WIND ENERGY & OTHER RENEWABLES IN NORTH DAKOTA

ENERGY DEVELOPMENT & TRANSMISSION COMMITTEE

HARVEST ROOM, STATE CAPITOL, BISMARCK

OCTOBER 14, 2015

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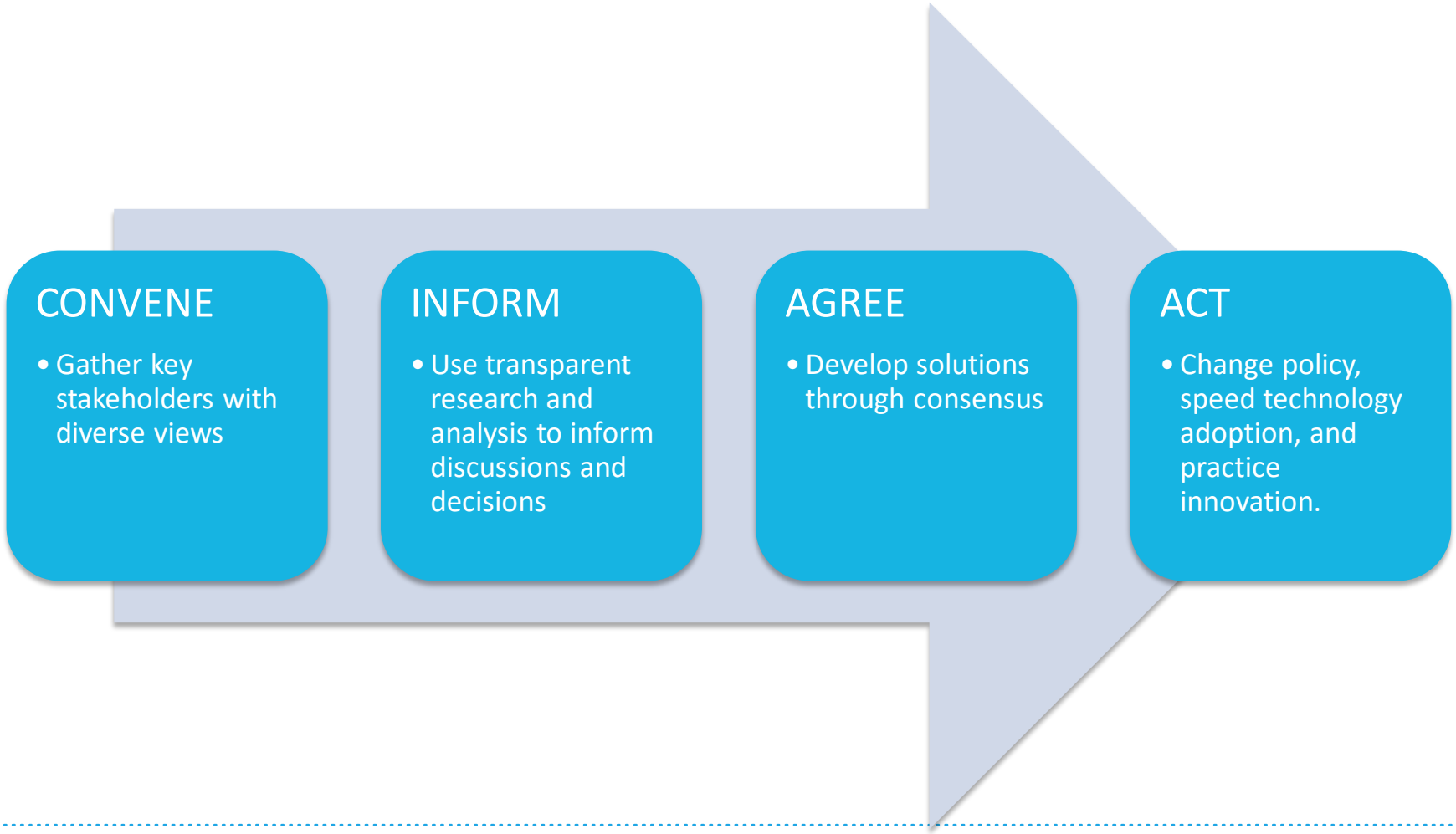
Great Plains Institute Approach



Who We Work With

3 Regional Initiatives Help Midcontinent States & Stakeholders Explore Clean Power Plan Implementation

Midwestern Power Sector Collaborative (MPSC):	Midcontinent States Environmental & Energy Regulators (MSEER):	PJM States Initiative:
• 30 coal-reliant power companies, Midwestern environmental and utility regulators and environmental organizations meeting to provide consensus recommendation to EPA and states (since 2012).	• Environmental and utility regulators from states in MISO operational footprint formed in Spring 2014 for joint evaluation of implementation options.	• Newly-established effort by PJM state regulators that includes participants of 4 overlapping states with both MISO and PJM operations within their jurisdictions.

Why are states sitting down together, despite intense national debate about the Clean Power Plan?

- **Engagement does not mean endorsement:** States and stakeholders have mutual interest in shaping the rule, even as some challenge EPA authority and implementation of the Clean Power Plan.
- **No-regrets strategy:** Joint evaluation of the Clean Power Plan and the potential for regional, multi-state compliance helps everyone better understand their options, regardless what implementation decisions are ultimately made.

The Final Clean Power Plan: Understanding the Options for the Midcontinent

Little Rock, AR | Statehouse Convention Center

Monday, October 19, 2015

8:30 AM to

3:30 PM (CDT)

