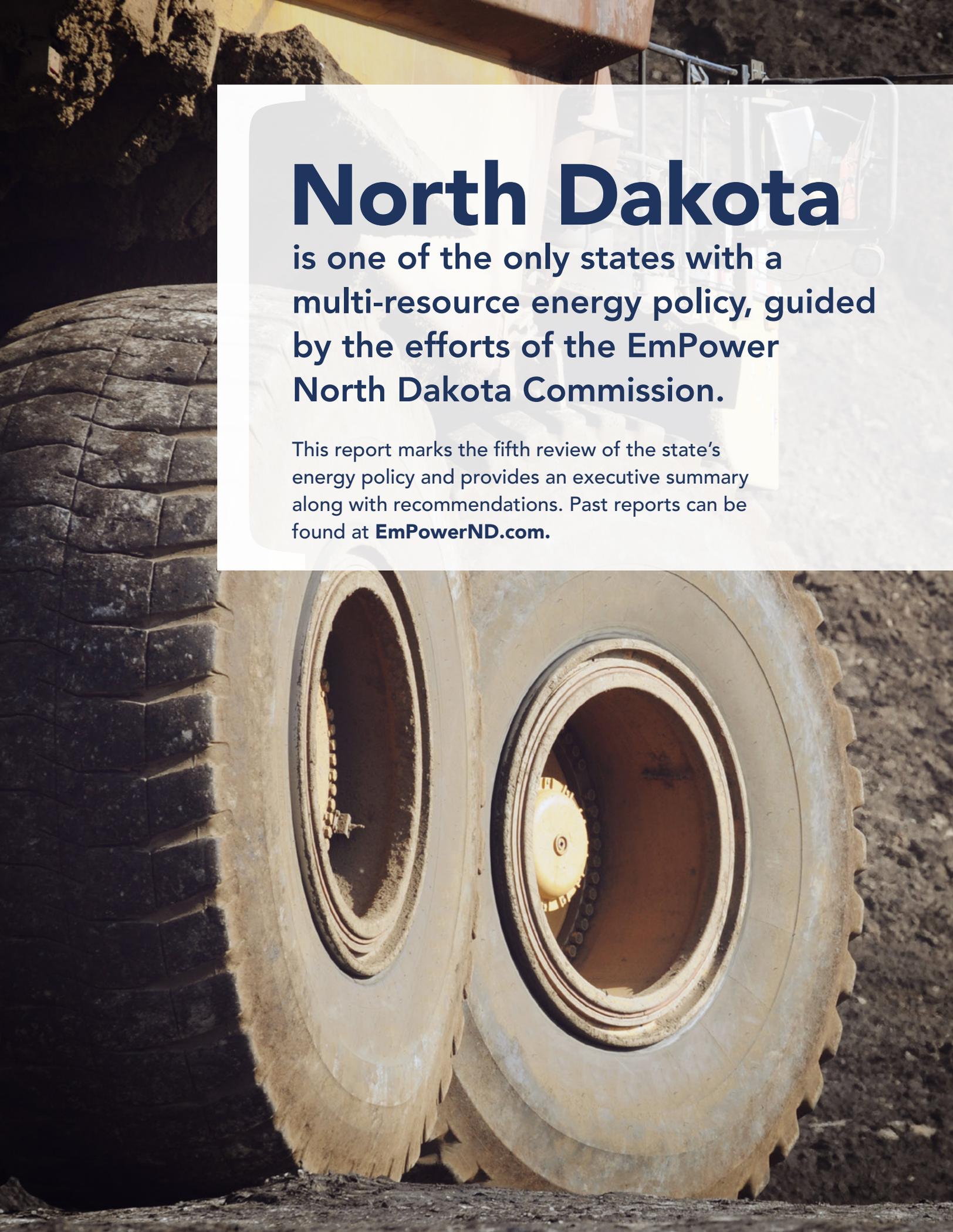
A photograph of an oil pumpjack in a field at sunset. The pumpjack is silhouetted against a bright, low sun that creates a strong lens flare and illuminates the sky with soft, golden light. The foreground is filled with tall, golden-brown grasses. In the background, there is a line of dark trees under a sky with scattered, light-colored clouds.

