



FALL CONFERENCE

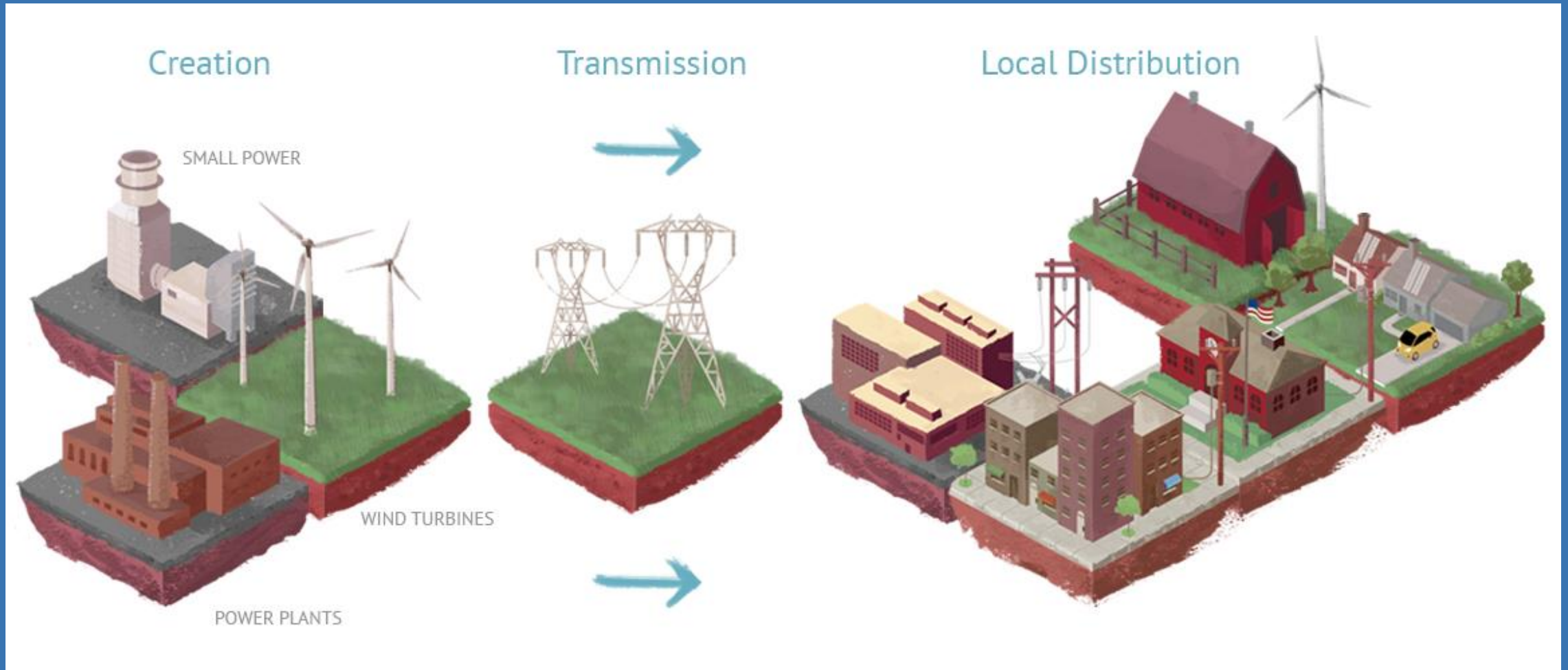
Energy 101

October 4, 2017

WHO WE ARE

The mission of the Coalition for a Secure Energy Future is to get the message out to businesses, policymakers, and residents in the Upper Midwest that retaining coal as a regional energy resource will help keep electric rates low, jobs plentiful, and the economy robust.

WHERE DOES OUR ELECTRICITY COME FROM?



MIDWEST ENERGY MIX

Sources of Midwest's electricity generation, by source, 2013*

State	Coal	Hydroelectric	Natural gas	Nuclear	Wind	Other
Iowa	59%	1%	3%	9%	28%	0%
Minnesota	46%	1%	12%	21%	16%	4%
North Dakota	78%	5%	0%	0%	16%	0%
South Dakota	28%	40%	5%	0%	27%	0%
Wisconsin	62%	3%	12%	18%	2%	3%

* Numbers may not add up to 100 percent due to rounding

Source: U.S. Energy Information Administration

ELECTRIC COOPERATIVES

- 44 across the state
- Wide variety in size, ranging from over 100,000 members to just over 2,000. Typical co-op serves 10,000-15,000 members
- Power supplied mainly through Generation & Transmission Cooperatives (G&Ts)
 - Great River Energy, Minnkota Power Cooperative, Basin Electric Cooperative and Dairyland Power Cooperative



UTILITY REGULATION

- Federal – FERC, NERC, Nuclear Regulatory Commission, RUS, EPA, Department of Energy
- Regional – MISO, Midwest Governors Association
- State – PUC, MPCA, DER (Commerce), MN Attorney General



MID-CONTINENT INDEPENDENT SYSTEM OPERATOR (MISO)



A RAPIDLY CHANGING INDUSTRY

FOUR KEY FACTORS FOR CHANGE:

- Market pressure from abundant natural gas supplies, low cost wind
- New technology
- Climate change and concerns over carbon emissions
- Federal and state regulations