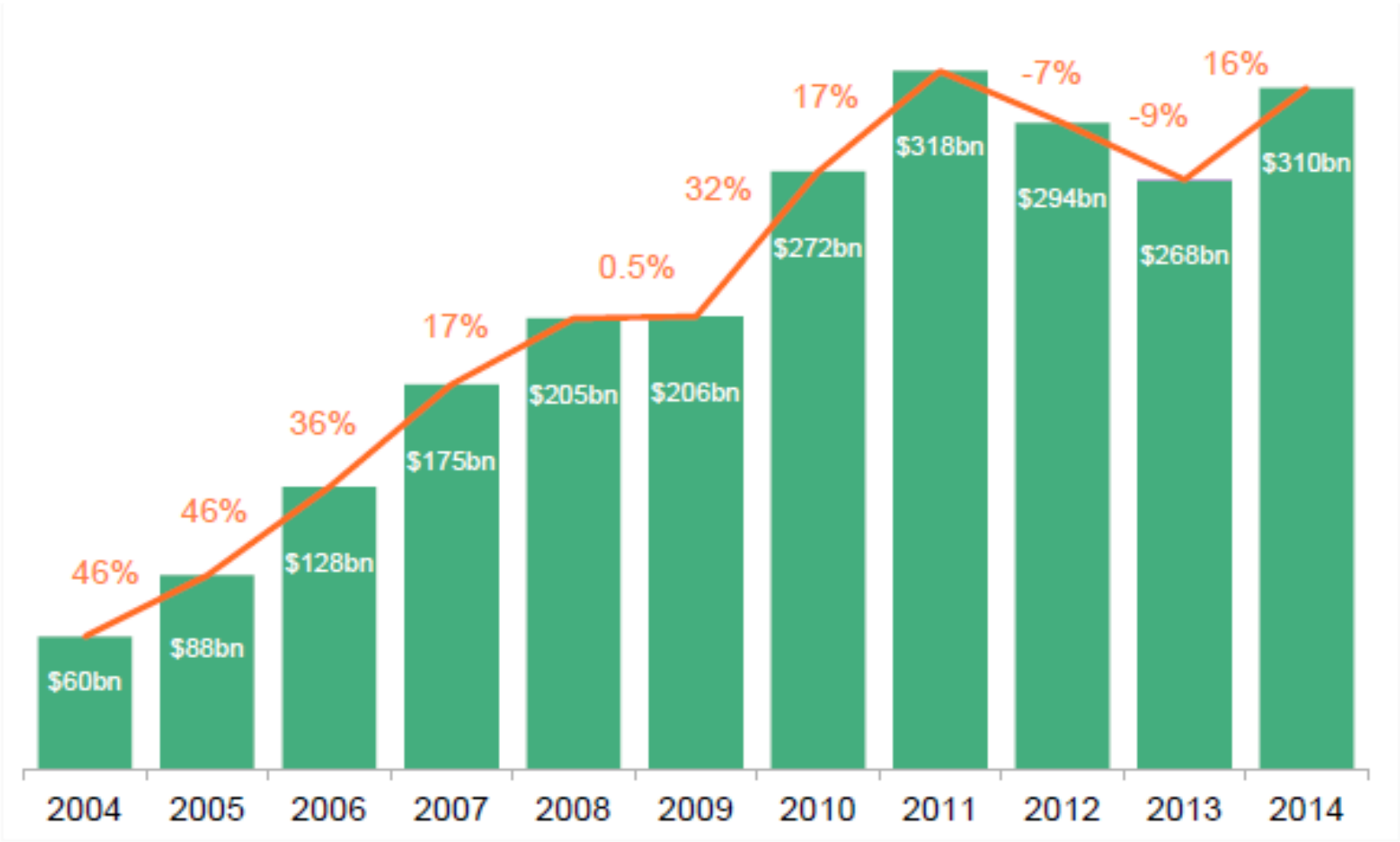
Live webcast will be available

This workshop will gather states, stakeholders, and experts, including those participating in MSEER and the Power Sector Collaborative, **to explore policy pathways for achieving compliance under the final Clean Power Plan as well as opportunities and challenges for multistate collaboration.**

A Global Perspective: Clean Energy Investments

NEW INVESTMENT IN CLEAN ENERGY
2004-14 ($BN)

Bloomberg
NEW ENERGY FINANCE



Note: Total values include estimates for undisclosed deals. Includes corporate and government R&D, and spending for digital energy and energy storage projects (not reported in quarterly statistics).

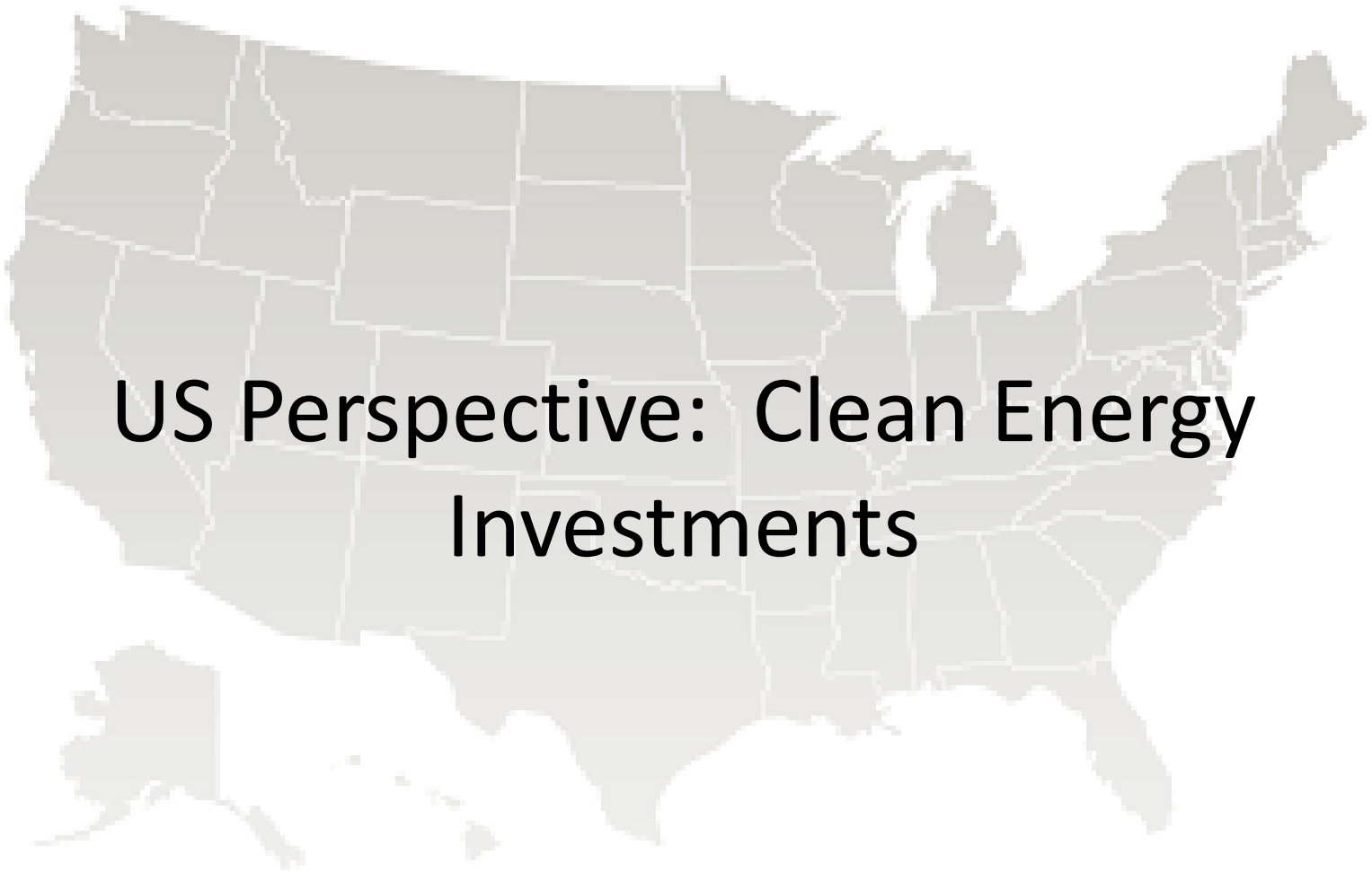
Source: Bloomberg New Energy Finance

Global Trends in Clean Energy

- **Innovation is driving down costs and making clean energy more accessible.**

- **Battery development and deployment is increasing**
  - Tesla's planned "Gigafactory" will effectively double the global supply of lithium batteries.

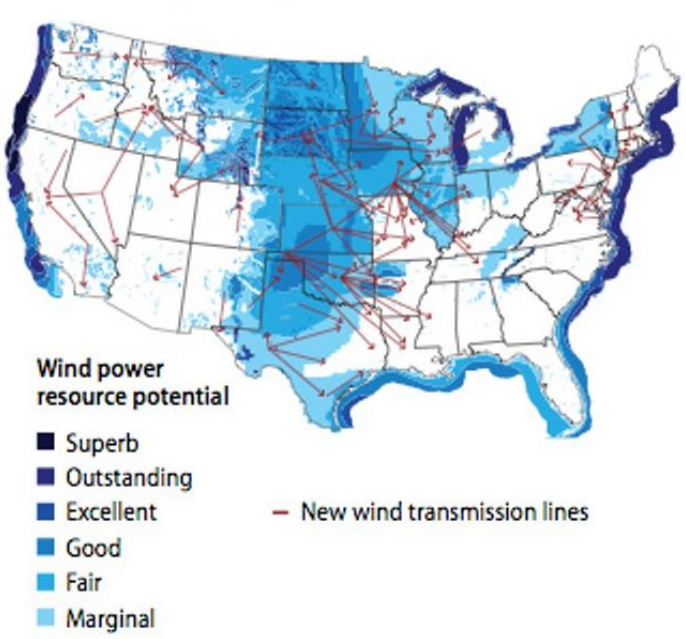
- **Countries are accounting for carbon**
  - Thirty-nine countries, and more than 23 states and provinces, now price carbon.