EMPOWER

NORTH DAKOTA

2016 POLICY UPDATES
AND RECOMMENDATIONS



North Dakota

is one of the only states with a multi-resource energy policy, guided by the efforts of the EmPower North Dakota Commission.

This report marks the fifth review of the state's energy policy and provides an executive summary along with recommendations. Past reports can be found at [EmPowerND.com](https://www.empowernd.com).

EmPower North Dakota

2016 POLICY UPDATES AND RECOMMENDATIONS

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A photograph of several wind turbines in a field at sunset. The sky is filled with golden, fluffy clouds, and the sun is low on the horizon, creating a warm, orange glow. The turbines are silhouetted against the bright sky. The text is overlaid on a semi-transparent white box.

North Dakota

is the 2nd largest oil-producing state in the nation.

Executive Summary

Through the EmPower North Dakota Commission, leaders from all major energy industries in North Dakota meet regularly with one common goal: to be critical thinkers for the development of the state's energy resources.

The strategic partnerships between North Dakota's long-standing and emerging energy industries enable all sectors of the industry to work together as they meet our state's and country's energy needs without government mandates, similar to those put forward in the Environmental Protection Agency's (EPA) Waters of the U.S. and Clean Power Plan rules.

North Dakota is proactive and aggressive in addressing energy development. It serves as a model for America in fostering innovative, long-term energy strategies to meet our nation's growing energy demand, and need for energy security in an environmentally responsible manner.

The state's diverse energy landscape celebrates many successes:

- North Dakota is the second largest oil-producing state in the nation and the fourth state to surpass production of 1 million barrels per day. The industry has over 13,000 oil and gas producing wells. In 2013, the industry supported 82,000 direct and indirect jobs and had a \$43 billion economic impact.
- Utility companies produce 4,000 megawatts of lignite and other coal generation at eight locations, which provide low-cost and reliable electric power to two million customers in North Dakota, South Dakota, Minnesota, Montana and Iowa. North Dakota is one of the country's top 10 coal-producing states, mining approximately 30 million tons every year since 1988, which results in an annual economic impact of \$3 billion.



Executive Summary (Continued)

- North Dakota leads the nation in the production of 10 different agricultural commodities, including two commodities used for liquid fuels. Several additional crops provide feedstock for successful and developing bio-refining industries in North Dakota.
- Between 2007 and 2013, North Dakota has gone from providing 1 percent to 3.2 percent of U.S. energy production and from ranking 23rd to 8th amongst all energy producing states.
- North Dakota's ethanol industry ranked 10th in the nation in production capacity in 2015. It contributes more than \$640 million annually to the economy and supports more than 10,000 direct and indirect jobs. The state is a national leader in flex fuel pump infrastructure and has seen a 250 percent increase in flex fuel vehicles over the past five years with 121,500 currently on the road.
- Twenty-six natural gas processing plants operate in western North Dakota; two additional new or expanded plants are planned to come online in 2016. Also, the oil and gas industry is investing over \$6 billion in infrastructure to capture natural gas.
- In 2015, North Dakota ranked 11th in the nation in installed wind energy capacity. The North Dakota Public Service Commission has permitted over 3,846 megawatts of wind generation.
- Tesoro, the state's only oil refinery, has expanded operations to 70,000 barrels per day. In addition, Dakota Prairie Refining, a diesel topping refinery producing 20,000 barrels per day, began operating in May 2015. A number of other refinery projects are in various stages of planning and permitting.
- Dakota Gasification Company owns and operates the Great Plains Synfuels Plant, the only commercial-scale coal gasification plant and carbon capture facility in the U.S. that also manufactures synthetic natural gas, as well as many other by-products from lignite coal. The plant is currently constructing a urea facility slated for completion in 2017 to produce 1,100 tons of urea daily, with the ability to shift urea production to produce diesel exhaust fluid, which is used to reduce NOx emissions in diesel engines, as mandated by the federal government.



