

# WIND ENERGY & OTHER RENEWABLES IN NORTH DAKOTA

ENERGY DEVELOPMENT & TRANSMISSION COMMITTEE  
ROUGH RIDER ROOM, STATE CAPITOL, BISMARCK  
OCTOBER 14, 2013



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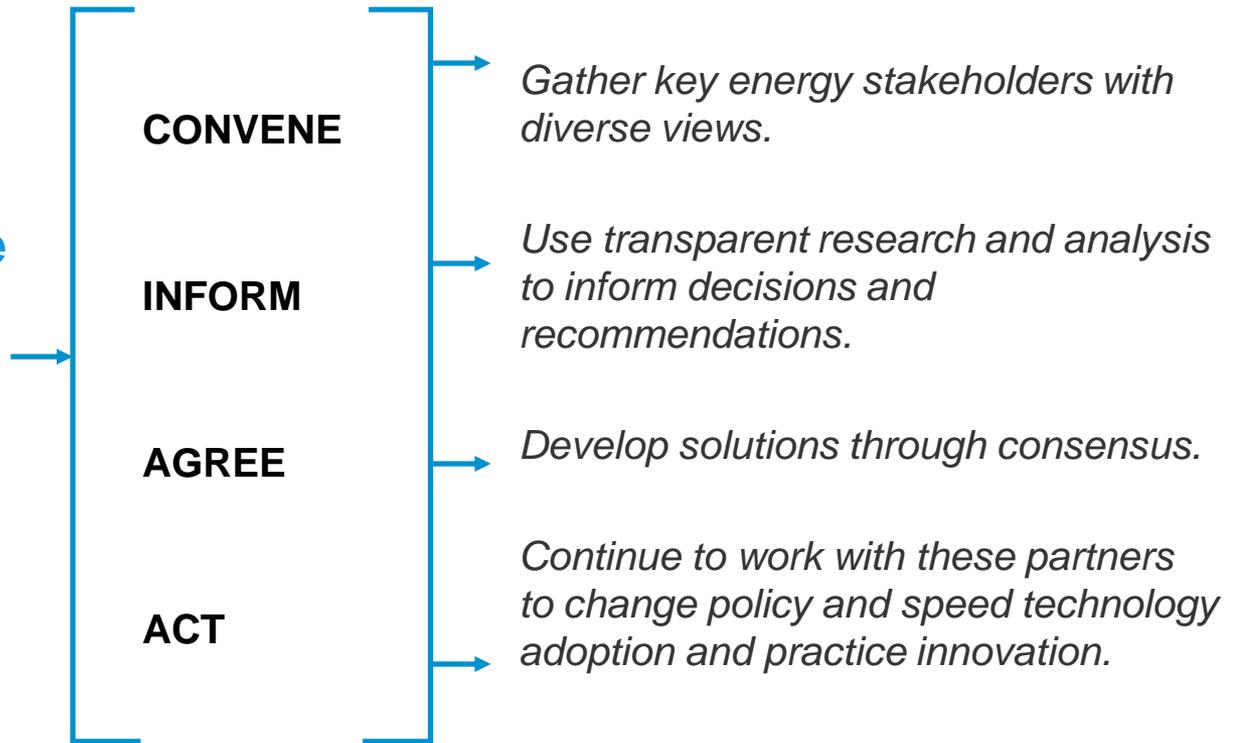
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# About the Great Plains Institute

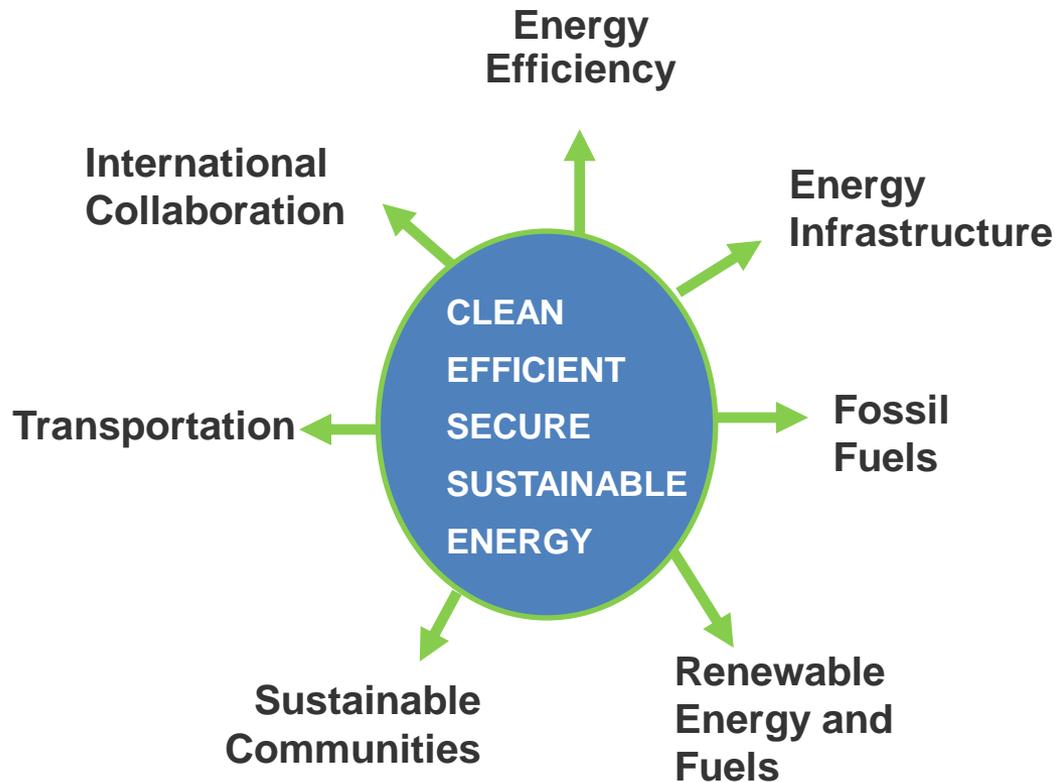
- **Nonprofit** based in ND and MN.
- Work with government officials, industry, agricultural and labor leaders, and environmental advocates to **foster deployment of advanced fossil energy technologies, greater energy efficiency, and renewable energy development.**
- Staff major **regional energy policy initiatives** in the U.S. and Canada for the Midwest Governors Association and other partners.
- Convenes the **National Enhanced Oil Recovery Initiative**, a national coalition of industry, labor and environmental organizations, and officials from oil and gas producing states that promotes incentives to expand American oil production using CO2 captured from industrial facilities and power plants.
- Organized **six successful overseas energy policy and technology delegations** involving government, private sector and NGO leaders from the Northern Plains and Midwestern regions.