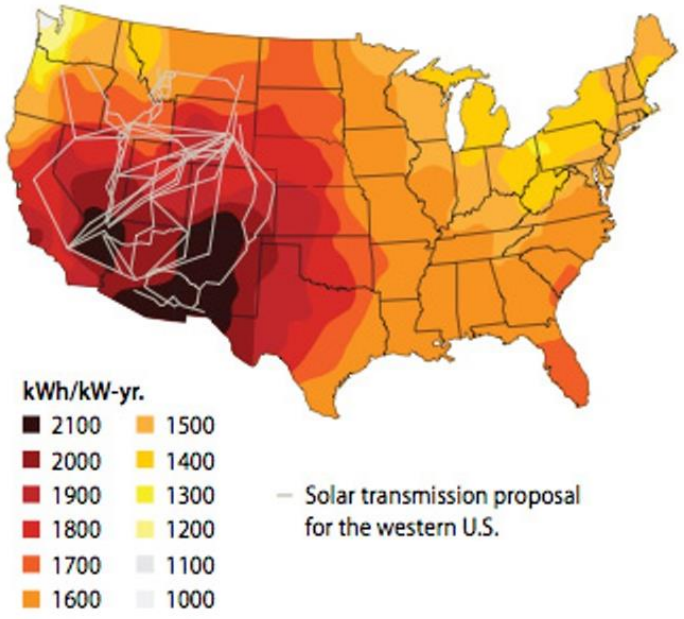
US Perspective: Clean Energy Investments

Potential for Renewable Energy Generation

Wind resource with new transmission lines



Solar resource with new transmission lines

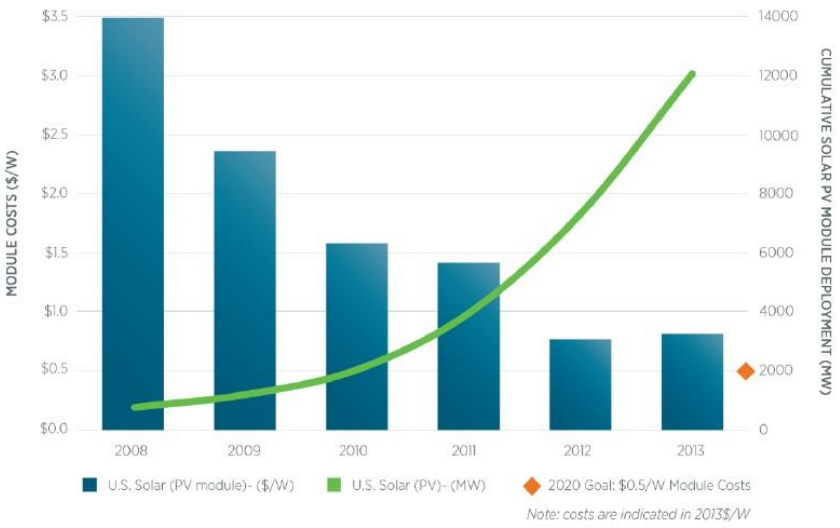


Source: DOE/NREL

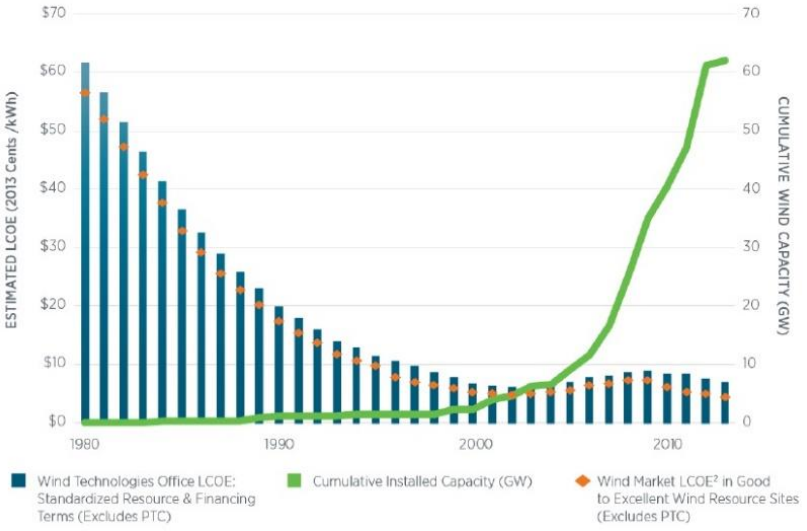
Wind power production has increased 33-fold increase from 2000–2014. Solar power doubled its output over the previous year (for the fourth year running) and, for the first time ever, eclipsed the annual generation of the nation's geothermal resources.

Costs for Wind & Solar Have Declined Dramatically

U.S. Deployment and Cost for Solar PV Modules 2008-2013



U.S. Deployment & Cost for Land-Based Wind 1980-2013



Source: DOE “Revolution Now” 2014 Update

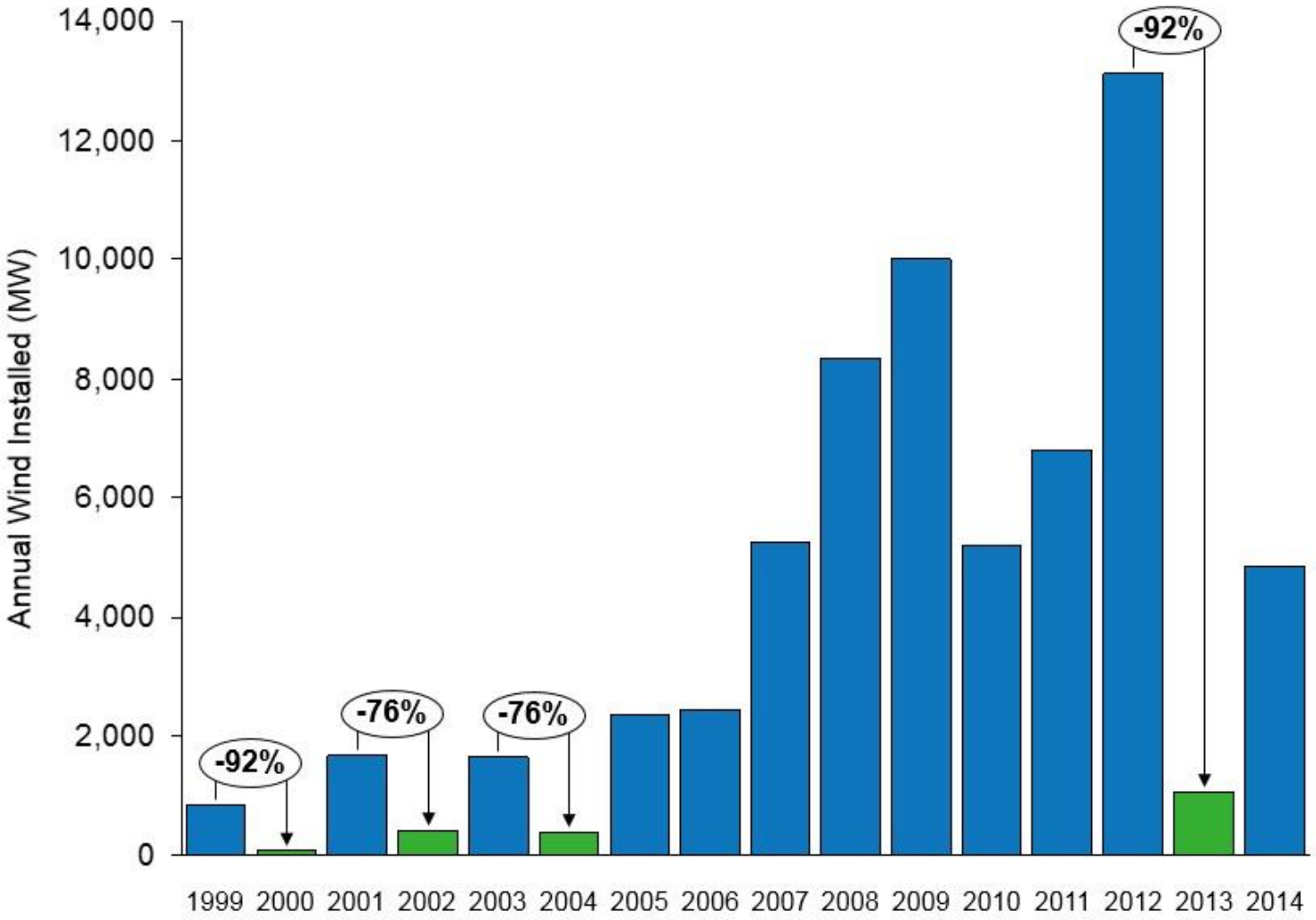
Federal policy: Uncertain future for federal PTC