Executive Summary (Continued)

- Verendrye Electric Cooperative has the largest solar program in the state. It features 260 solar powered water pumps, including the 18 systems installed in 2015. The pumps are primarily used in pasture wells in remote areas where building power lines is cost prohibitive.
- Whiting Oil uses photovoltaic systems (PV) at oil well sites to power pump jacks in isolated areas where electrical service is currently unavailable. The PV systems also allow control room staff at natural gas processing plants to monitor production levels at any time.
- Cass County Electric Cooperative broke ground on the state's first community solar garden in June 2016. The Prairie Sun Community Solar is a 102 kilowatt solar array with 324 panels that will give cooperative members access to solar power without the hassle of equipment installation and maintenance.
- The University of North Dakota is working to demonstrate the technical and economic feasibility of electrical power generation using the heat contained in oil field fluids. This geothermal system will generate a continuous 250 kilowatts of electricity from non-conventional, low-temperature water from a Continental Resources, Inc. supply well site near Marmarth.

Special Note

Comprehensive updates for all energy industries can be found in the Spotlight on Energy document produced by the National Energy Center of Excellence: www.energynd.com/spotlight

EmPower ND Commission Members

In 2007, the North Dakota Legislature formalized energy policy and created the 16-member EmPower Commission, which includes representatives from across the energy industry. Their insights provide the substance for this updated EmPower North Dakota Comprehensive State Energy Policy.



Al Anderson
North Dakota Department
of Commerce, chairman



Jason Bohrer
Lignite Energy Council,
lignite coal



Mark Bring
Otter Tail Power
Company, ex officio



Ron Day
Tesoro, refining or
gas-processing



Terry Goerger
farmer, agriculture



Margaret Hodnik
Allete, Inc., ex officio



Ron Ness
North Dakota Petroleum
Council, oil and gas



Dale Niezwaag
Basin Electric Power Cooperative,
generation and transmission
electric cooperatives



Mark Nisbet
Xcel Energy, wind



Mike Rud
North Dakota Petroleum
Marketers Association,
petroleum marketers



Randy Schneider
North Dakota Ethanol Producers
Association, ethanol



Jay Skabo
Montana-Dakota Utilities Co.,
investor-owned utilities



David Straley
North American Coal
Corporation, lignite coal
producing industry



Sandi Tabor
KLJ, ex officio



John Weeda
Great River Energy,
biomass



Julie Voeck
NextEra Energy Resources,
LLC., ex officio



Commission Recommendations

INFRASTRUCTURE

Water, oil and natural gas pipelines, roads, railroads, electric transmission lines, power generation and affordable housing – all are key infrastructure needs for the development of North Dakota’s energy resources. Infrastructure provides the backbone for North Dakota’s energy industry to export products to the rest of the world. In addition, a vital infrastructure is critical to the growth of communities, the minimization of development impacts and the enhancement of public safety.

- The 2013 Legislative Assembly made substantial progress towards meeting the critical infrastructure needs of the state with an investment of \$2.5 billion, nearly double the amount appropriated in 2011.
- Early in the 2015 legislative session, Gov. Jack Dalrymple signed an unprecedented \$1.1 billion early funding bill that provided North Dakota counties, cities and the state highway department a head start on road and other infrastructure projects in the Oil Patch and beyond.

Infrastructure provides the backbone for North Dakota’s energy industry to export products to the rest of the world.

In light of the issues facing infrastructure related to energy development in the state, the Commission urges the State of North Dakota to:

- Continue to provide support to key infrastructure for both energy and community development (roads, rail, water and waste water, emergency and medical services, airports, etc.) across all regions.
- Provide legislative funding on a priority basis and make low-interest loans available to political subdivisions to ensure that critical infrastructure projects begun with the 2015 early funding legislation are completed and that other projects identified by the 2016 study by the Upper Great Plains Transportation Institute are prioritized.



