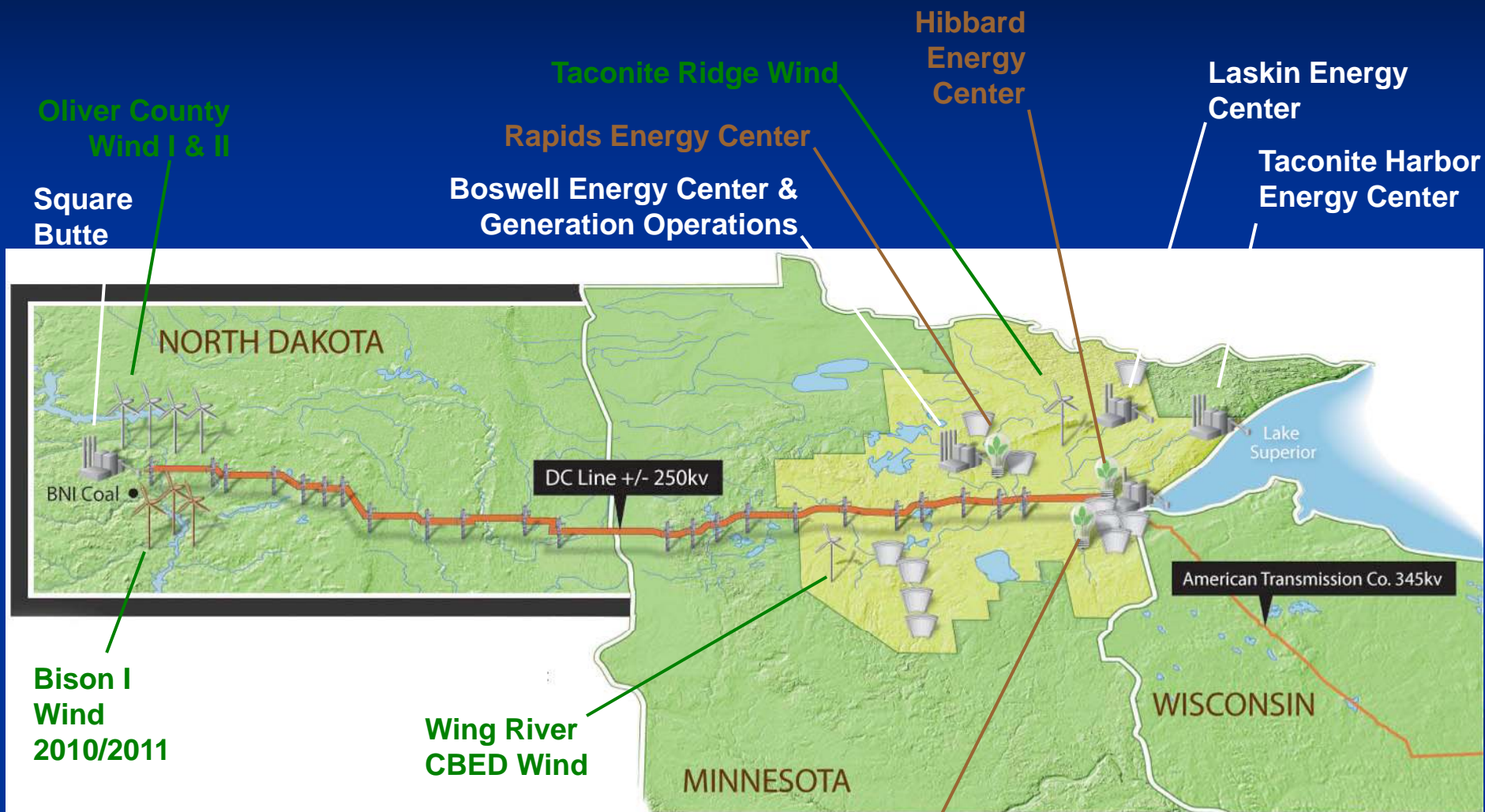
2010 U.S. – Canada Clean Energy Trade
Conference