How the production tax credit (PTC) works:

- Available to wind, small hydro, geothermal, biomass and nuclear power
- Wind – owner reduces tax bill by 2.3 cents for every kWh produced over a 10-year period
- Credit only taken when energy is produced and after wind project is up and running
- Doesn't apply to development or construction phases

After more than 11 months without the PTC/ITC, Congress extended the credit on December 16, 2014. The extension applied retroactively from the start of 2014 and expired on December 31. The PTC/ITC has not yet been extended in 2015.

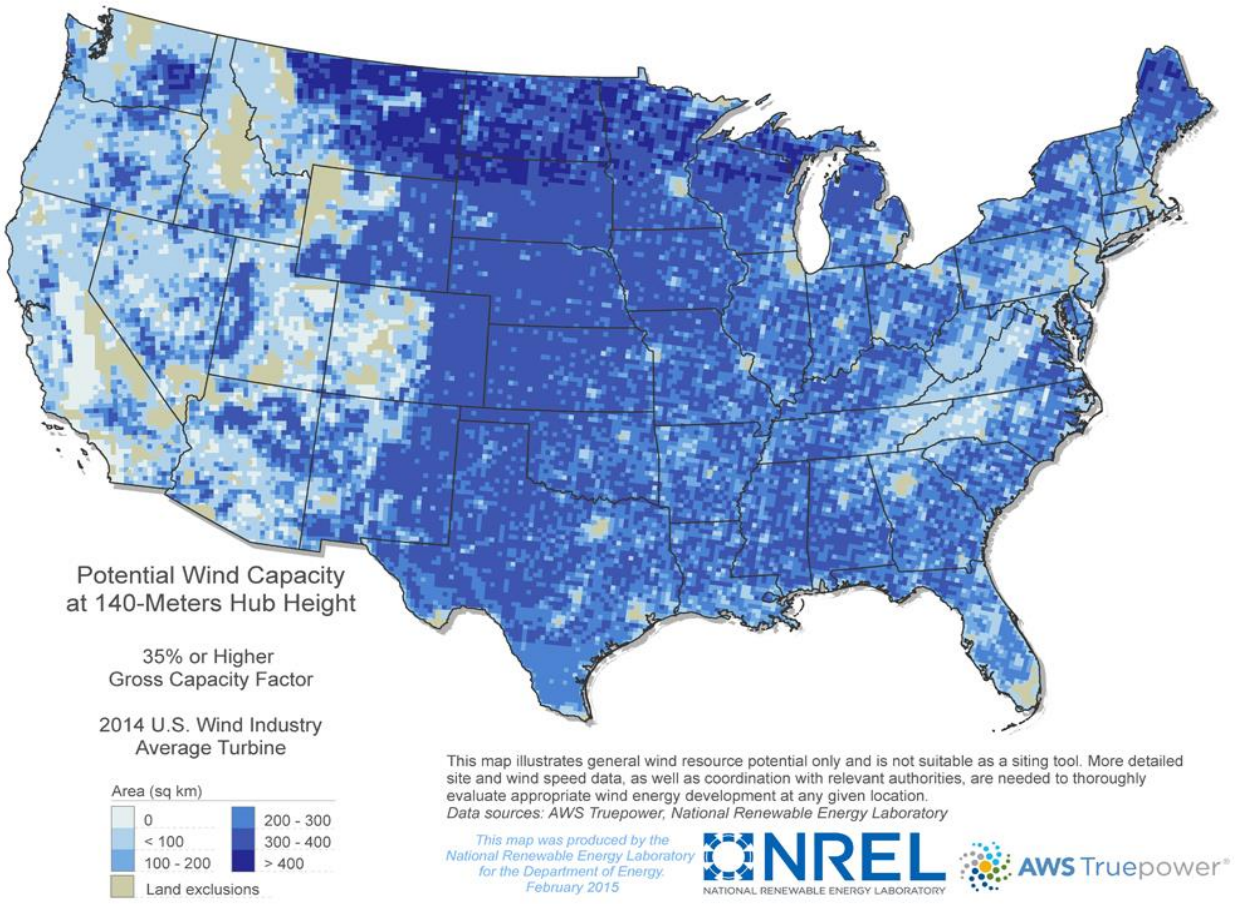
Historic Impact of Production Tax Credit (PTC) Expiration



The Future of Federal Wind Policy

- Growing consensus over tax credit extension for a defined period of time
- Future policy options:
  - Multi-year extension of PTC, with gradual phase-down
  - Replace with financing mechanisms similar to other industries (oil, gas, coal & transmission)
    - Master Limited Partnerships (MLPs) – Congressional adoption of the MLP Parity Act
      - MLP is a limited partnership that is publicly traded on a securities exchange. It combines the tax benefits of a limited partnership with the liquidity of publicly traded securities.)
    - Real Estate Investment Trusts (REITs) – IRS revenue ruling to expand to renewables

