



# **Energy Development and Transmission Committee**

**October 3, 2011**

**Sandi Tabor, VP - Government Affairs**

**Lignite Energy Council**

1986 Antelope Valley 2 – 450MW



1954 Heskett 1 – 25MW



1984 Antelope Valley 1 – 450MW

1963 Heskett 2 – 75MW

1966 Stanton 1&2 – 202MW



1966 Leland Olds 1 – 210MW



1981 Coyote 1 – 427MW

1981 Coal Creek 2 – 550MW



1979 Coal Creek 1 – 550MW



1977 Milton R. Young 2 – 455MW

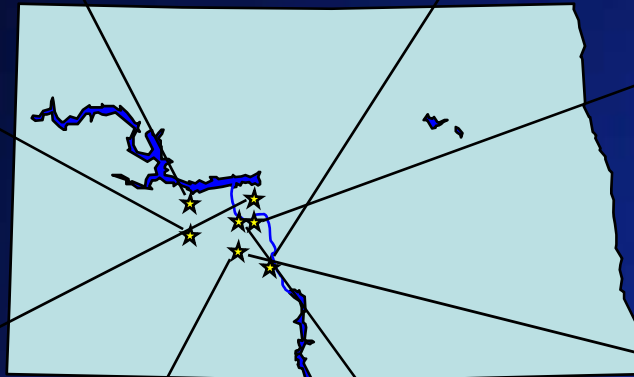


1975 Leland Olds 2 – 440MW

1970 Milton R. Young 1 – 235MW



## North Dakota Coal Fired Power Plant Construction History



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# ND Lignite Industry

## ★ Overview

**Four surface mines in ND**

**Produce 30 million tons/year**

- **80% used to generate electricity**
- **13% used for syn-gas**
- **7% used for fertilizer products**