**GPI'S unique  
policy  
approach**



# GPI'S PORTFOLIO APPROACH





# A Global Perspective: Private Investment in Clean Energy



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Figure 7: Investment by country and sector, 2012

## Nations Compete: Who's Winning the Clean Energy Race? 2012



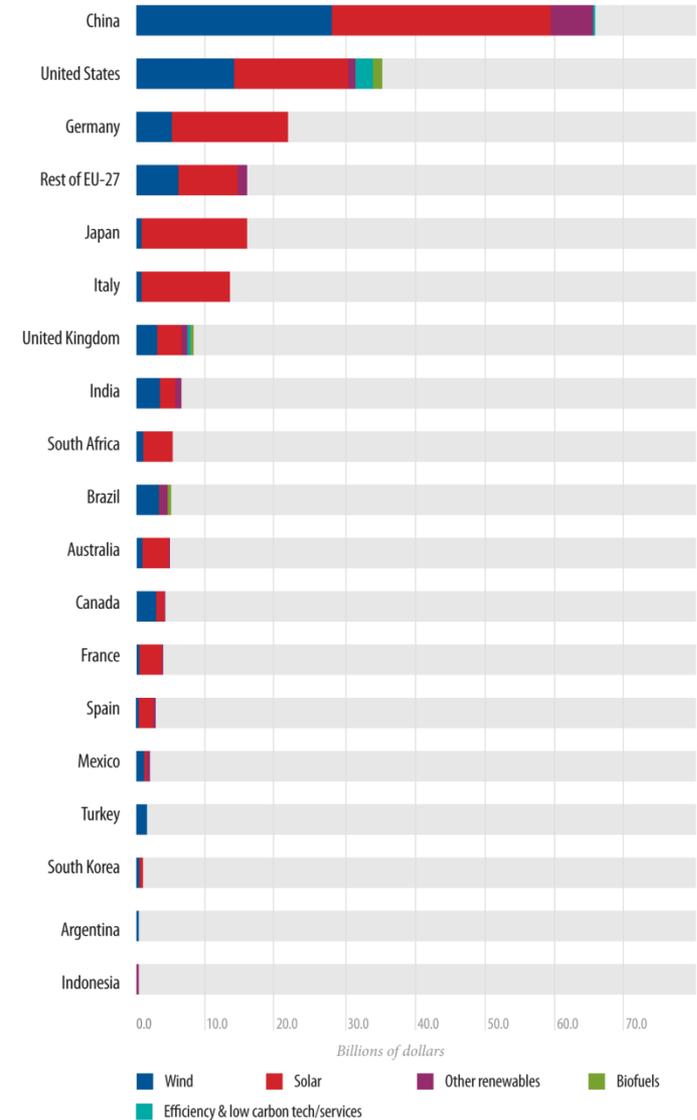
\$65.1



\$35.6



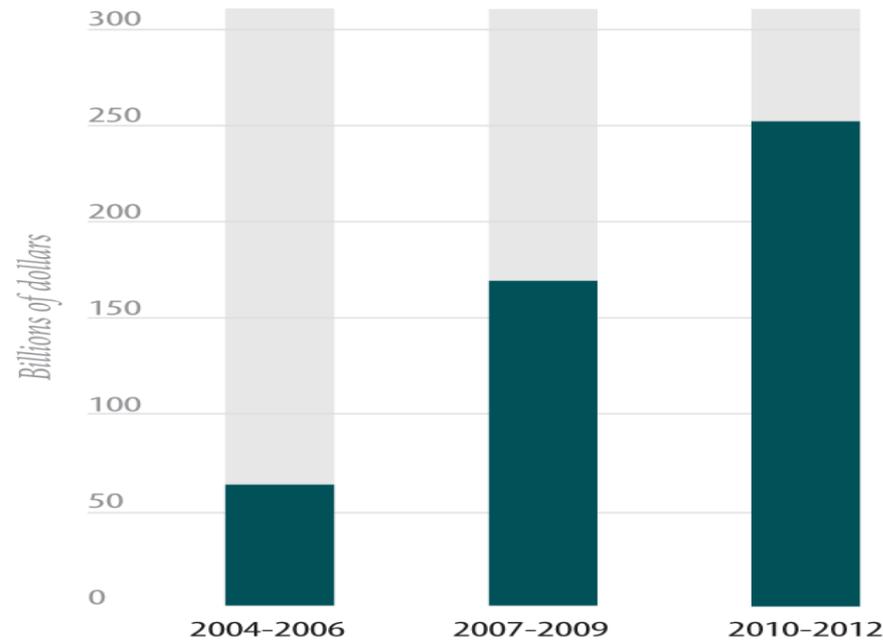
\$22.8



Source: Bloomberg New Energy Finance

# Clean Energy Sector Remains Resilient

**Average worldwide clean energy investment\***



\*Does not include research and development investments.

Source: Bloomberg New Energy Finance



# Global Clean Energy Targets



15% of total energy from low-carbon sources by 2020



35% of electricity from renewable energy by 2035



28 GW from solar, 5 GW from wind by 2020



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# US Energy Independence by 2035...or sooner?