INFRASTRUCTURE (CONTINUED)

- Support expansion of existing water systems to provide capacity to meet growing community and commercial needs, including support for the State Water Commission’s efforts to increase access to Lake Sakakawea water for community and commercial needs.
- Monitor the railroad infrastructure upgrade plan within North Dakota to ensure there is adequate ability to meet the export demand of all commodities to market.
- Continue support for the Ombudsman Program, which is provided to landowners by the pipeline restoration and reclamation oversight program and consider expanding the program’s focus to other reclamation sectors. (Started as a pilot by the North Dakota Department of Agriculture in April 2015.)
- Provide legislative clarification of state permitting and jurisdictional authority where required. Any required state level permitting process should include input from local political subdivisions as part of the standard permitting process. Local permitting conditions should not be more stringent than state conditions, unless the political subdivision can prove commercially applicable and reasonably prudent.
 - Political subdivisions’ input and discussion are valued, but should not duplicate a state permitting process and create jurisdictional uncertainty.
 - The input must follow the prescribed process and preserve the due process designed for state oversight and authorization.
 - The 53 sets of county rules, over 300 city rules, and 1,430 township rules create uncertainty, delays and duplication of efforts, economic development restriction, and limitations on the ability to build critical infrastructure that improves safety, transportation and quality of life.



RESEARCH AND DEVELOPMENT

Research and development (R&D) is a key component in ensuring the sustainable use of our valuable natural resources now and into the future. North Dakota is a leader in fostering R&D partnerships between state government, private industry, higher education and research facilities. R&D plays an essential role in diversifying North Dakota's economy and identifying value-added opportunities for the state's largest economic drivers – energy and agriculture.

As R&D funding is reduced at the federal level, contributions by the state and its partners are critical in the effort to find methods that best utilize North Dakota's vast resources to secure its energy future. R&D provides a road map for the development of new technologies. This includes:

- Understanding the integration between renewable and traditional energy resources.
- Meeting federal climate policy objectives.
- Exploring development of production technologies that may reduce greenhouse gas emissions.

Traditionally, lignite R&D has focused on preserving the existing fleet of lignite-based

plants by developing new options for increased efficiency and reduced emissions. In 2015, the Legislature provided \$5 million in funding for research into new technologies to produce low-cost, lignite-based energy – solutions that are near zero emissions, including CO₂. Funding is needed to further develop, demonstrate, and ultimately commercialize these transformational technologies.

Approximately \$8 million is available each biennium to fund R&D through the Lignite Research Council. The funding is derived from a two cents per ton R&D tax, a dedicated percentage of the Coal Trust Fund, and for a limited time (through July 31, 2018), a portion of the coal conversion tax. A portion of this funding is also used by the North Dakota Transmission Authority to work on transmission issues, which can limit energy development opportunities in the state.

RESEARCH AND DEVELOPMENT (CONTINUED)

The opportunities for enhanced oil and gas recovery in North Dakota are in the early stages of development. The current growth in oil and gas production is primarily due to the utilization of new technologies and practices. At the forefront of these emerging practices is the Dakota Gasification Company's plant in Beulah, where residual CO₂ is captured and delivered via pipeline into the Weyburn oil field in Saskatchewan, Canada. It is estimated that the CO₂ being injected will extend that field's productive life for 25 years and result in production of as much as 130 million barrels of oil that might otherwise have been abandoned.

Further R&D is needed to understand how CO₂ injection or other methods of enhanced oil recovery can be applied in North Dakota's oil shale play. For instance, estimates of the total oil resources in the Bakken and Three Forks Formations range from 300 to 900 billion barrels of oil. If applications of CO₂ improved outcomes by even 1 percent, that would result in the recovery of 3 to 9 million additional barrels.

R&D will be a "key" to unlocking enhanced oil and gas production in the Bakken and Three Forks systems, legacy formations, and potential formations undergoing study. The Bakken Optimization Program is looking for the best methods to recover the oil and gas resources that remain underground and to minimize the environmental impacts. This program includes research on waste minimization and utilization, spill remediation and land reclamation.

Funding for the Oil & Gas R&D Council is appropriated indirectly from the oil and gas production taxes at \$10 million per biennium. A portion of this funding is used to provide staff for the Pipeline Authority to continue work on matters of oil and gas transportation.