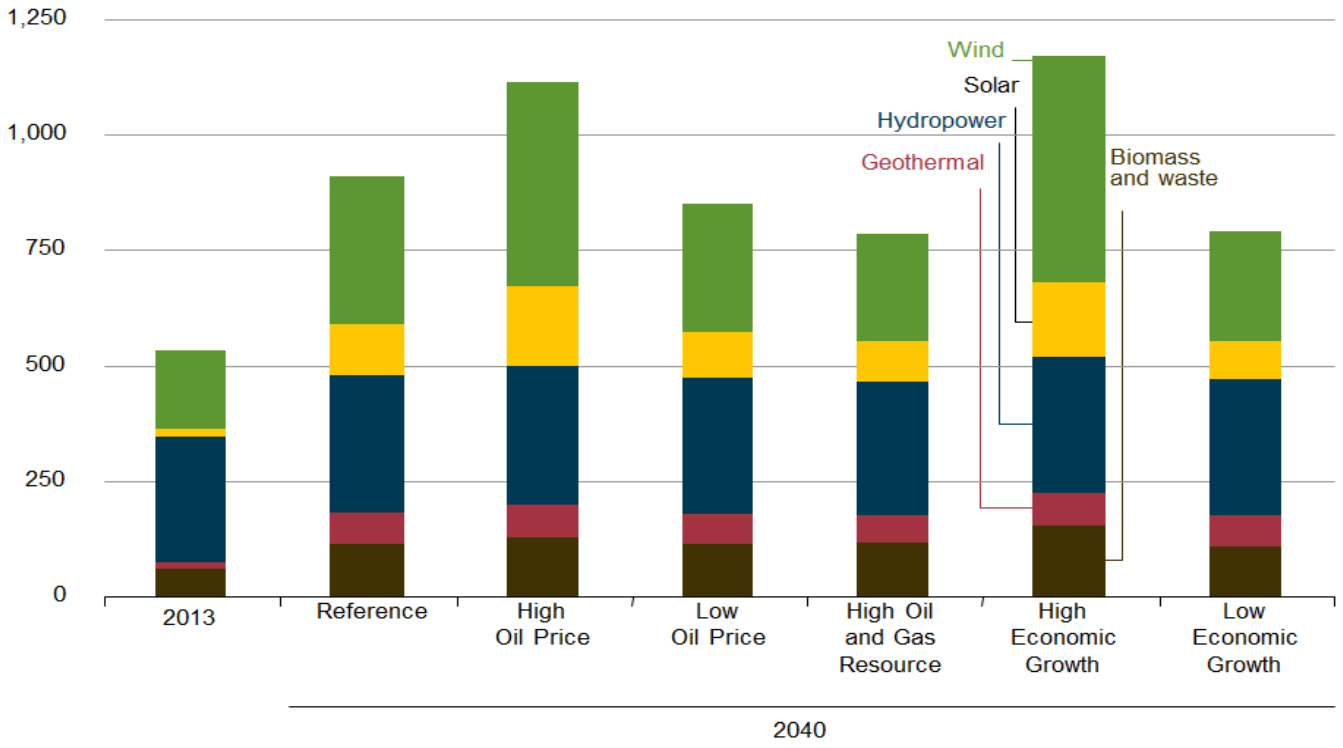
Significant potential for ND wind development with near-term technology



Renewable electricity generation projected to account for more than 1/3 of new generation capacity by 2040

Figure ES8. Total U.S. renewable generation in all sectors by fuel in six cases, 2013 and 2040

billion kilowatthours



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Clean Power Plan Compliance Timeline

EPA is encouraging early action in 2020-2021

- Interim compliance period pushed back 2 years to 2022

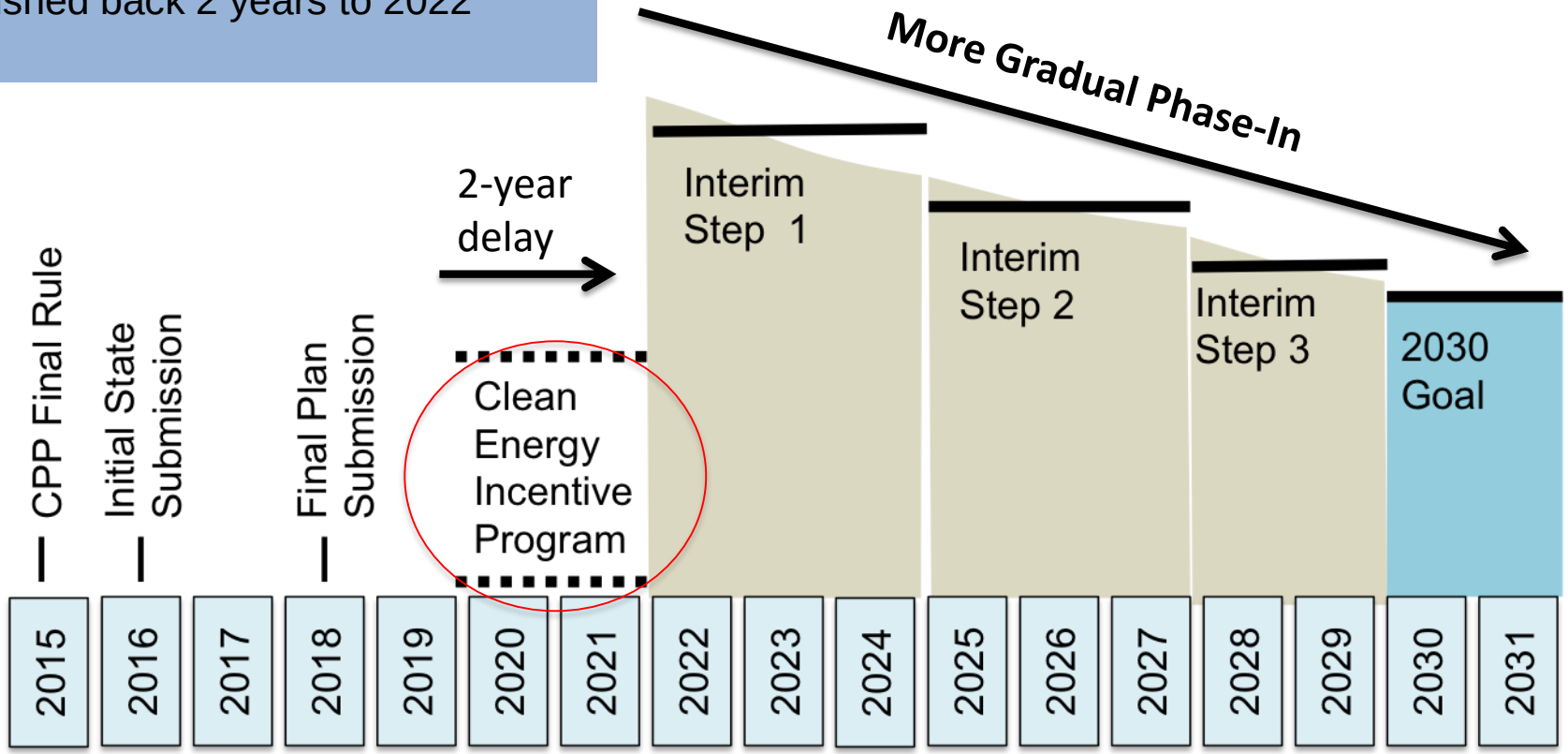


Chart Credit: Duke Nicholas Institute

Clean Energy Incentive Program

- Voluntary "matching fund" program that states can use to incentivize early investment in eligible RE and demand-side EE projects that are implemented in low-income communities
- State participation optional
- Early Action Credits or Allowances earnable in 2020 & 2021
- Only projects constructed/installed after the earlier of submittal of final plan or Sept. 6, 2018

A State Perspective: Clean Energy

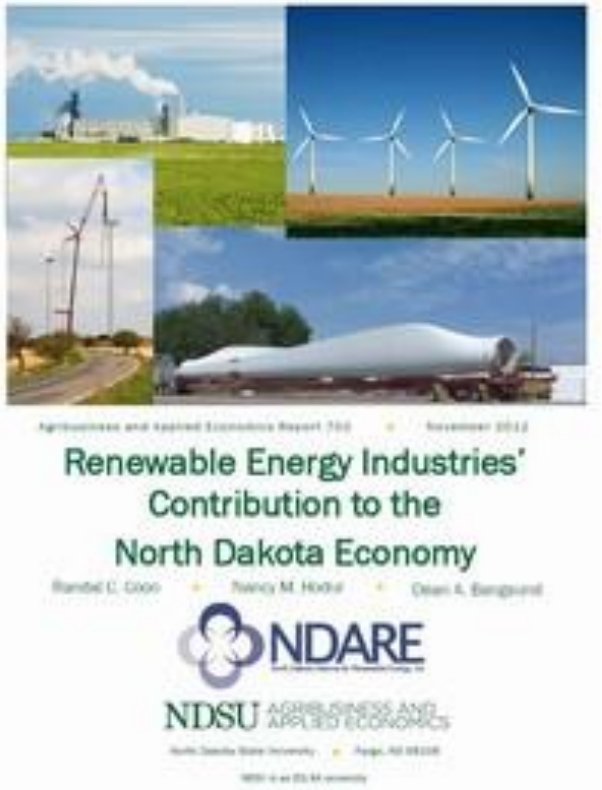
North Dakota's Energy Rankings in the US

Category	Rank
Total Energy Production	12th
Crude Oil Production	2nd
Natural Gas Production	14th
Coal Production	9th
Installed Wind Capacity	11th
Ethanol Production	10th
Total Electricity Generation	38th

Source: Great Plains Energy Corridor, Annual Report, 2014.