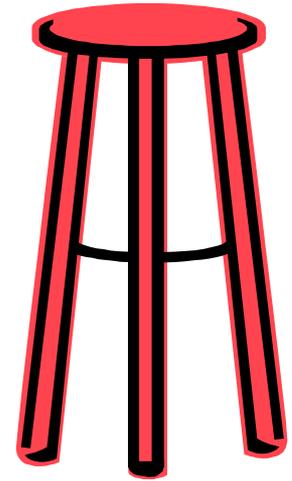
- EIA report predicts US as top energy producer in 2013
  - Surpassing Russia and Saudi Arabia
  - Since 2008, US oil production up 7 quadrillion BTU, natural gas 3 quadrillion BTU
- Traditional energy production will be a primary driver toward energy independence. **Biofuel production and vehicle fuel energy efficiency** are the two other legs of the “energy independence stool” if the US is to become self-sufficient in energy production by 2035.

**North Dakota will be major contributor to future US energy independence**



# North Dakota is positioned to help lead the nation in building 2 legs of the “energy independence” stool...

- Ranked second nationally in oil production
  - Production projected to double by 2017
  - New technology to boost production??
    - ~5% of the oil is being recovered today
- 800-year supply of lignite coal
- Referred to as “Saudi Arabia” of wind
- Ample agricultural feedstocks for biofuel production
- And more?



# North Dakota's Energy Rankings in the US

Category	Rank
Total Energy Production (2011)	13th
Crude Oil Production	2nd
Natural Gas Production	18th
Coal Production	9th
Installed Wind Capacity	11th
Ethanol Production	10th
Total Electricity Generation	40th

Source: Energy Information Administration, American Wind Energy Association, Renewable Fuels Association

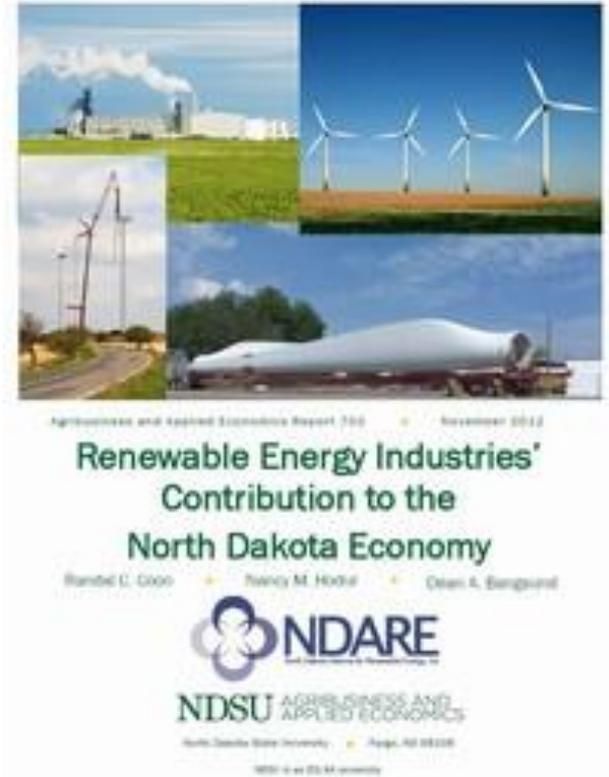


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# Renewable Energy Economic Impact