# **Reliable & Affordable Electricity**

- ★ **Electricity from lignite is reliable**

**Available 24/7**

- ★ **Most of the electricity in the Midwest comes from Coal**

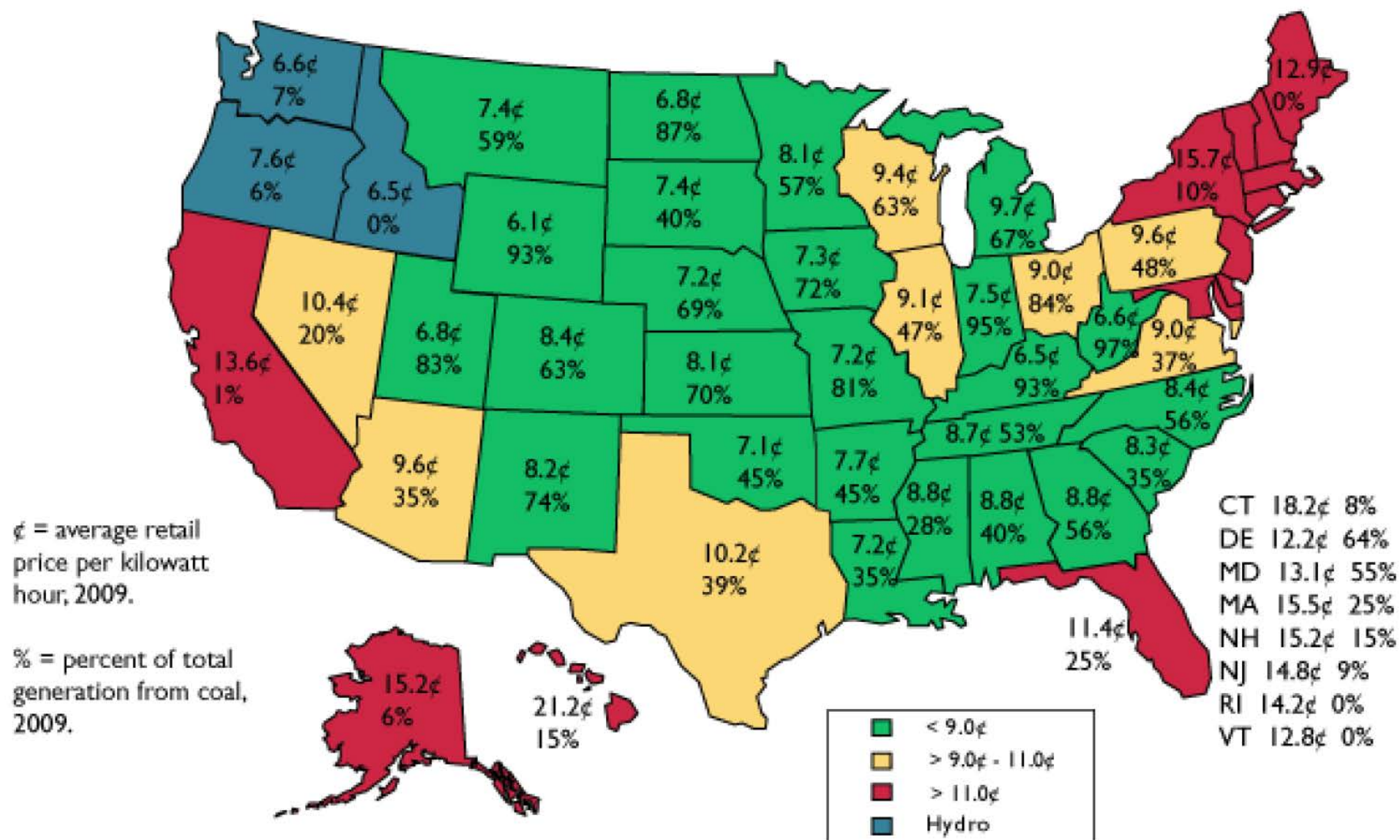
**Average ND coal cost: \$20.58 Mwh**

**Average US coal cost: \$28.57 Mwh**



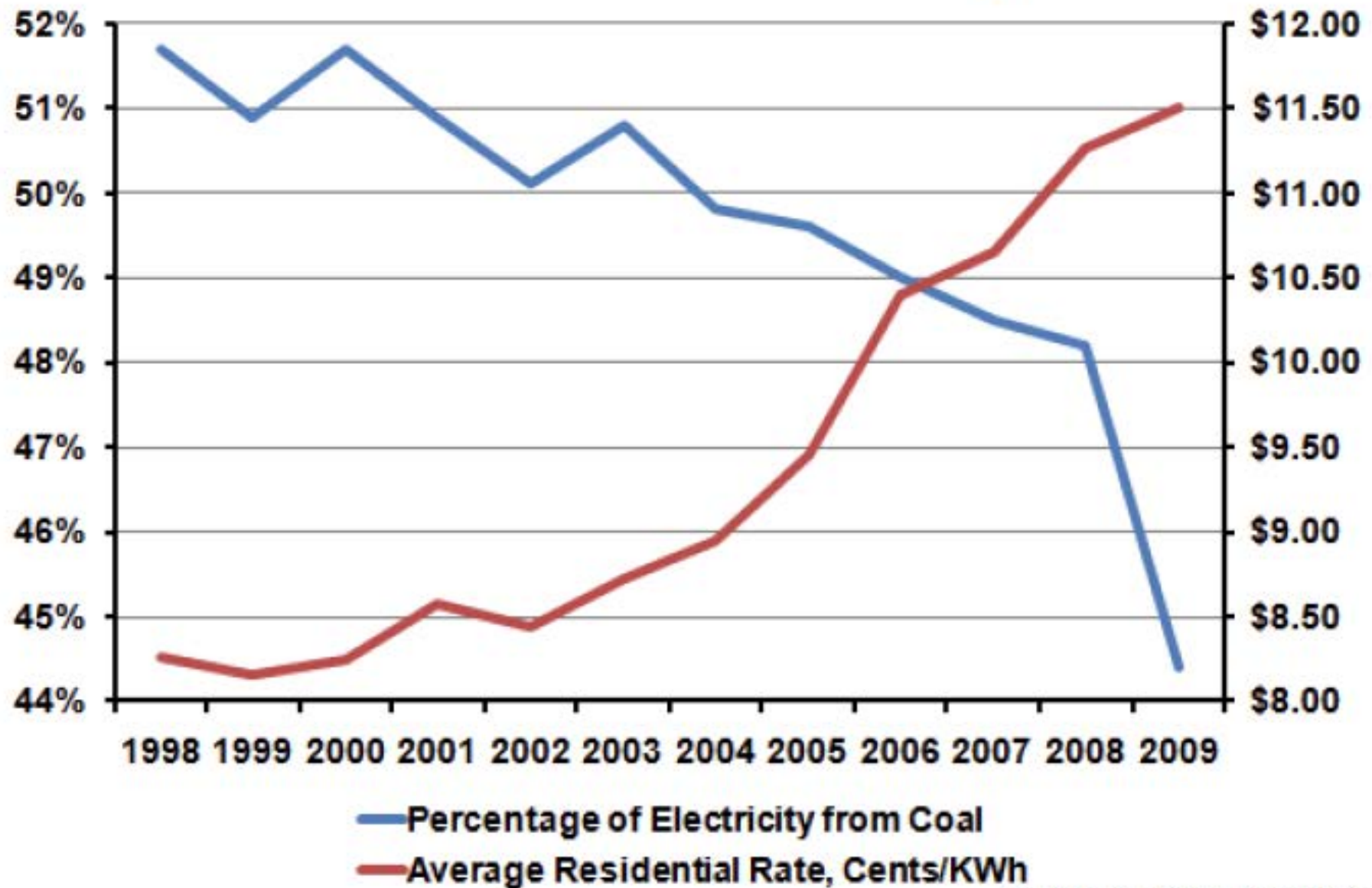


# Cost per kWh and Percent Coal Power Sector Generation



Source: Energy Information Administration

# U.S. Use of Coal for Electricity vs. Price



Source: Energy Information Administration.

# Lignite's Contribution to North Dakota's Economy

- ★ Creates 27,000+ direct & indirect jobs
- ★ Generates personal income of \$910 million annually
- ★ Generates \$2.9 billion of business volume annually
- ★ Generates more than \$91 million of state tax revenue annually / \$182 million over biennium

*Source: NDSU Agricultural Economics Department - March 2011*





# Lignite Energy is Environmentally Clean

- ★ ND utilities have invested more than \$1.7 billion in pollution control equipment
- ★ Annual operating cost is \$90 million
- ★ ND is one of 12 states to meet all federal ambient air quality standards
- ★ North Dakota made the American Lung Association 'honor roll' for air quality



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# The R&D Program: Industry/Government Partnership

State of  
North Dakota



Lignite Energy  
Council

- ★ Funded by 10-cents per ton severance tax allocation and 5% allocation of Coal Conversion Tax