Minnesota Power

- Investor Owned Utility [NYSE: ALE] with \$1B Market Cap
- Customer Base:
 - 141,000 Retail Customers.
 - Natural Resource Economy.
 - Timber, Mining, Pipelines.
- Ties to both Manitoba Hydro and Ontario Hydro



MP Generation Fleet



Oliver County Wind I & II

Square Butte

Taconite Ridge Wind

Rapids Energy Center

Boswell Energy Center & Generation Operations

Hibbard Energy Center

Laskin Energy Center

Taconite Harbor Energy Center

BNI Coal

Bison I Wind 2010/2011

Wing River CBED Wind

DC Line +/- 250kv

American Transmission Co. 345kv

Lake Superior

MINNESOTA

WISCONSIN



Hydroelectric Units

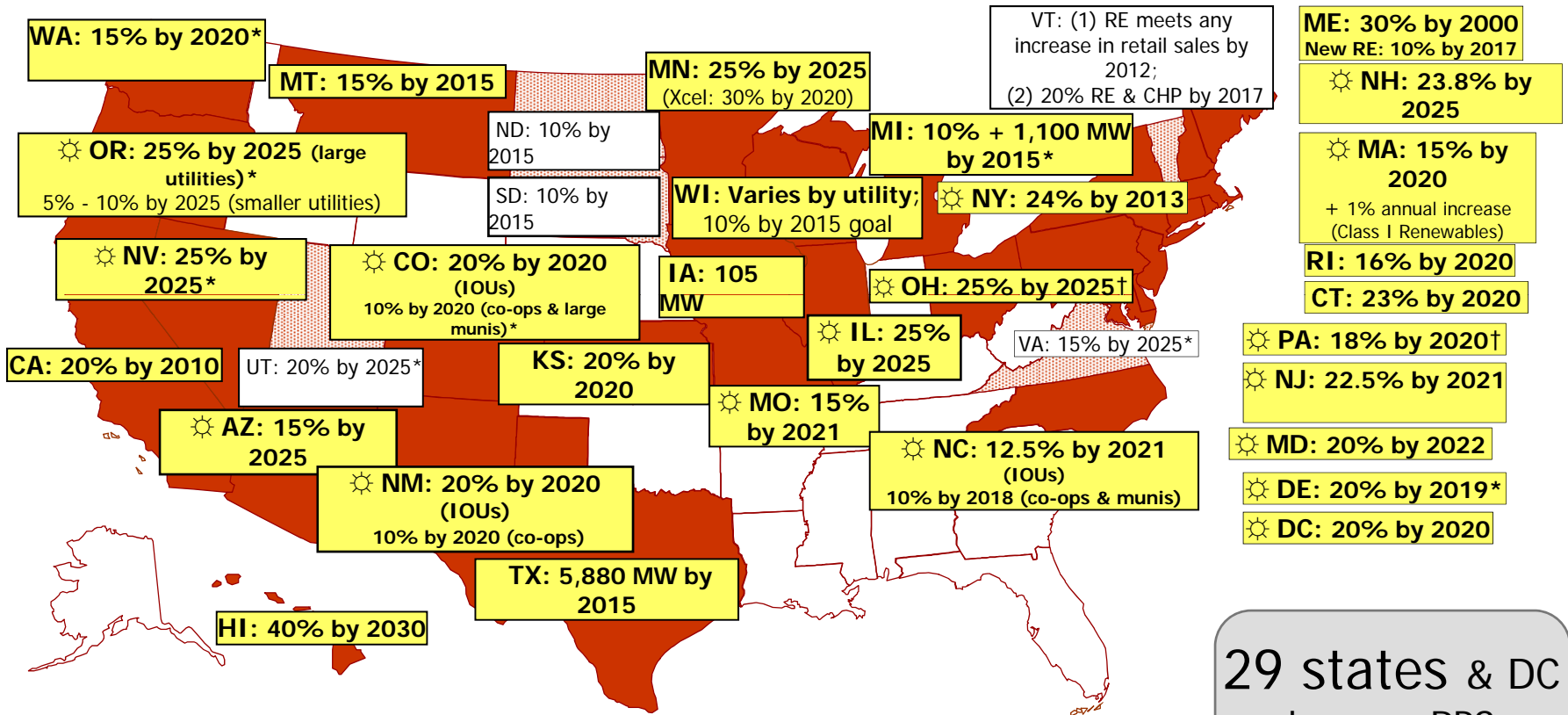
Cloquet Energy Center

Key Signposts Impacting Canada to US Hydro Sales:

- Renewable Energy Policies
- Carbon / Global Warming Actions
- Transmission Policy and Builds