- **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**

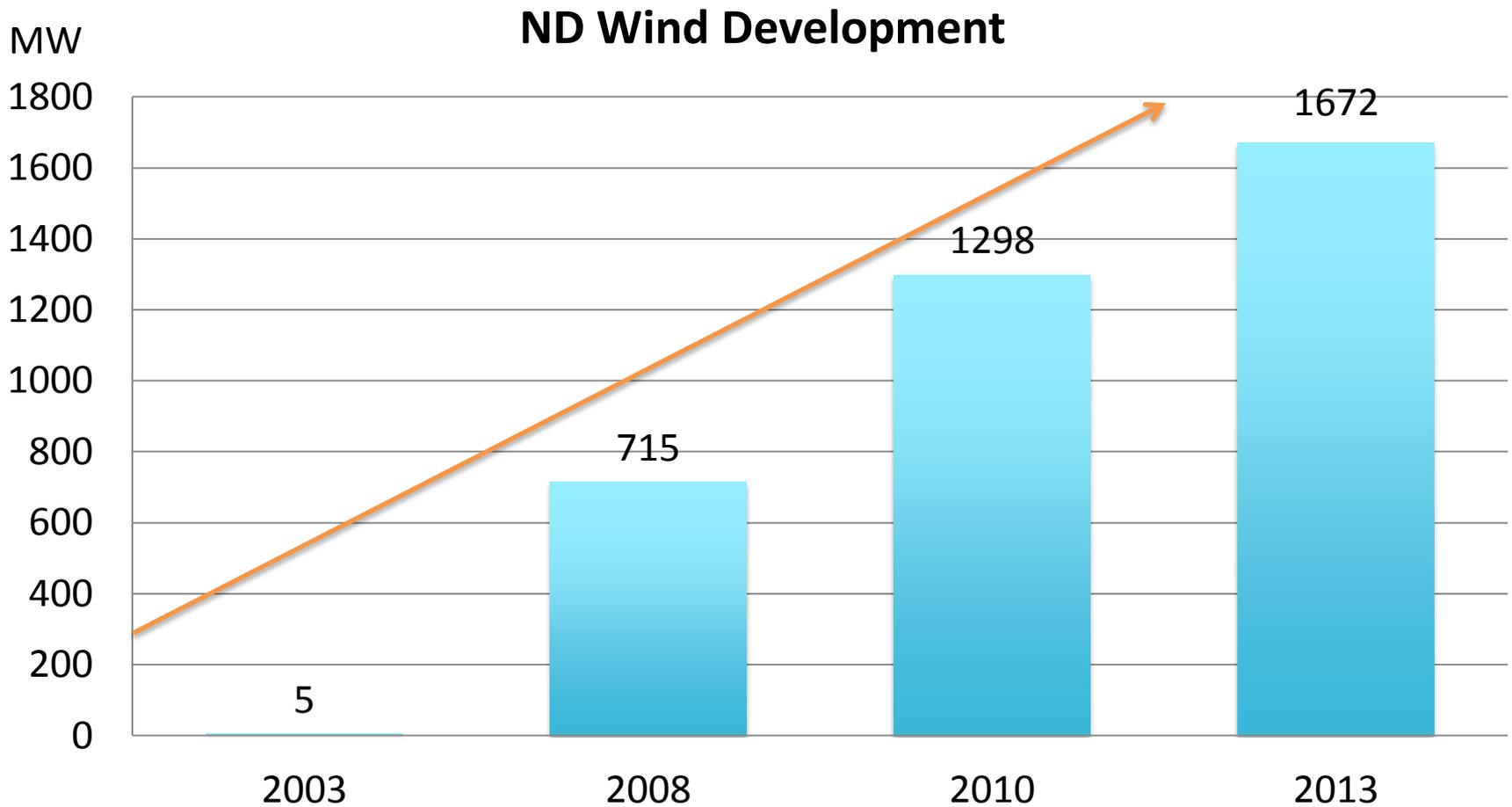


# State-level Renewable Energy Policies

- Renewable Energy Council: \$3 M for 13-15 biennium (RTF)
- Energy Conservation Grant Program: Up to \$1.25 M for 13-15 biennium (RTF)
- Blender Pump Program
- Valued added study for renewable energy (\$500 K)
- Fuel Production Facility Loan Guarantee Program (Up to \$25 M guarantee; no more than 30% of loan amount)
- Ethanol Production Incentive (countercyclical)
- Tax incentives:
  - Exemption for wind energy facilities through 2017
  - Property tax exemption for installation of solar, wind or geothermal machinery and equipment
  - Sales tax exemption for wind generation facilities (larger than 100 kW)



# 334-fold increase in wind over 10-yr period



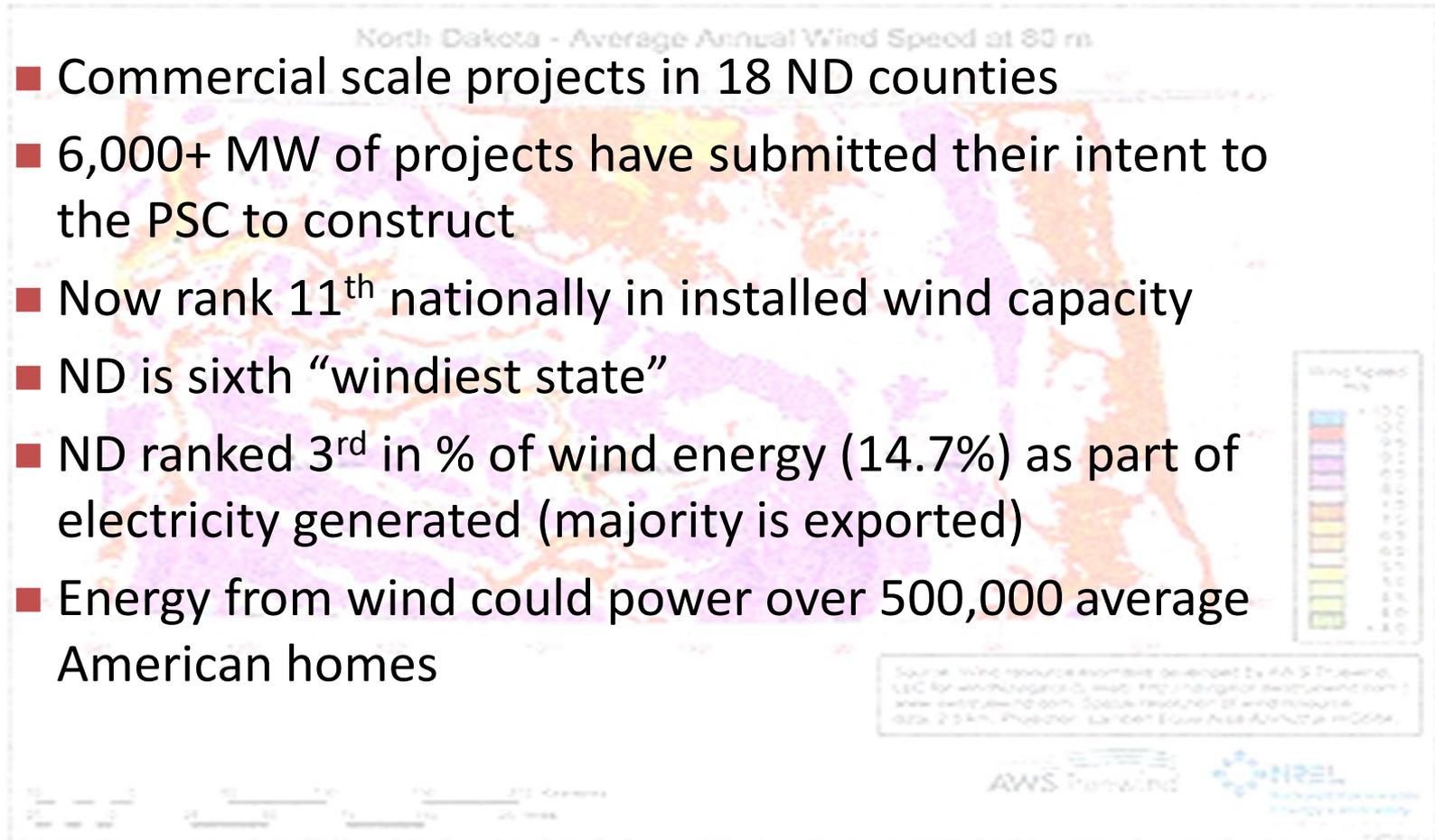
# North Dakota Wind Energy

- ▣ 1,672 MW of installed capacity
  - 210 MW (Bison Wind IV) under construction
  - 150 MW (Thunder Spirit) just approved by PSC for construction
  - 991 turbines in operation



# North Dakota Wind Energy

- Commercial scale projects in 18 ND counties
- 6,000+ MW of projects have submitted their intent to the PSC to construct
- Now rank 11<sup>th</sup> nationally in installed wind capacity
- ND is sixth “windiest state”
- ND ranked 3<sup>rd</sup> in % of wind energy (14.7%) as part of electricity generated (majority is exported)
- Energy from wind could power over 500,000 average American homes