LOW GAS PRICES

- Increasing the share of natural gas in the generation mix
- Led to additional coal retirements
- Depressed wholesale electricity prices, which may make some of the existing nuclear fleet vulnerable to early retirement
- Driving use of gas-fired generation with renewable investments



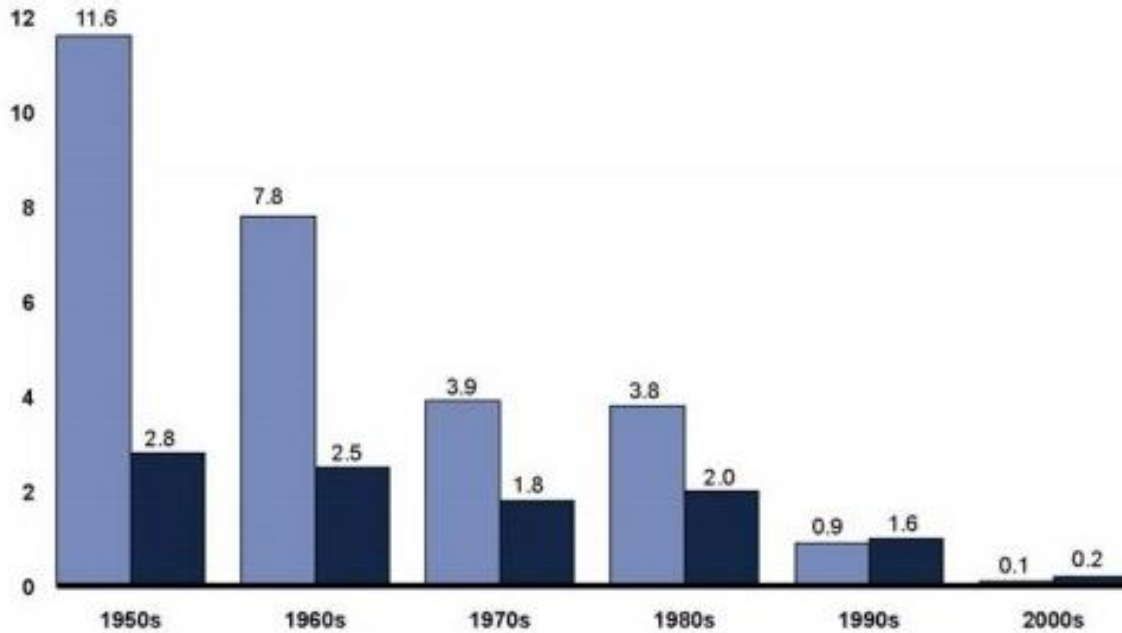
CONCERNS OVER CO₂ EMISSIONS

- Industry has done much to address mercury, NOX, SOX, fine particles – shifting focus to CO₂
- CO₂ rationale behind most energy-related policy proposals at legislature
- Used as rationale for changes to existing fleet of generation

NOT YOUR FATHER'S COAL PLANTS

Figure 5: Emissions of Sulfur Dioxide and Nitrogen Oxides per Unit of Electricity Generated by Fossil Fuel Generating Units in 2010, by Decade Unit Began Operating

Emissions rate (in lbs/MWh)



Age of unit (decade unit began operating)

- Sulfur dioxide emissions rate
- Nitrogen oxides emissions rate

Legend: lbs/MWh = pounds per megawatt-hour

Source: GAO analysis of Ventyx data.

FEDERAL & STATE REGULATION

- State policies like renewable mandates and GHG goals have already driven generation decisions at Minnesota utilities
- Likely more proposals in future, despite industry progress

CLEAN POWER PLAN



- Trump Administration actions:
 - Reconsideration of EPA rules on carbon emissions
 - Retraction of other climate-related rules and actions – moratorium on coal extraction, social cost of carbon, WOTUS, others
 - Actions represent more of pause than true policy reversal
 - Congress also reversing Obama Administration actions

WHAT THE FUTURE WILL LOOK LIKE

- More conservation/efficiency
- Driven by end users/improved technology
- More demand?
- New gadgets and uses for electricity (electric cars)
- Likely to see increases in distributed generation
- Cost of solar dropping significantly
- Community solar increasing in popularity
- Potential of storage
- Continued increase in use of natural gas and renewables
- Utility IRPs point to over 30% renewables by 2030
- New generation technologies



NEW GENERATION TECHNOLOGIES – ALLAM CYCLE

- A new coal-based power plant make economic and environmental sense
 - North Dakota is experiencing load growth in the Bakken – oil-related pumps, compressors and treaters require 24/7 baseload electricity
 - Allam Cycle is a near-zero emissions technology that is highly efficient
 - North Dakota offers a set of unique circumstances that makes it perfect to build a test plant
 - 800 years of proven, economically recoverable low cost lignite
 - Access to developed CO2 infrastructure from coal country to western oil fields
 - R&D Partnership between the state of North Dakota and the lignite industry that dates back three decades
 - Department of Energy has a history of investing in North Dakota lignite R&D projects

PROJECT TUNDRA

- Carbon Capture retrofit base on proven Amine / Solvent technology
- Building on lessons from previous projects to increase efficiency and lower cost
- Partnership between Allete, Minnkota, ND, DOE, EERC, and Mitsubishi

FEDERAL INITIATIVES

- **45Q Tax Credit**
 - Bipartisan bill to increase tax incentive for carbon capture research and deployment
- Wind production tax credit currently set to sunset in 2019
- Potential carbon capture utilization funding in FY 2018 budget

QUESTIONS?