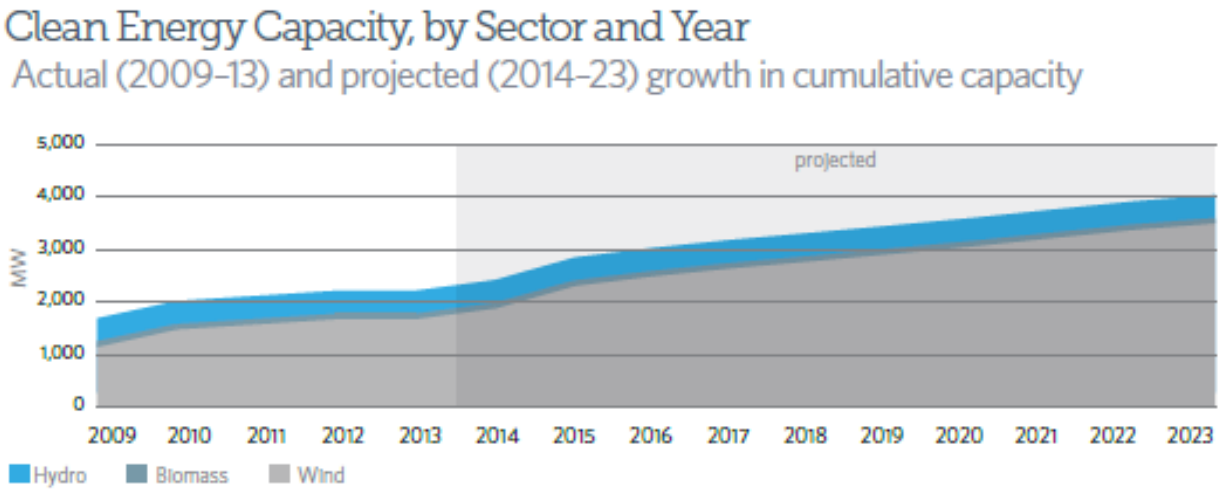
Renewable Energy Economic Impact

- **Renewable energy** such as wind and biofuels generate more than **$1.2 billion in annual economic activity** in North Dakota.
  - Ethanol ~$650 M
  - Wind ~ $100 M
- Construction expenditures in 2002-2011 were $2.7 billion.
- Over **$10 billion in total economic impact in 10-year period**, peaking in 2008 with $4.2 billion
- **$129 million in tax collections over 10-year period**



Renewable Energy: By the Numbers

Navigant Research estimates that private investment in clean energy in the state will grow by **$2.9 billion** over the next decade (2014 to 2023).



Download at:
www.pewtrusts.org

NDARE 2015 Renewable Energy/Energy Efficiency Survey

Survey purpose: To assess attitudes and perceptions of North Dakota adults regarding issues relating to energy efficiency and renewable energy.

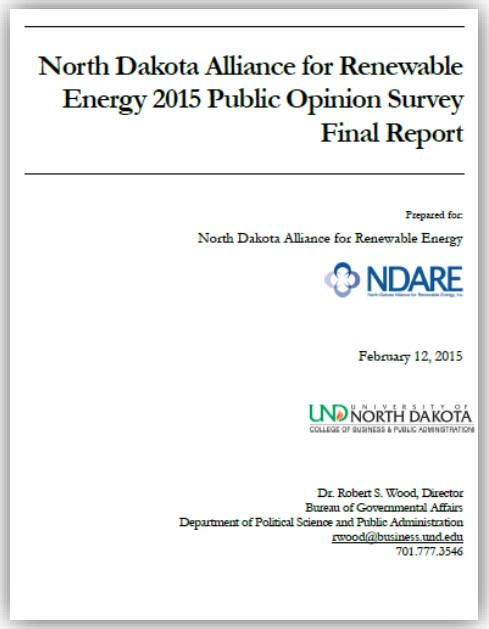
- Survey areas include attitudes and perceptions regarding:
  - Energy efficiency
  - Willingness to increase utility bills to promote energy efficiency programs
  - Resource Trust Fund use and future funding priorities
  - Economic impact of energy efficiency, ethanol and flex-fuel vehicle use
  - Renewable energy branding messaging ratings
  - Factor importance when making an energy efficiency investment decision
  - Representation of the state-level energy commission, and
  - Support for extending various tax incentive programs

NDARE Members

NORTH DAKOTA'S POVERTY FIGHTING NETWORK

NDARE 2015 Renewable Energy/Energy Efficiency Survey

- Survey details:
  - 532 telephone interviews of randomly selected adults age 18 or older in North Dakota
  - Interviews were conducted from January 16 through 29, 2015
  - Combination of landline and cellular phone respondents
  - Margin of error of +/- 4.97%
  - Commissioned by NDARE, with financial support from the ND Department of Commerce Office of Renewable Energy & Energy Efficiency
  - Survey conducted by UND Bureau of Governmental Affairs



North Dakota Alliance for Renewable Energy 2015 Public Opinion Survey Final Report

Prepared for:
North Dakota Alliance for Renewable Energy

NDARE

February 12, 2015

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College of Business & Public Administration

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www.ndare.org

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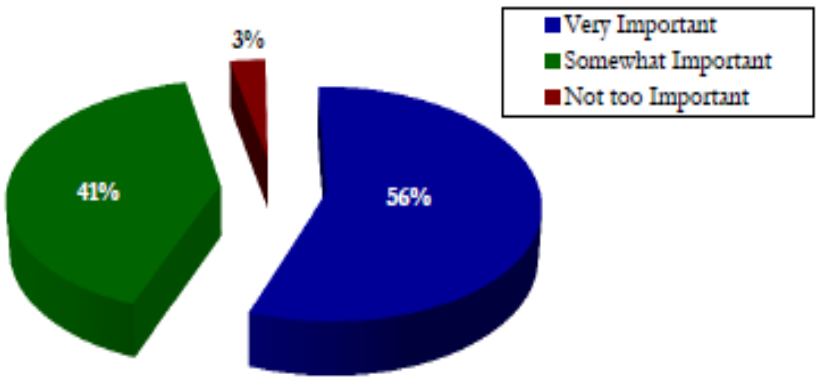
Survey Findings

ATTIDUDES TOWARDS ENERGY EFFICIENCY

Importance

Almost all respondents (97%) believe that energy efficiency is "very" or "somewhat" important to them (Figure 1).

Figure 1. Importance of Energy Efficiency



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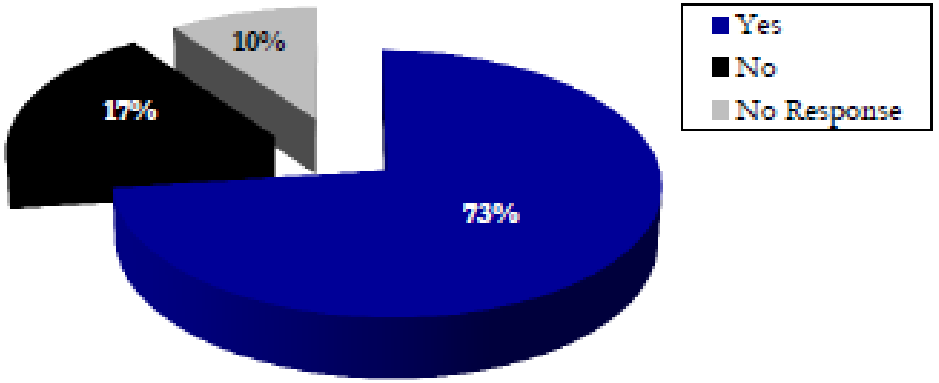
Survey Findings

Figure 6. More Resource Trust Fund Allocations to Renewable Energy and Energy Efficiency Programs



73% of respondents agree that more Resources Trust Fund dollars should be allocated to renewable energy programs or projects in North Dakota.