# 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 Wind Manufacturing

- Wind manufacturing will employ more than 600 people in North Dakota this year.
- Uncertainty of federal PTC has led to varying workforce levels in wind manufacturing

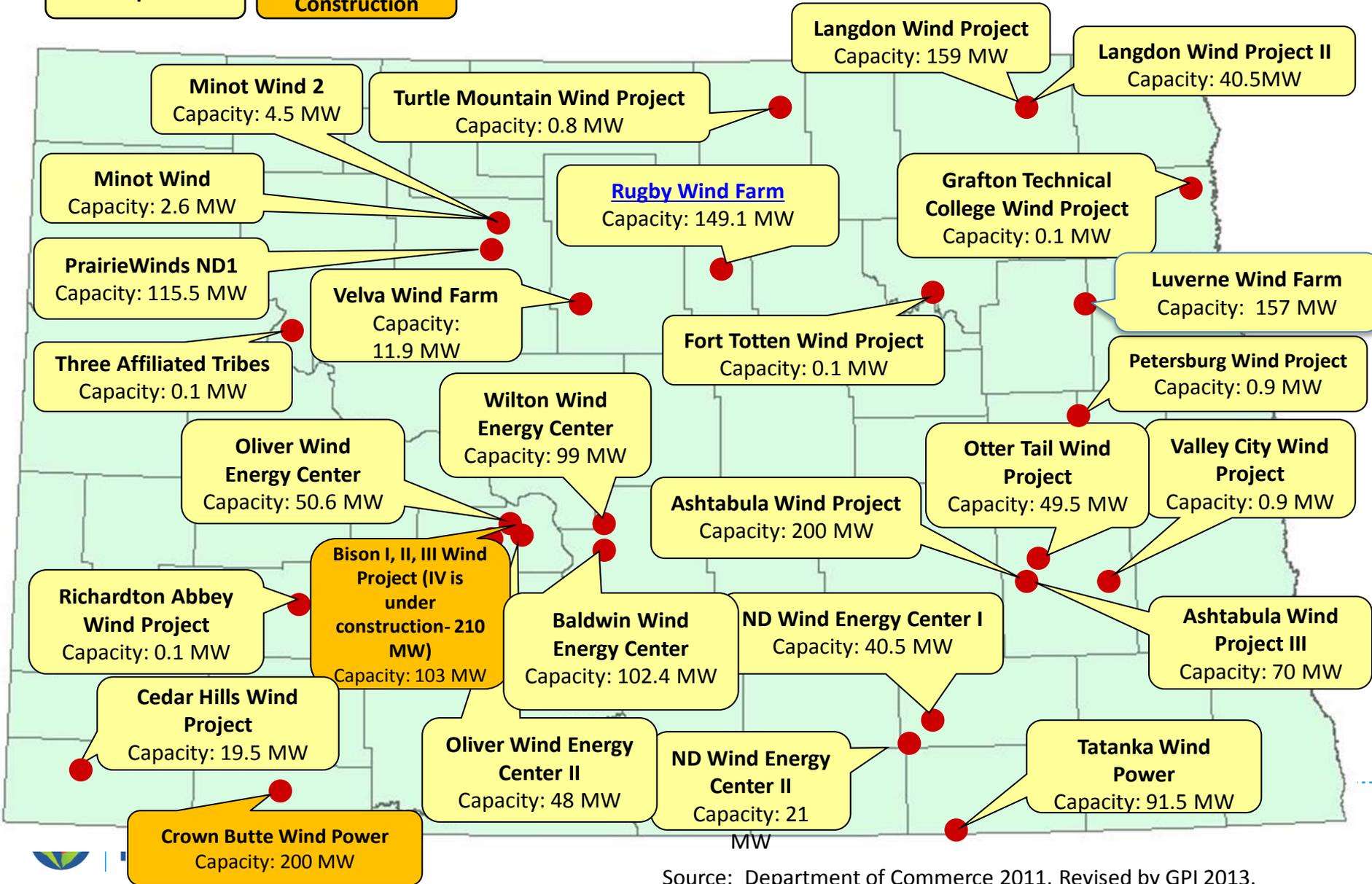


# Completed and Under Construction

## Wind Energy Projects

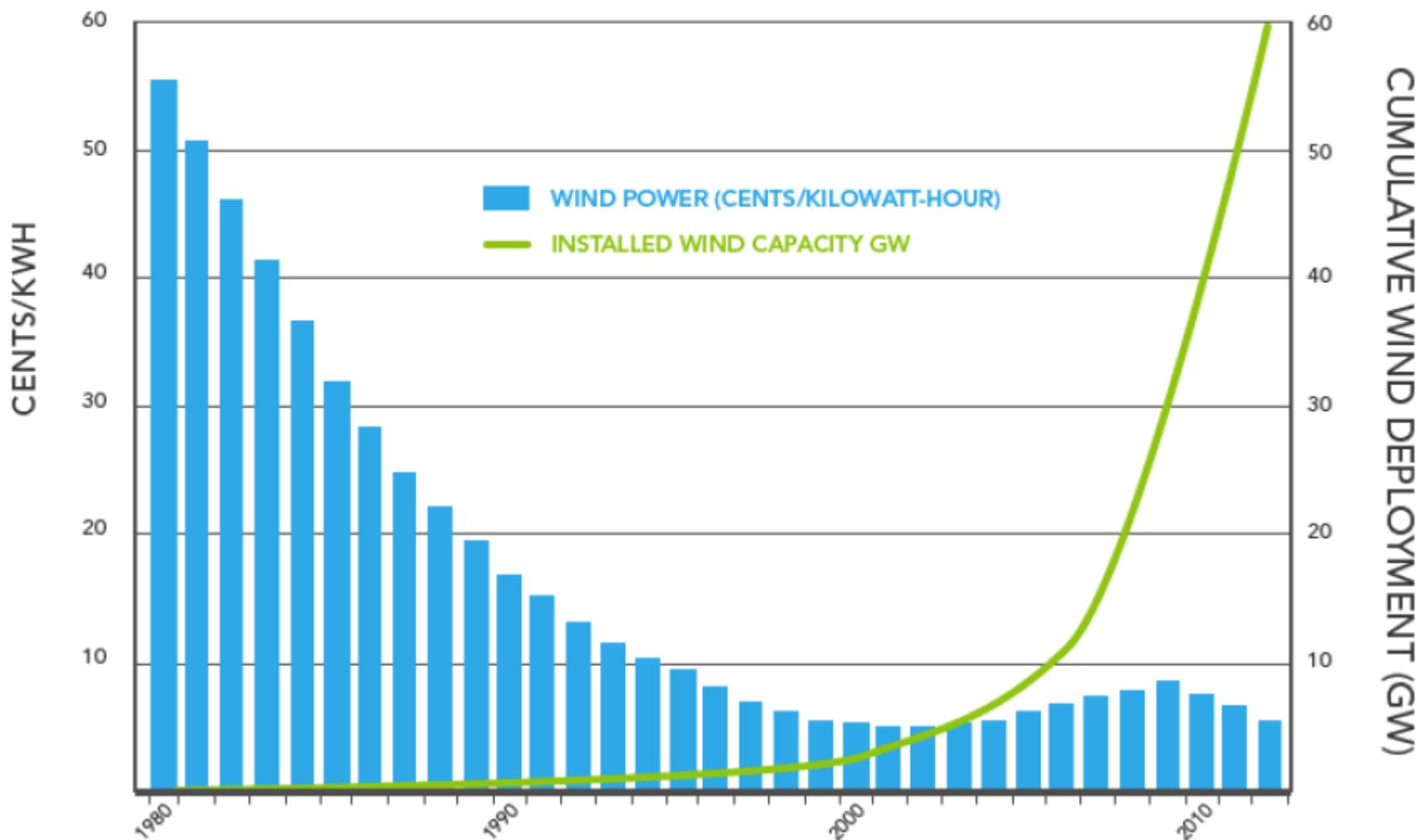
Completed

Under Construction



Source: Department of Commerce 2011, Revised by GPI 2013.