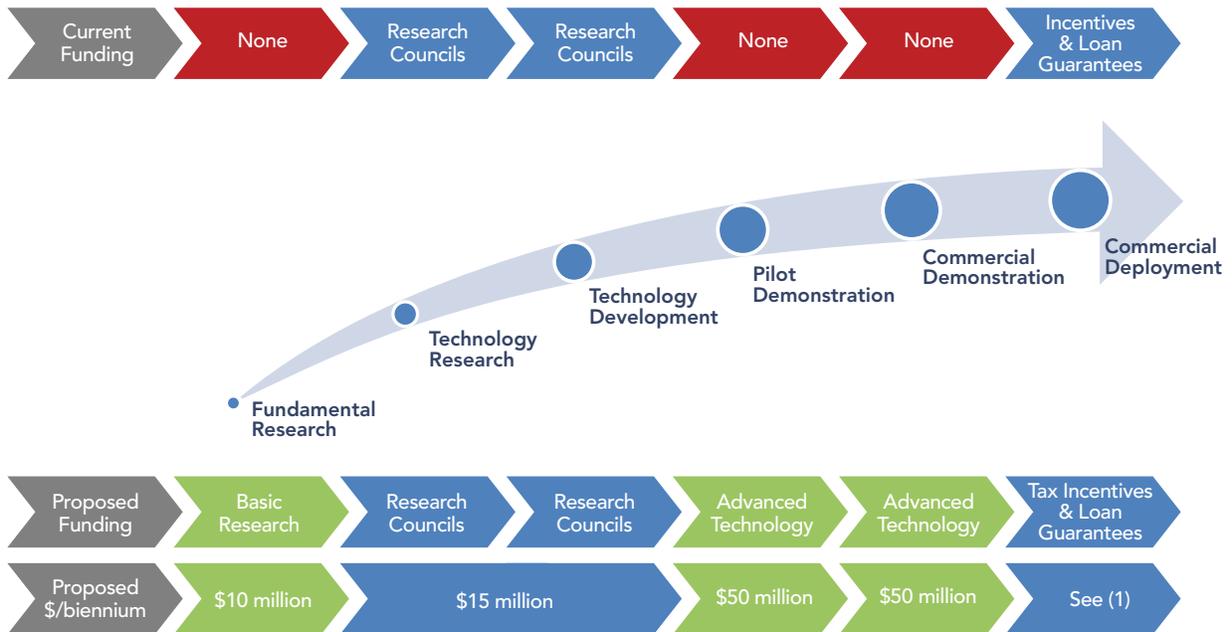
R&D plays an essential role in diversifying North Dakota's economy and identifying value-added opportunities for North Dakota's largest economic drivers – energy and agriculture.

The Renewable R&D Council is funded at \$3 million per biennium from the State's Resources Trust Fund. This program promotes the growth of North Dakota's renewable energy industries through research, development, marketing and education. Funded projects have included the development of new renewable feedstocks, as well as technologies to process renewable energy.

As all our energy resources are developed, these research programs can play a critical role in advancing value-added processing and manufacturing across the state. Similar to the tremendous growth witnessed in value-added agriculture, North Dakota can become a leader in value-added manufacturing related to energy development.

In light of the issues and opportunities needing research and development related to energy resources in the state, the Commission urges the State of North Dakota to:

Typical Technology Development Pathway & Funding



(1) Continue existing incentives and add an anthropogenic (man-made) CO₂ utilization incentive.

- Continue to support existing R&D programs which will ensure the development and implementation of new technologies to promote growth for all energy resources.
 - Remove the sunset provision for the portion of the coal conversion tax going into the Lignite Research Fund, and maintain a commitment of at least \$8 million per biennium.
- Support fundamental research for value-added energy that advances product research, development and commercialization at the UND EERC. The Commission recommends a non-matching funding level of \$10 million per biennium with oversight provided by the Lignite Research Council and Oil & Gas Research Council.
- Support the additional appropriation of dollars for use by the lignite and oil and gas research councils to support pilot and commercial demonstration, resolve the technical problems associated with the commercial deployment of carbon capture technologies, and seek additional incremental improvements in the recovery of oil through enhanced oil recovery using CO₂ or other gases. The Commission recommends a funding level of \$50 million per biennium for a pilot/commercial demonstration project.
- Create and implement a strategy to assist North Dakota in developing viable hydrocarbon- and bio-chemical industries.
- Engage the Electric Power Research Institute to create an impact model for North Dakota that enhances our understanding of integration of traditional and renewable electrical generation.



