

NORTH DAKOTA LAW REVIEW ENERGY LAW SYMPOSIUM

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Energy Policy Development, Justifications and Outcomes

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Pre Industrial Revolution




- Human and animal labor were major sources of energy
- Wealth, prosperity were related to ability to move, command, control and feed vast numbers of people
- Labor was transformed into wealth with little mechanical improvements
- Energy policy did not really exist

Industrial Revolution-Early Electrification



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- First energy policies objectives sought to spread and create wealth and prosperity
 - **Policy: Rapid Electrification**
 - Reaction: Co-ops, significant government investment, TVA
 - Energy didn't come directly from human labor
 - Energy began to come from machines, fed by fossil fuels
 - Objective was successful as mechanical advantages and machines transformed energy into wealth and prosperity
 - Relatively little R&D, little to no public opposition




Wartime and Postwar Expansion

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- Objectives: Provide energy for the industrial machinery to transform energy into wealth and military might
 - Specific Policy: Accelerate Dam development
 - Response: Alcoa Aluminum in Washington—dams were built with excess capacity, with the belief that industry would soak up that capacity
 - Objective was successful
 - Growing R&D, minor but growing opposition, increasing timelines for projects
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Cold War Malaise


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- Objective was to increase energy security
 - Policy: Prohibition of natural gas being used for power plants in 1974
 - Reaction: Rapid deployment of coal power plants, including in North Dakota
 - Objective was successful
 - Significant R&D—nuclear, Dakota Gasification, significant public engagement, major transmission controversies in Minnesota, opposition to nuclear power
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Environmental Movement

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- Objective was to reduce acid rain, pollution
 - Policy: Clean Air Act Amendments of 1977, 1990
 - Reaction: Shift to western coals
 - Still major R&D, extended policy timelines, public engagement and political strong-arm tactics, but no longer could policy be considered to move quickly
 - Objective was successful

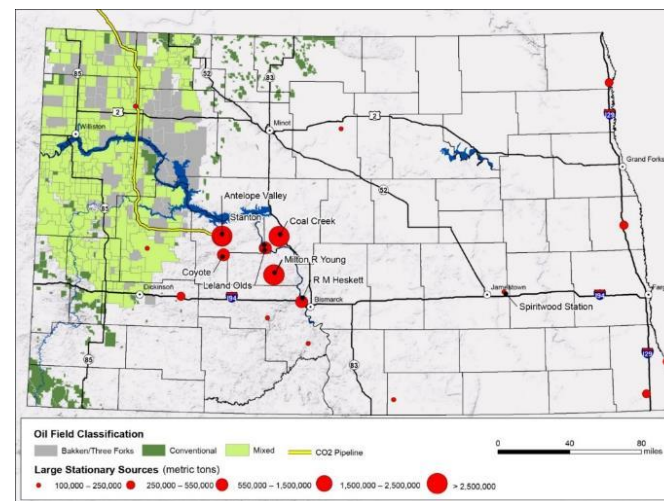


Modern Energy Policy

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- Objectives are to reduce climate change
 - Policy: Clean Power Plan, reducing CO2
 - Reaction: Major R&D, industry moving to anticipate new regulations, public pressure from Investor Groups, financing arms and public at large
 - **Less linear regulatory/industry progression**
 - More difficult to define success

Much of the Focus Has Been on Carbon Management - North Dakota is Ideally Suited

- North Dakota has an ideal situation for CO₂ management
 - CO₂ emission sources are in close proximity to CO₂ storage targets
 - Between 23 and 78 Gt of storage available within the state between saline formations and oil reservoirs





New Fleet Technology Solution Allam Cycle

- Near-zero emissions
- Uses CO₂, not steam to drive turbine
- Smaller footprint, extremely efficient
- Economically competitive with natural gas



Existing Fleet Technology Solution Project Tundra

- Carbon capture retrofit to the Young Station in Center, North Dakota
- Amine/Solvent based technology already demonstrated at a large scale
- Project enhancements from previous deployments to improve efficiency and reduce cost of capture

What's Next?

- Drive CO2 Uptake and partnerships
- Enhanced oil recovery needs CO2
 - Oil fields don't care where CO2 comes from
- State implemented incentives to produce oil with CO2, regardless of sources of CO2
- State of North Dakota's interests include maximizing use of its natural resources
 - Using manmade CO2 leverages North Dakota's coal resource AND its oil resource
 - Manmade CO2 is more technologically challenging to capture
 - Empower identified a need for an additional incentive for manmade CO2



New CO2 Incentive

- Accounts for challenges associated with capturing manmade CO2
- Provides same benefit to oil recovery
- Adds a new 20 year exemption from oil taxes for oil produced from coal-derived CO2
- Constrained to non-Bakken traditional wells
- Managed and certified by the Industrial Commission
- Other exemptions remain unchanged

Future Energy Policy: 2020

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- Objectives are to cleanly and economically produce power in North Dakota
 - Policy: Lignite Research Fund
 - Reaction: Major R&D, DOE Partnerships, Industry Engagement
 - Less linear regulatory/industry progression
 - Objective Achieved: Project Tundra and beyond

Questions??