# Deployment and Cost for U.S. Land-Based Wind 1980-2012



# Federal policy: Uncertain future for federal PTC

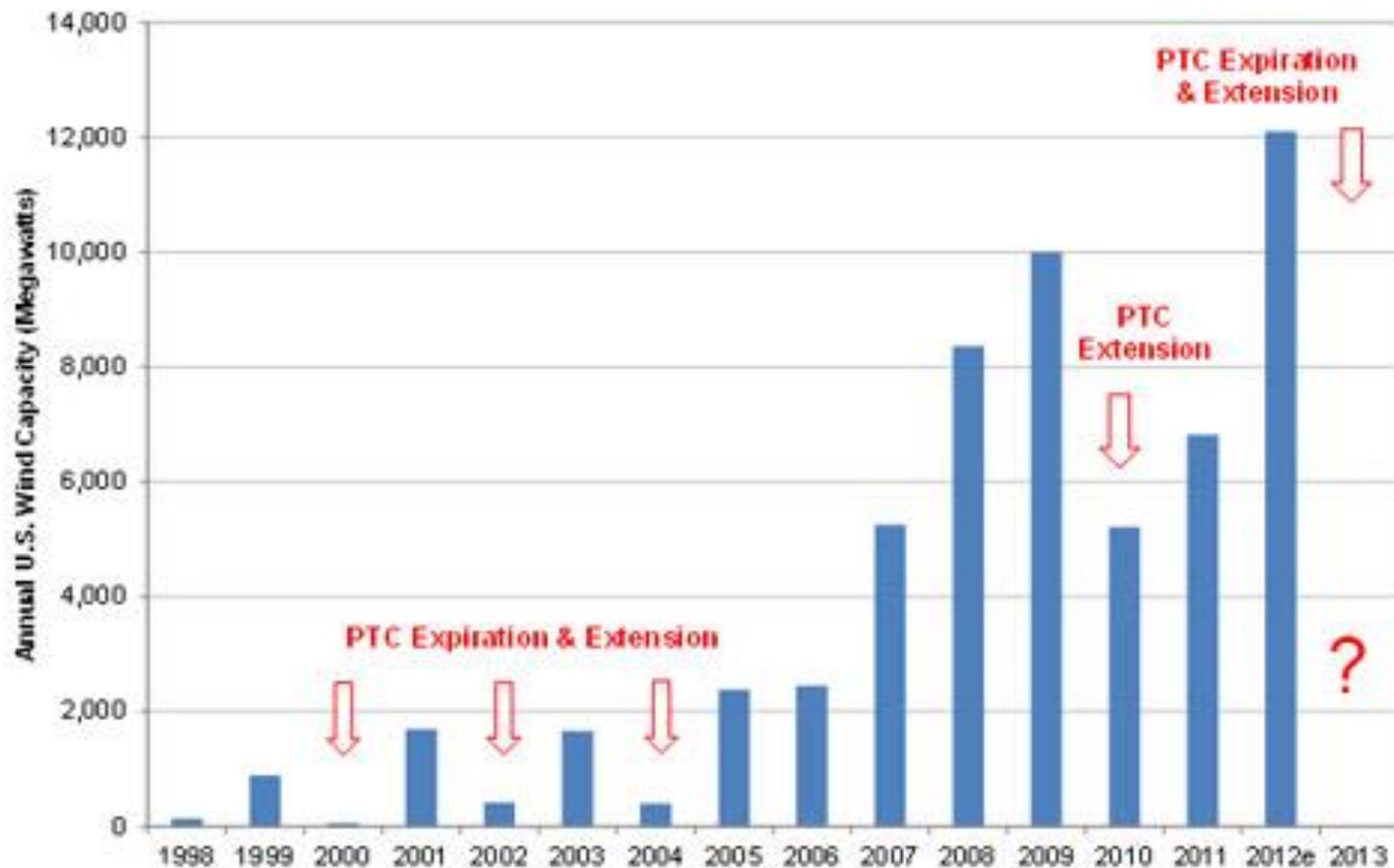
How the production tax credit (PTC) works:

- 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

**PTC was extended as part of the American Taxpayer Relief Act of 2012 and will be available to projects that begin construction before January 1, 2014.**



# Impact of PTC Expiration on Annual U.S. Wind Installations



Sources: Compiled by UCS based on data from DOE 2012, EIA 2012.