- Natural Gas Pricing and Availability

Renewable Portfolio Standards

www.dsireusa.org / September 2009



29 states & DC have an RPS
5 states have goals

- State renewable portfolio standard
- State renewable portfolio goal
- Minimum solar or customer-sited requirement
- Extra credit for solar or customer-sited renewables
- Includes separate tier of non-renewable alternative resources

MN Renewable Energy Standard

- Passed into law in 2007
- Renewable Requirement:
 - 25% by 2025
 - 30% by 2020 for Xcel
- Qualifying Resources:
 - Solar, biomass, wind, and hydro < 100MW

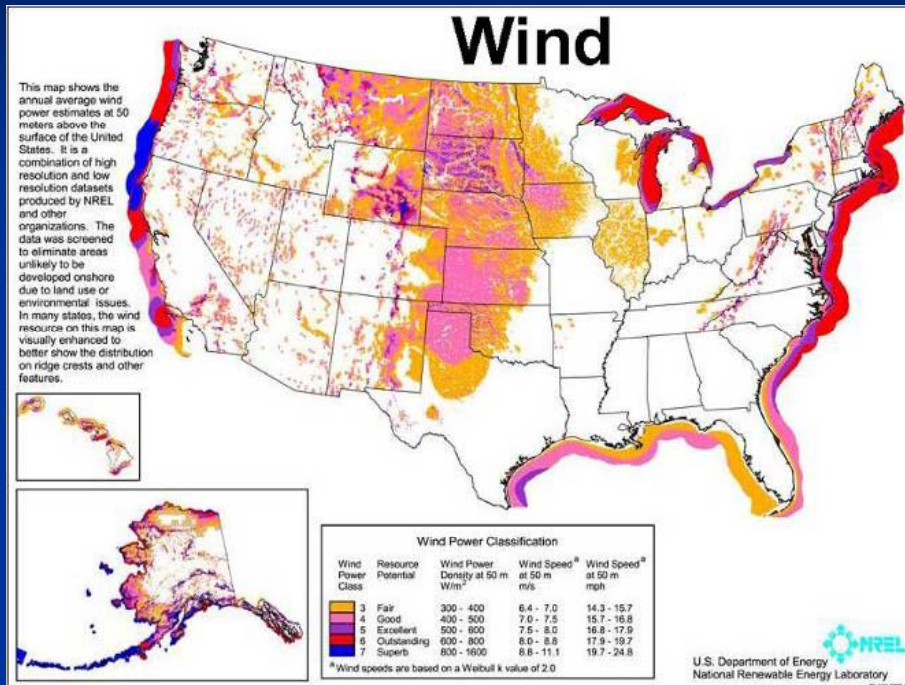


**WIND
WATER
WOOD**

Renewed energy for our region



Wind Generation



Map Source: Power Magazine

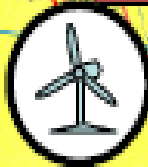
- Wind development focused in the Midwest
- In 2008, U.S. became the World Wind Leader