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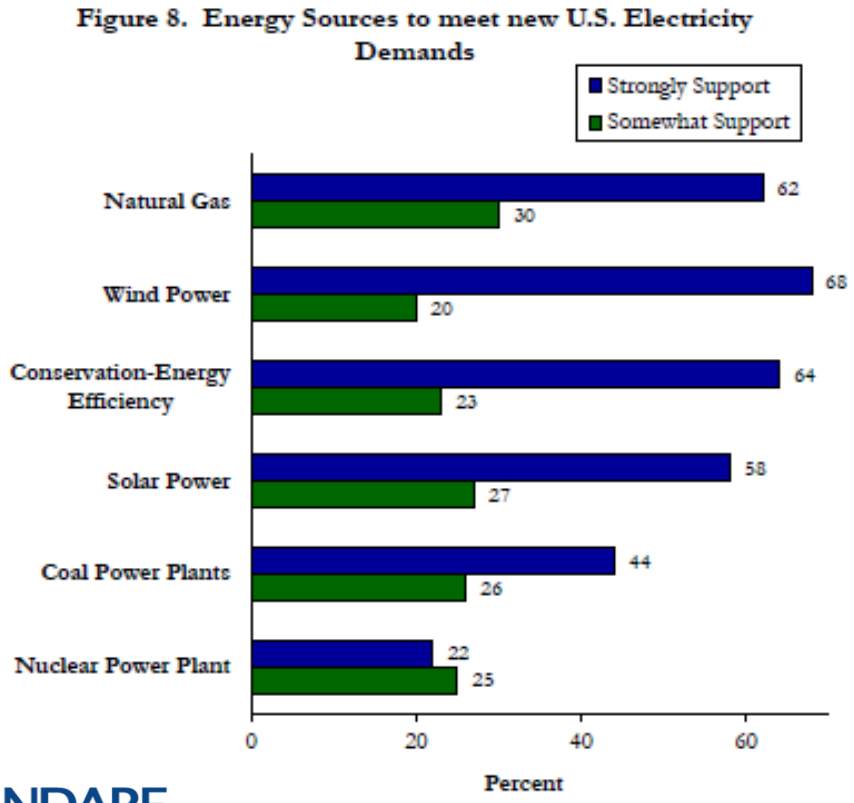
Energy & Electricity Perceptions



- **92% support for natural gas**
- **88% support for wind power**
- **87% support for energy efficiency and conservation**
- **85% support for solar power**
- **70% support for coal plants**
- **47% support for nuclear**

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North Dakotans Feel that Renewable Energy & Energy Efficiency Creates Jobs

Figure 9. Impact of Increasing Renewable Energy Sources on Jobs in North Dakota

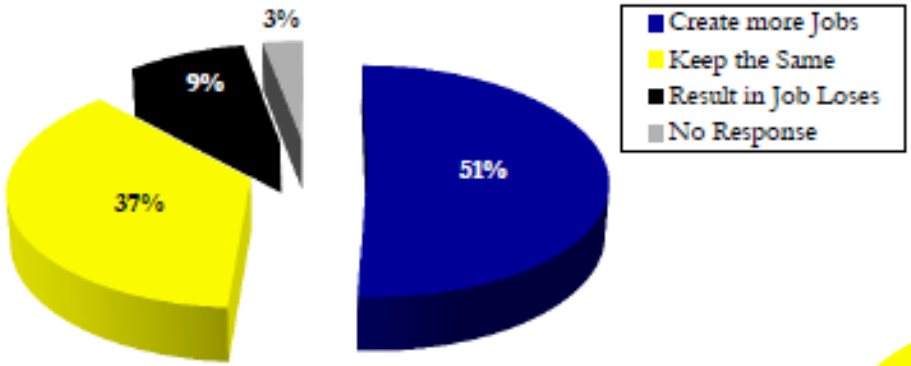
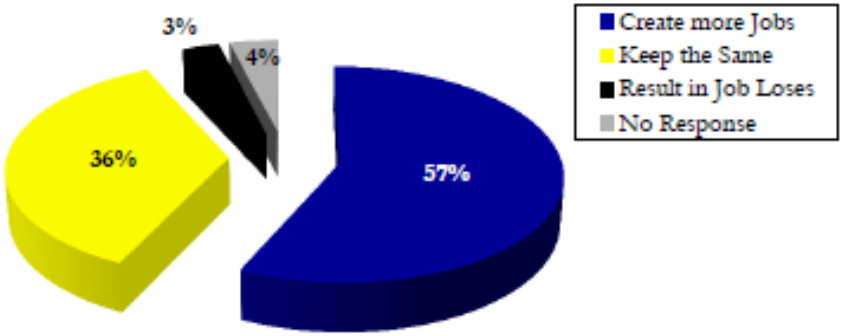


Figure 10. Impact of Energy Efficiency Projects on Jobs in North Dakota



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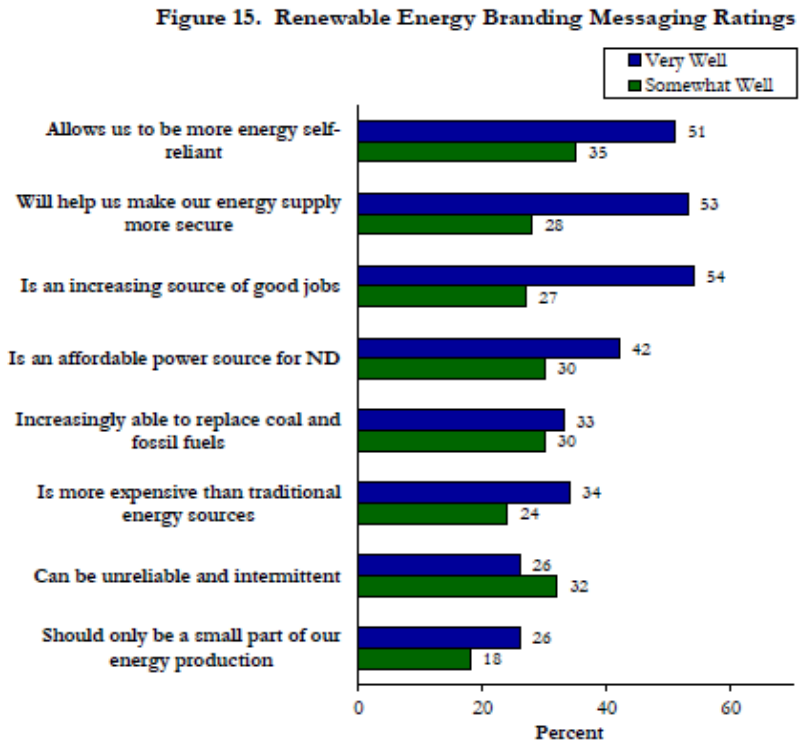
Jobs, energy self-reliance and energy security are all reasons to pursue renewable energy…



