North Dakota Department of Mineral Resources

http://www.oilgas.nd.gov http://www.state.nd.us/ndgs

600 East Boulevard Ave. - Dept 405
Bismarck, ND 58505-0840
(701) 328-8020 (701) 328-8000
North Dakota Resources
(currently being consumed/exported)

- **Coal**: 350 T Btu/year
- **Electricity**: 120 TBtu/year
  - Seven plants (including imported coal)
- **Natural gas**: 700 TBtu/year
  - (200 TBtu/year currently flared)
- **Oil**: 2300 TBtu/year, second in United States
- **Wind**: sixth in potential and eleventh in production
- **Agricultural**: first in 13 commodity crops, first in energy crop potential, four ethanol plants, and one biodiesel plant
  - 80 TBtu/yr agricultural residue
- **CO₂**: 2 Mtpy captured and marketed now
1.3 Trillion Tons of Coal
in North Dakota

25 Billion Tons of Mineable Lignite
800+ year supply

THE LIGNITE RESOURCES OF NORTH DAKOTA

by

Edward C. Murphy, Ned W. Kruger, Gerard E. Goven,
Quentin L. Vandal, Kimberly C. Jacobs, and Michele L. Gutenkunst

REPORT OF INVESTIGATION NO. 105
North Dakota Geological Survey
Edward C. Murphy, State Geologist
Lynn D. Helms, Director Dept. of Mineral Resources
2006

THE LIGNITE RESERVES OF NORTH DAKOTA

by

Edward C. Murphy

REPORT OF INVESTIGATION NO. 104
North Dakota Geological Survey
Edward C. Murphy, State Geologist
Lynn D. Helms, Director Dept. of Mineral Resources
2006
Bakken
OOIP 200 billion barrels
USGS 7.4 billion barrels EUR
Conventional: Case Study of North Dakota Fields/Pools for CO₂ Flooding and CO₂ Sources

OOIP 7.1 Billion barrels
1.6 billion barrels EUR
280 million barrels
Bakken Formation & CCUS

Estimate 2.0-3.2 billion tons of CO2 utilization for EOR

Estimated incremental oil recovery of 4-7 billion barrels of “low carbon” petroleum resource
Synergies

West-Central North Dakota Synergies

- Coal Mine
- Gas Plants
- Oil Fields
- Coal Basins
- Pipelines

Electric Utilities (CO₂ tonnes):
- 15,000–750,000
- 750,000–2,500,000
- 2,500,000–7,500,000
- 7,500,000–15,000,000
- 15,000,000–20,000,000

EERC

The University of North Dakota
North Dakota Policy > VI Primacy

1. It is in the public interest to promote geologic storage of CO$_2$ in order to reduce anthropogenic emissions.

2. Doing so will help ensure the viability of the State's coal and power industries, to the economic benefit of North Dakota and its citizens.

3. North Dakota considers CO$_2$ and pore space resources to be regulated and managed as such.
No Class VI Primacy = Unfavorable Regulatory Environment

• EPA federal authority
  • SDWA – UIC Program
  • Class VI Rule
• North Dakota laws and Regulations
  • Statute – CO$_2$ Underground Storage
  • Subsurface Pore Space Policy
  • Administrative Rules
• 2 Regulatory jurisdictions
• Project Development Deterrent
   Solution – North Dakota Class VI Primacy
Class VI Primacy > Regulatory Certainty

North Dakota’s Lignite and Energy Generation Industries need regulatory certainty regarding carbon dioxide capture, utilization, and storage.

Industry has two major concerns:

1. Pore Space Ownership
2. Long-term liability of Stored CO₂

- CO₂ is considered a valuable commodity for utilization in enhanced oil recovery
  - There continues to be a funding gap between CC and US (CC-$-US)
    - Low carbon fuel credits
    - 45Q tax credits
  - Pore space is managed as a resource.
  - Use a risk based approach to regulation, enforcement, and inspection.
Waste Disposal Regulatory Paradigm – EPA UIC Class VI

- Doesn’t account for pore space ownership or amalgamation
- Doesn’t account for post-closure (long-term) liability (SDWA does not provide for a pathway to release operators from long-term liability following the post-closure period)
- Sidesteps the Public’s Role in both the creation of CO2 and the mitigation of its release into the atmosphere
- Places the burden solely on industry to rid itself of “waste” from which the public must be “protected”
- Lack of citizen buy-in with respect to responsibility for the problem as well as the solution negatively impacts CCUS as a viable methodology for reducing anthropogenic CO2 emissions

Resource Management Philosophy – Geologic Storage of CO2

- Defines pore space ownership and allows for amalgamation
- Accounts for transfer of long-term liability of closed CO2 storage facility
- Allows for the regulatory complexities of CCUS to be integrated into a unified regulatory framework through a “public-private partnership”
- Improves environmental protection
- Maximizes Storage Capacity