REGULATORY ENVIRONMENT

EmPower North Dakota Commission policy statements and goals often reflect concerns regarding the existing federal regulatory climate that often fails to provide for reasonable, responsible and cost-effective regulations over many facets of the energy industry. Federal regulations must:

- Provide a fair and responsible regulatory environment based on sound science, the capacity of current technology, and the creation of new technologies to advance and ensure future energy development.
- Be cost-effective and include sufficient lead time for industry to adapt to new statutory requirements affecting production or products.
- Minimize new barriers on investment and development and consider technological feasibility and cost of new technologies to meet regulatory demands.
- Consider the resources and strengths of each state to develop sound energy policies rather than develop broad-sweeping, one-size-fits-all policies.

North Dakota should encourage federal agencies to recognize its unique environmental issues and to work with the state to develop regulations that are flexible and make sense to allow state agencies' primacy in the program.

In developing regulations, it is crucial that economic impacts to individual state economies also be considered. The energy industry can serve as a valuable ally in helping the state identify and analyze the impact of federal regulations on the citizens and stakeholders of North Dakota. Simply understanding the impact of federal regulations is only one part of the equation. Providing input to federal regulators on proposed regulations is a crucial part of the overall strategy to protect the state's interest. Moreover, when regulations do not adequately meet the needs of North Dakota, the state and its Attorney General should vigorously defend state interests and assert primacy. Equally important are communications with the North Dakota congressional delegation on federal regulations of importance to the state.

REGULATORY ENVIRONMENT (CONTINUED)

North Dakota also must recognize both the growth and ongoing changes of all energy sectors and the additional burdens new regulations place on state regulatory agencies. Appropriate regulatory programs are a necessary part of ensuring that North Dakota can maintain its clean environment in conjunction with a healthy business environment. Staff and resources for state regulatory agencies, like the North Dakota Department of Health, need to manage federal regulatory requirements and to ensure North Dakota retains primacy over these regulatory programs.

In light of the federal regulatory climate, the Commission urges the State of North Dakota to:

- Encourage federal agencies to work with individual states and state agencies as a first resource to identify environmental issues, regulatory solutions and economic impacts to each state; in order to develop regulations that are flexible, sensible, advance the U.S. energy position and allow for state primacy.
- Encourage state agencies to provide regular updates on energy-related issues to the Commission and identify ways in which the Commission can support agency efforts on federal issues.
- Establish opportunities for state and federal regulatory agencies to collaborate on federal rulemaking efforts in ways that address individual state issues and work with other states to develop a regional approach to existing and new regulations.
- Recognize opportunities to use by-products, or encourage development of new value-added technologies and by-products, to minimize waste from new energy

development to offset increases in regulatory monitoring burdens on state agencies.

- Provide adequate funding and staffing levels for North Dakota Department of Health – Environmental Health Section to ensure it will be able to properly manage its respective programs and maintain primacy.

Appropriate regulatory programs are a necessary part of ensuring that North Dakota can maintain its clean environment in conjunction with a healthy business environment.

ADDITIONAL RECOMMENDATIONS

These recommendations are supported by the EmPower Commission, but are outside the areas of Infrastructure, Research & Development and Regulatory Environment.

- Remove the sunset provision on the sales tax exemption provided for the construction of wind powered electrical generating facilities.
- Support incentivizing man-made CO₂ for use in enhanced oil recovery.
- Provide increased funding to career and technical education programs, especially through adequate training facilities, to ensure the energy industry has needed workforce into the future.



1600 E. Century Avenue, Suite 2 • Bismarck, ND 58502-2057
Phone: 701-328-5300 • Toll-Free: 1-866-4DAKOTA • Fax: 701-328-5320
EmPowerND.com