- ★ Every state dollar invested has resulted in \$6 of industry match
- ★ 2007 Legislature added \$11 million from coal conversion tax over the next ten years to lignite development projects
- ★ LRC meets two times per year to consider proposals

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# Three Principles of the Lignite R&D Program

- ★ Help solve problems for our *existing* facilities (R&D Projects)
- ★ Assist with developing *new* lignite-fired facilities (LV 21 Program )
- ★ Help with strategies for increased use of coal-based electricity and niche opportunities for ND lignite



# Results of the R&D Program

## Two Lignite Studies

- ★ **Beneficial Use of CO<sub>2</sub> from Lignite based energy facilities**

Identify technologies other than EOR that could result in a revenue stream based on CO<sub>2</sub> produced at plant using ND lignite

- ★ **Lignite-Based Advanced Generation Technology Systems**

Identified and prioritized technology options for a 175-225 MW base load green field plant based on ND lignite



# Results of the R&D Program

## *GRE Dry Fining Example*

- ★ **NDIC investment of \$400,000 has resulted in \$13.5 million DOE investment for coal dryers at Coal Creek Station Unit II and capital investment by GRE of \$250M**
- ★ **The coal drying R&D projects have led to construction of \$370.4 million Spiritwood power plant fueled with 610,000 tons of beneficiated lignite from the Falkirk Mine**