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# The Future of Federal Wind Policy

- New Joint Committee on Taxation report shows cost \$6.1 B over ten years if production tax credit is extended beyond 2013
- 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



# Other issues

- Transmission needs
- Storage
- Development
  - Increasing landowner rights/issues
  - Siting



# ND Ethanol Industry

- Economic Impact
  - More than \$300 million annually
- Employment
  - More than 250 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



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# ND Ethanol Industry

## □ Production

- More than 350 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

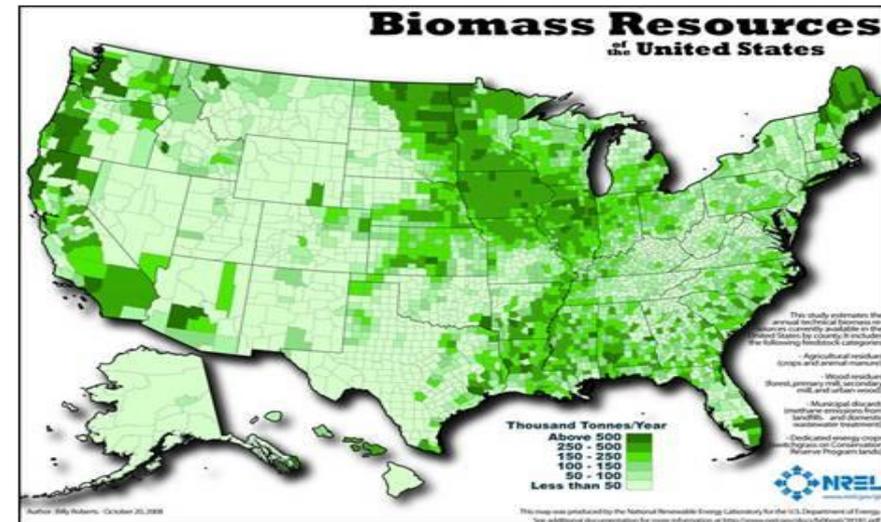
- Each bushel of corn processed by North Dakota ethanol plants produces 2.8 gallons of ethanol, 18 pounds of livestock feed (dried distillers grains) and 18 pounds of carbon dioxide.
- North Dakota ethanol plants produce more than 1.3 million tons of dry distillers grains annually.



# North Dakota's Renewable Energy Landscape

## Biomass

- ND ranked #1 in potential for energy crops (ORNL)
- GRE's Spiritwood Station & Dakota Spirit AgEnergy
- ADM Enderlin Sunflower crushing plant
- EERC's Center for Biomass Utilization (Grand Forks Truss plant)
- Fargo Landfill gas project; Bismarck Aquatics Center
- NDSU Biomass Testing Lab, Northern Great Plains Research Lab



# North Dakota's Renewable Energy Landscape

- In 2012, ND led the nation in flex fuel pumps per capita:
  - 221 installed statewide at 59 stations in 44 communities
- ND had record E-85 sales in 2011
- E-15 pumps now available:
  - Petro Serve USA stations – Mandan, Bismarck, Fargo, West Fargo



# Dakota Spirit AgEnergy

2012.03 v1

## About the biorefinery

### Economic development impacts

- 36 operating jobs
- 275 construction and trade jobs
- New local market for area corn producers

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<b>Feedstock</b>	Corn Feedstock: – 23 million bushels
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<b>Products</b>	Ethanol – 65 MGY DDGs – 173,000 tons/year Corn Oil – 5,400 tons/year
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## Timeframe

**2012-13** Phase I Engineering, Financing, Construction

**2013** Construction commences

**2014** Start-up & Commissioning

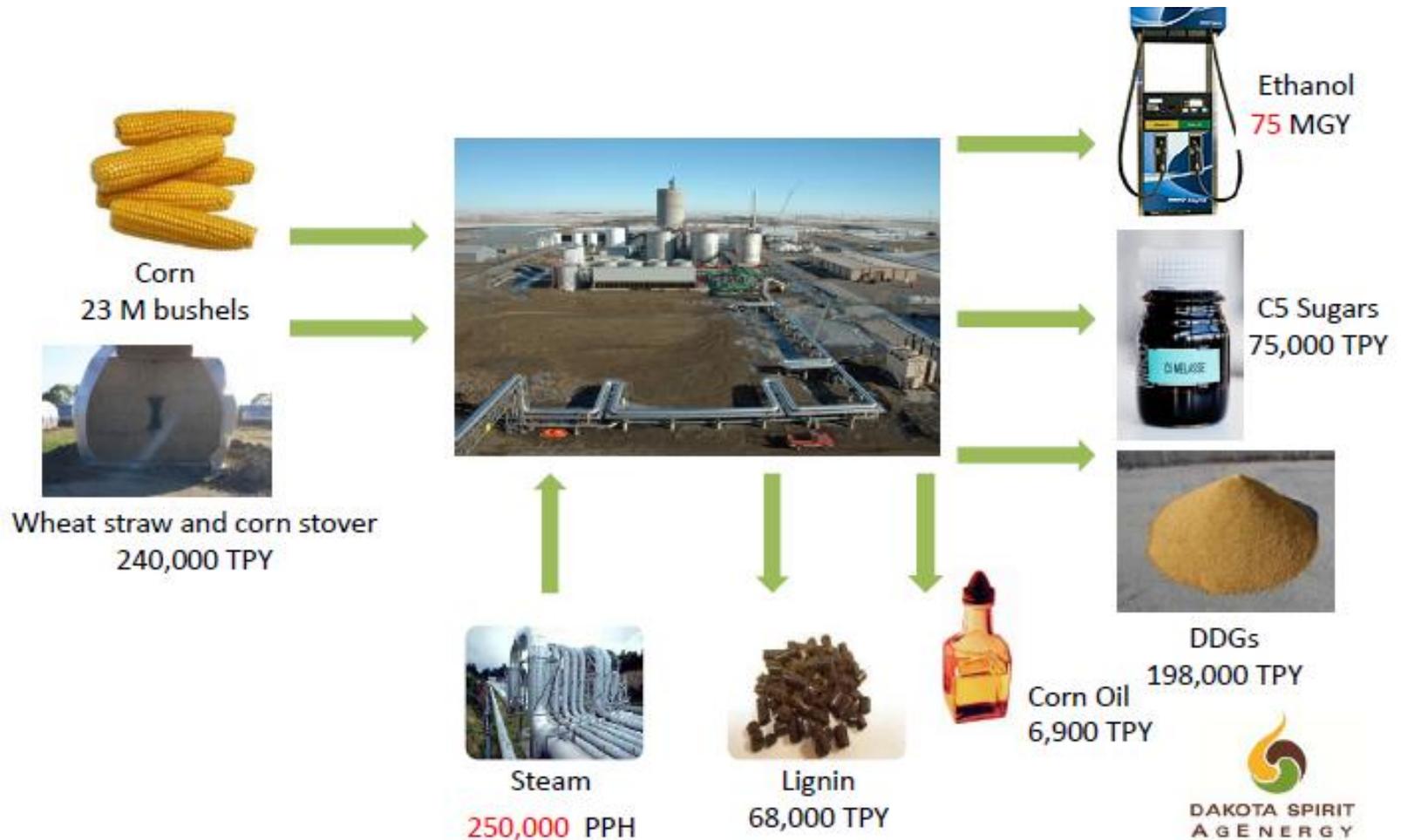
**2015** Advanced biofuels evaluation, engineering, financing