**MP to Deliver 600-700MW
of Wind on the DC Line**

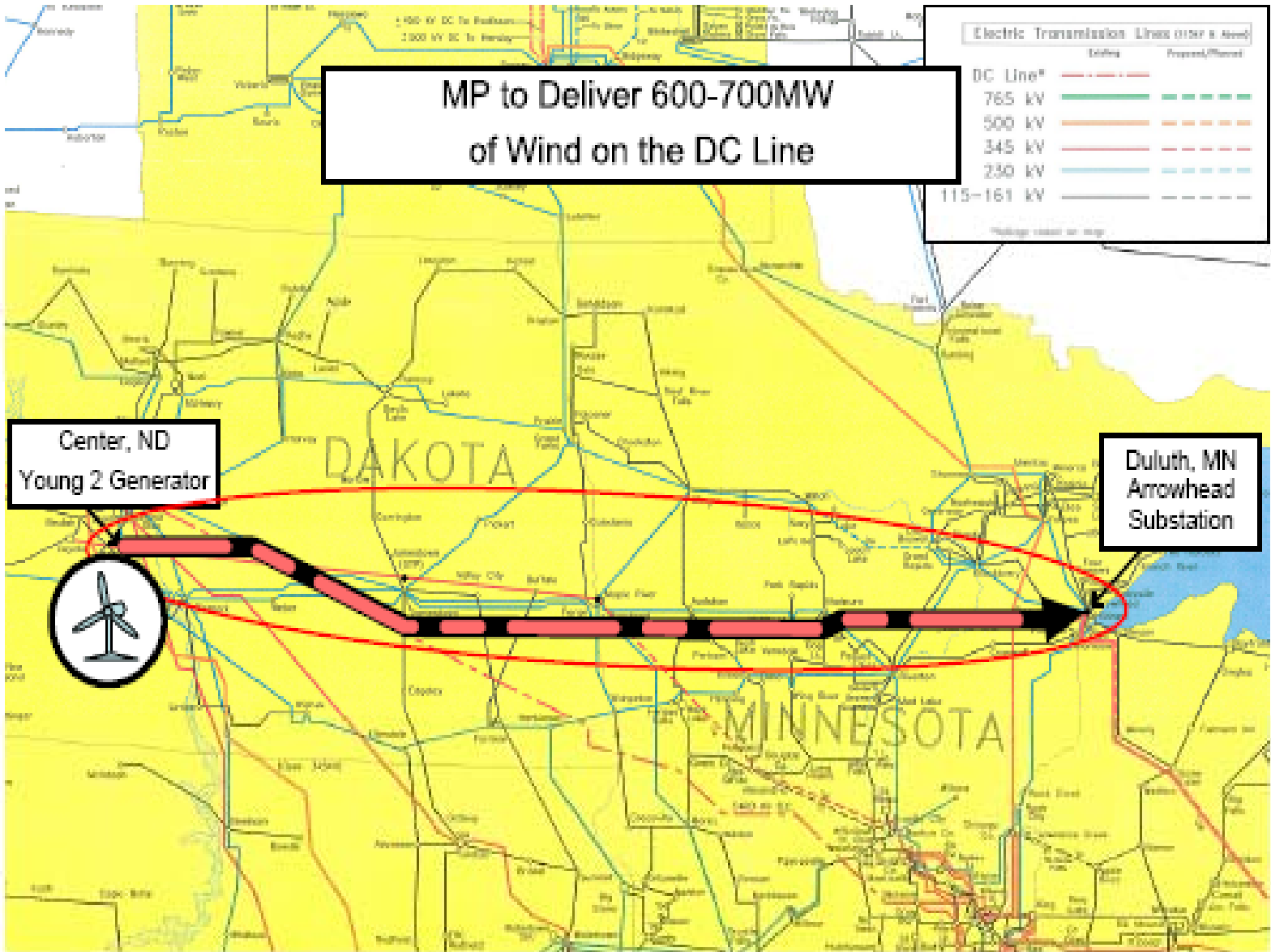
Electric Transmission Lines (Over 6 Feet)		
	Existing	Proposed/Planned
DC Line*	—	- - - -
765 kV	—	- - - -
500 kV	—	- - - -
345 kV	—	- - - -
230 kV	—	- - - -
115-161 kV	—	- - - -