# LV21 Program

- ★ Spiritwood Energy
- ★ South Heart Project
- ★ ALE - Coal-to-Liquids Plant





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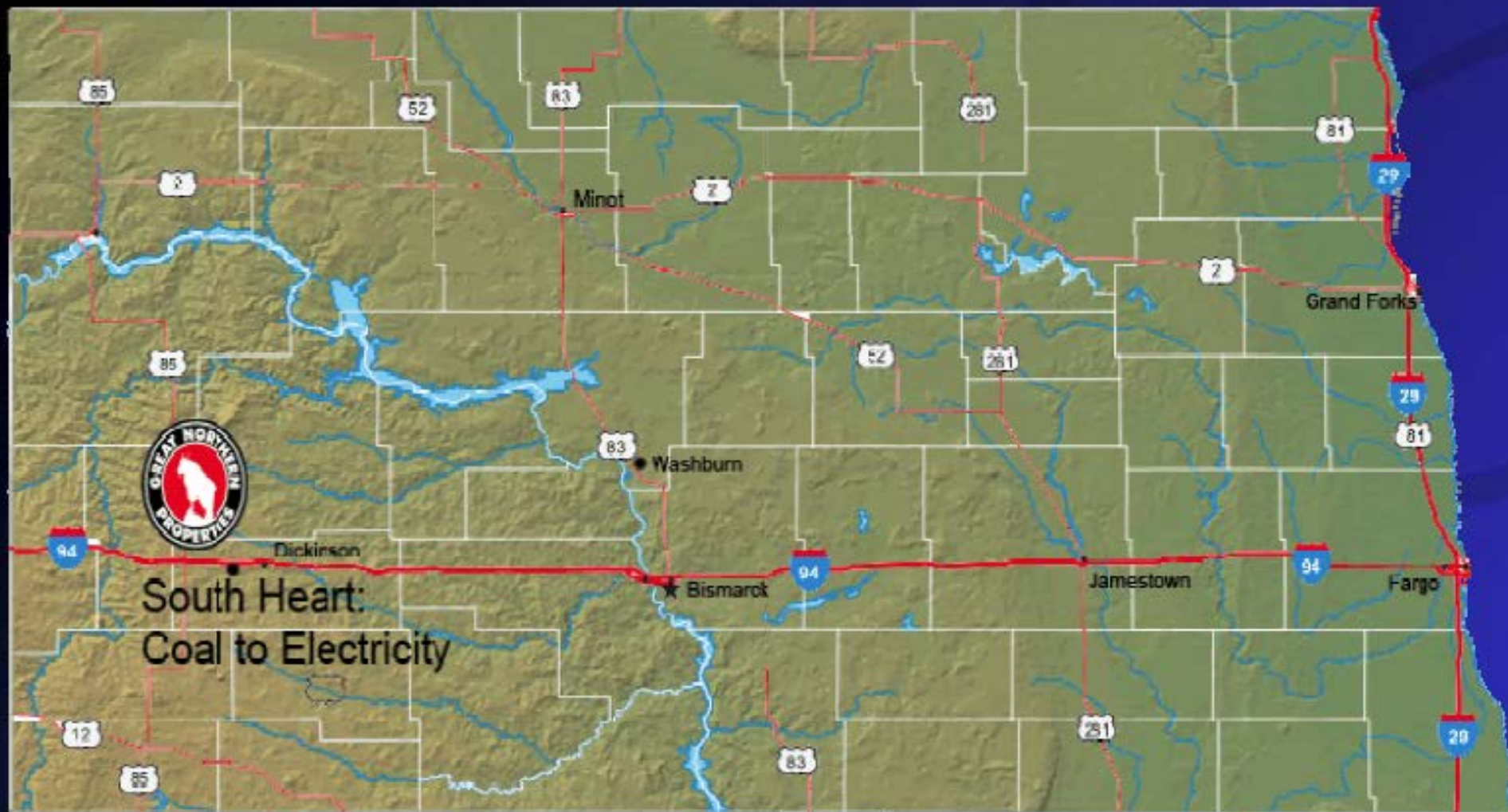
# Lignite Vision 21 Program

## Spiritwood Energy Power Plant - GRE

- ★ 99 MW combined heat and power plant
- ★ Commercial operation delayed until 2013 due to lagging MN economy
- ★ Local Impact
  - Cost of plant \$370 million
  - 400 construction jobs and 24 full-time power plant employees
  - Economic impact of \$380 million per year
- ★ Lignite Industry Impact
  - \$450,000 (est.) in annual severance and conversion taxes
  - 600,000 tons/year







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# Lignite Vision 21 Program

## Great Northern Power Development

- ★ Coal to electricity or other lignite conversion alternatives, i.e. hydrogen and liquid fuels, currently being evaluated along with customer potential
- ★ Regulatory uncertainty regarding CO<sub>2</sub> capture and storage along with instability of financial markets has led to a re-examination of alternatives by the project promoters
- ★ Depending on project, GNPD could be looking at 250 employees with an annual tax revenue to the state of \$14 million





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# American Lignite Energy (ALE)

- ★ Coal gasification followed by a Fisher-Tropsch reactor to convert coal to liquids. Considering Direct Coal Liquefaction
- ★ Project is on hold pending resolution of project finance issues
- ★ Go/no go decision 12/31/11