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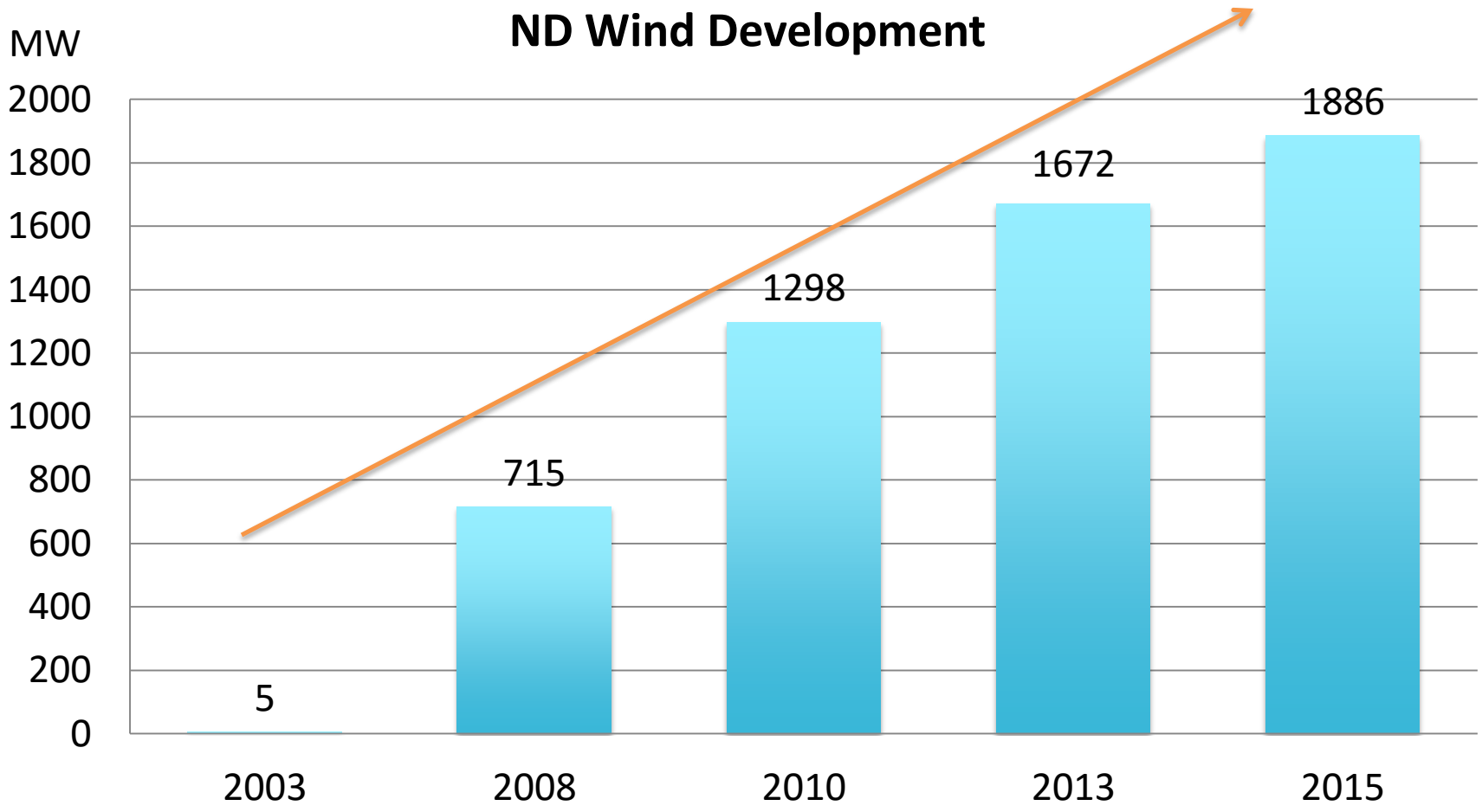
North Dakota Wind Energy

ND ranks 11th nationally in wind energy production

- Ranked 6th nationally based on wind resource
- 1,886 MW installed capacity
- More than 1,000 turbines
- 22 commercial projects
- More than 15% of electricity generated from wind (ranked 5th nationally)
- Projected to grow to 2,770 MW of installed capacity
- More than 500 MW currently under construction

337-fold increase in wind since 2003



North Dakota Wind Energy

- Investments in wind energy translate into:
  - Capital investments of more than $3.3 billion
  - Annual lease payments to landowners of ~$5 million
  - More than 1,000 jobs statewide (both direct and indirect)

North Dakota Ethanol Plants

Blue Flint Ethanol

Location: Underwood
Number of Employees: 40
Ethanol Production: 65 million gallons per year
Corn Use: 23 million bushels per year
DDGS: 190,000 tons per year
Year Established: 2007

Dakota Spirit AgEnergy

Location: Spiritwood
Number of Employees: 40
Ethanol Production: 65 million gallons per year
Corn Use: 23 million bushels per year
DDGS: 190,000 tons per year
Year Established: 2015

Hankinson Renewable Energy

Location: Hankinson
Number of Employees: 51
Ethanol Production: 130 million gallons per year
Corn Use: 46 million bushels per year
DDGS: 395,000 tons per year
Year Established: 2008

Red Trail Energy

Location: Richardton
Number of Employees: 42
Ethanol Production: 50 million gallons per year
Corn Use: 18 million bushels per year
DDGS: 125,000 tons per year
Year Established: 2007

Tharaldson Ethanol

Location: Casselton
Number of Employees: 54
Ethanol Production: 130 million gallons per year
Corn Use: 46 million bushels per year
DDGS: 395,000 tons per year
Year Established: 2008

ND Ethanol Industry

- **ECONOMIC IMPACT**
  - More than $640 million annually
  - Contributed nearly $1.9 billion to the state ag retail industry (2013)
- **EMPLOYMENT**
  - More than 200 workers directly, 10,000 indirectly
  - $64,000 (approximate) average annual wage
- **RURAL ECONOMIC DEVELOPMENT**
  - Each of ND's plants
    - Is located in a community with a population of less than 2,500
    - Contributes an average of 51 jobs and an average annual payroll of $3.3 million to the community
    - Purchases the majority of its corn from ND farmers and sells DDGs to ND livestock producers

Source: ND Ethanol Council

ND Ethanol Industry

- **PRODUCTION**
  - More than 450 million gallons per year
  - Ten fold increase since 2005
- **CORN UTILIZATION**
  - North Dakota ethanol plants use approximately 140 million bushels of corn/year (more than 80 % of corn purchased from ND farmers)
  - 40-60% of North Dakota's total corn production annually is purchased by North Dakota ethanol plants.
- **CO-PRODUCTS**
  - Each bushel of corn processed by North Dakota ethanol plants produces 2.8 gallons of ethanol, 18 pounds of livestock feed (dried distillers grains) and 18 pounds of carbon dioxide.
  - North Dakota ethanol plants produce more than 1.3 million tons of dry distillers grains annually.

Source: ND Ethanol Council

ND Ethanol Industry

INFRASTRUCTURE

- Nearly 200 flex fuel pumps in 40 communities
- 9th state to offer E15
- ~115,000 flex fuel vehicles (FFV)

CONSUMPTION

- Over the past five years E-85 sales have increased by 54%
- Total ethanol-blended fuel sales have increased by more than 78%
- 41.9 million gallons was blended with gasoline and sold within the state (2014)

Source: ND Ethanol Council

Emerging Opportunities

- Interest in solar energy growing
- Cass County Electric project:
  - 100kW solar array
  - Customers can purchase array portions
  - 1/3 of the way on commitments
  - Construction Spring 2016

In Summary…

- North Dakota's renewable energy sector is robust and growing.
- North Dakota has abundant clean energy resources that can be tapped to future development (help with implementation of Clean Power Plan).
- Public opinion survey confirms that North Dakotans strongly support renewable energy and energy efficiency use and deployment.
- We need to work to bridge the gap between public opinion and legislative action to support further development.

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THANK YOU!

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