*Voltage varies by stage

**Center, ND
Young 2 Generator**



**Duluth, MN
Arrowhead
Substation**



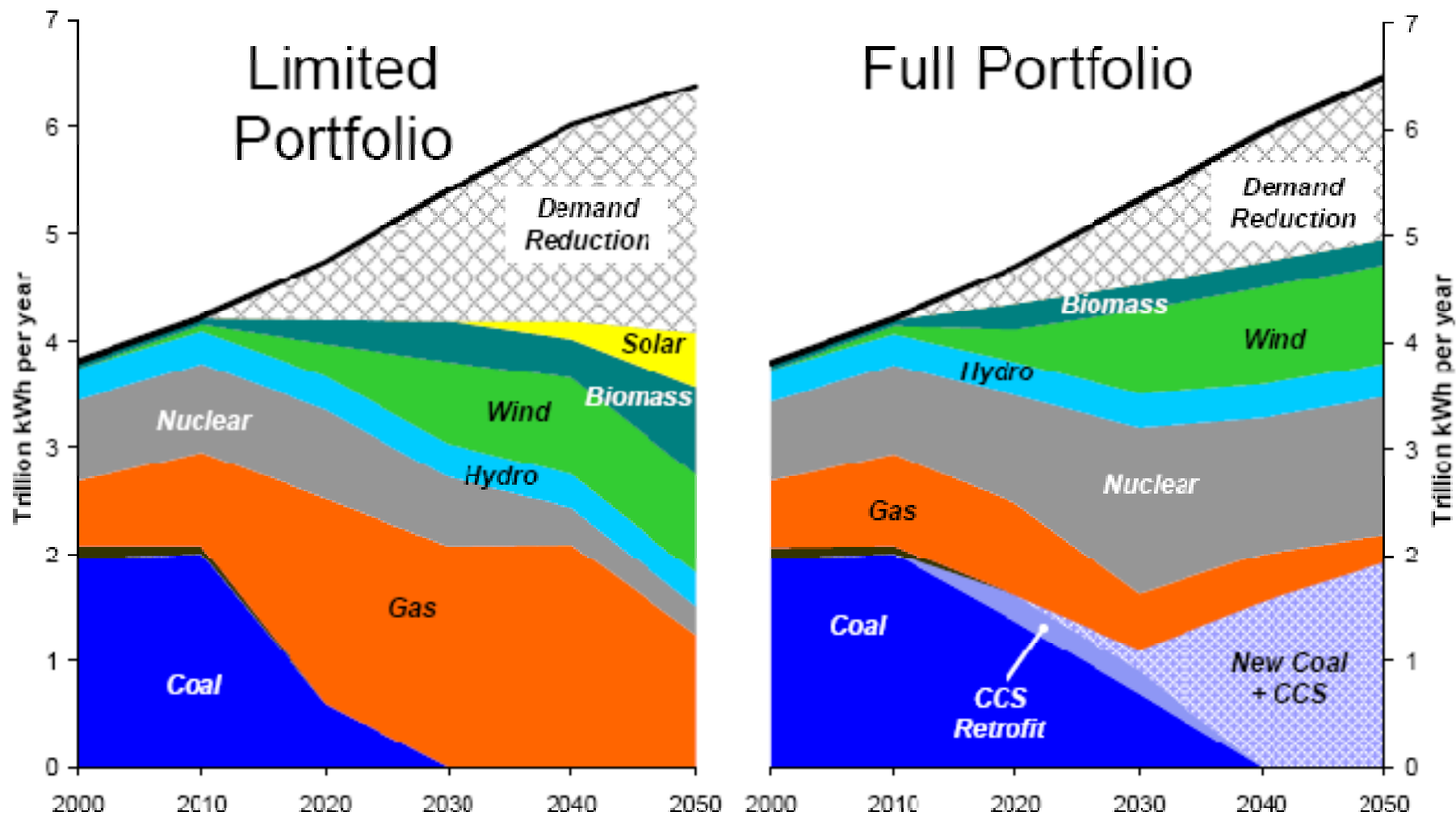
U.S. Federal Renewable Legislation

- Stand alone - or part of broader energy/climate legislation
- Proposed levels range from 10% - 25%
- Will large hydro count
- Will federal targets overshadow State regulations