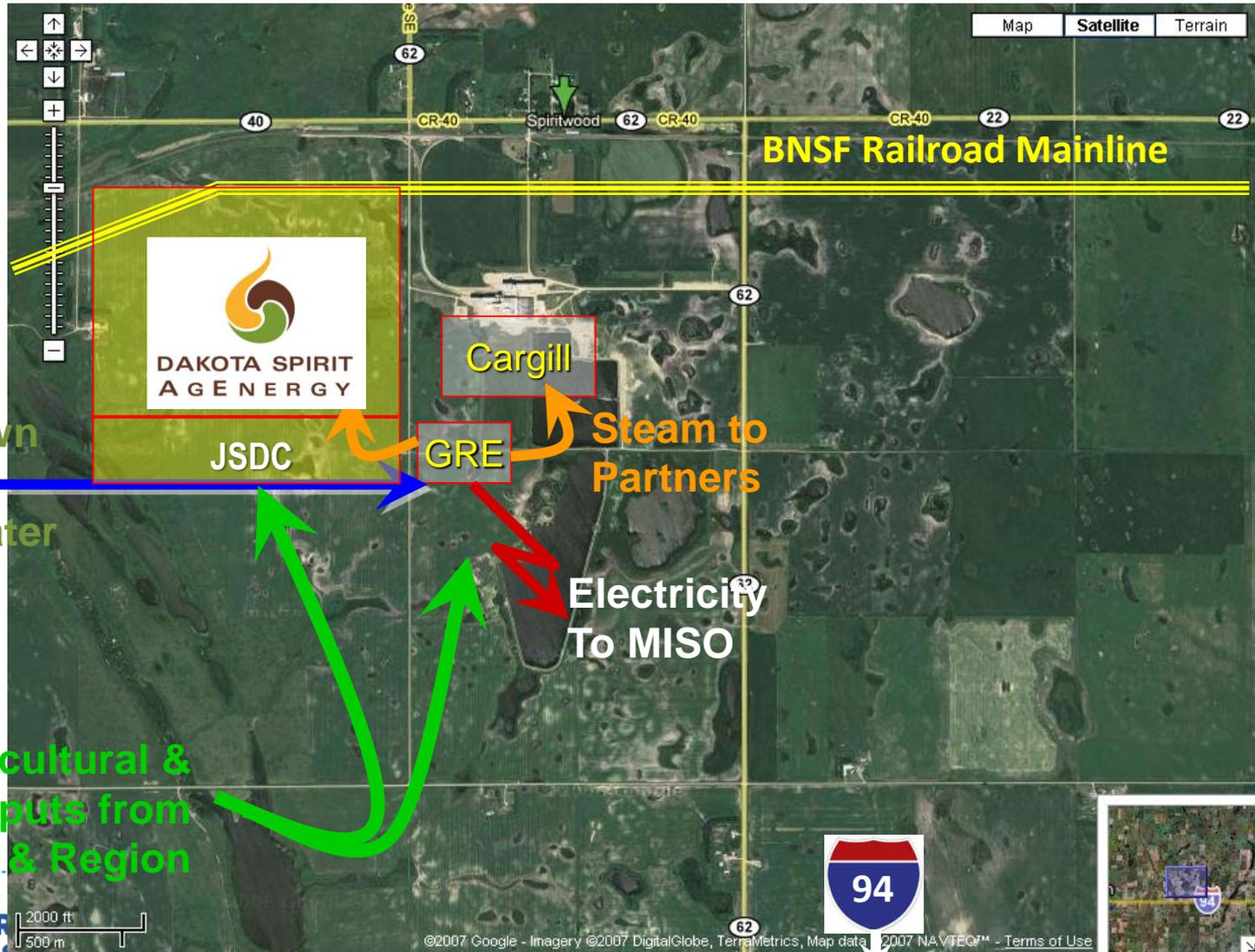
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# Dakota Spirit AgEnergy – Phase I + II



# Ideal Plant Location



# Summary

**North Dakota is blessed with abundance resources – fossil, renewable and agricultural.**

**We have the opportunity to capitalize on all fronts to help lead US to energy independence.**



# THANK YOU!

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