U.S. Climate Legislation – Still in Flux

- 80% targeted emission reductions by 2050
- Cap and trade -- or something else
 - Full auction or free allocation of allowances
 - Where do allowance allocations go - generation and/or load serving entities
- Energy efficiency and renewable energy
 - If/when bill becomes law, expect U.S. power systems to transform over next decades.

MERGE U.S. Electric Generation Mix



Wuskwatim
200 MW
(Under Construction)

Conawapa
1,250 MW

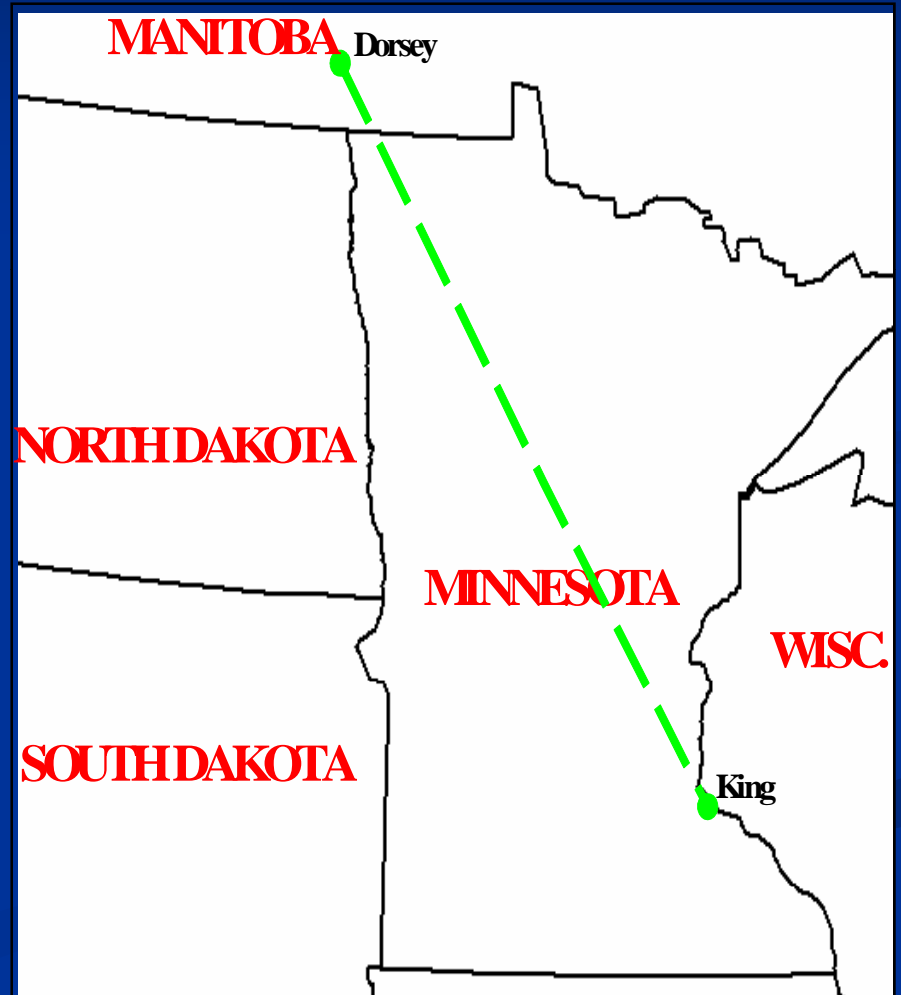
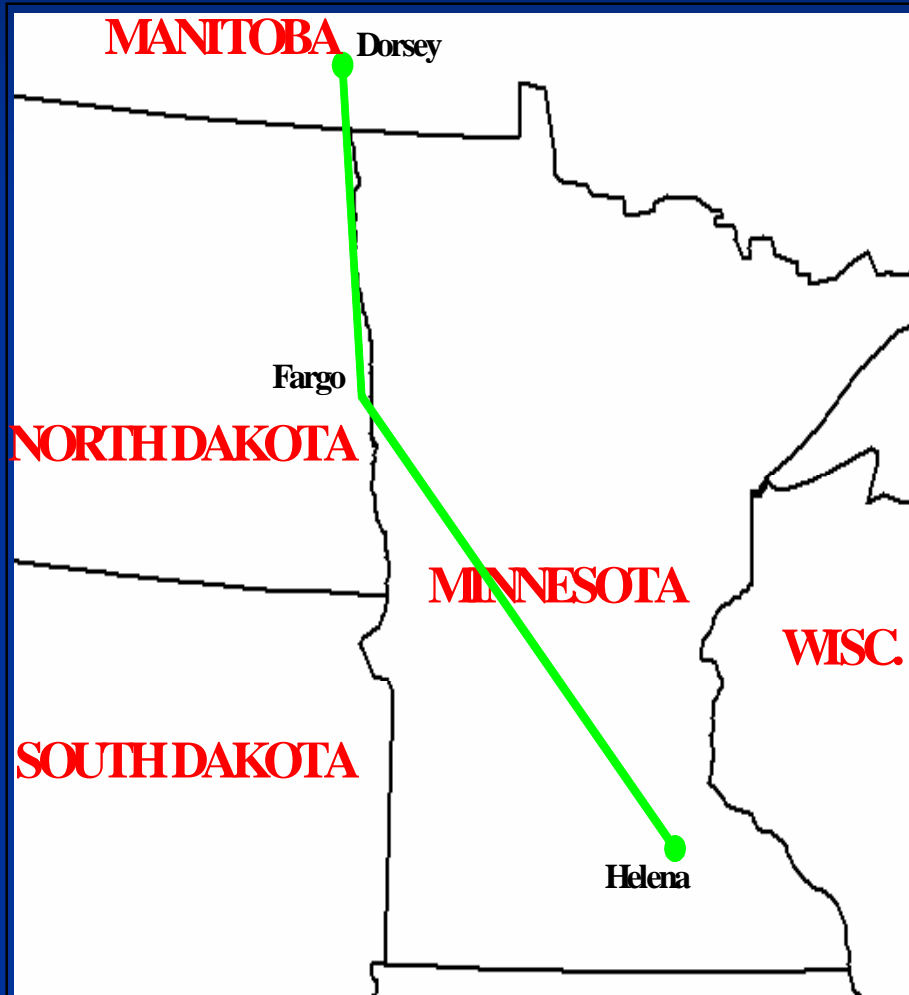
Keeyask
620 MW

Bipole III
2000+ MW

Manitoba Hydro's Proposed Major Projects



U.S. Transmission Build



U.S. Transmission Policy

- Who builds it
- Who owns it
- Who pays for it
 - Congress and the Federal Energy Regulatory Commission are struggling over cost allocation, siting and planning issues
 - Lack of clarity over the above issues makes connecting remote resources difficult

Natural Gas

- Supply and pricing has dramatically changed in last few years
 - Lower wholesale prices affect renewable economics
 - Long-term supply and price stability key
 - Combined Cycle generation primary alternative for carbon reduction
 - Simple Cycle primary renewable backup
-Natural Gas is a key wildcard to watch

Henry Hub Outlook



Source: IHS Cambridge Energy Research Associates.

Watch these signposts which will shape clean energy future

- Renewable Energy Policies
- Carbon / Climate Legislation
- Transmission Policy and Builds
- Natural Gas Price and Availability

Questions?

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