EMPOWER
North Dakota

2008-2025

COMPREHENSIVE STATE ENERGY POLICY

Revised January 5, 2009

Legislative language for establishing EmPower ND

2007 Session Laws Chapter 204 § 6

SECTION 6. NORTH DAKOTA ENERGY INDEPENDENCE INITIATIVE - REPORT TO LEGISLATIVE COUNCIL. During the 2007-08 interim, the department of commerce shall convene an energy policy commission for the purpose of developing a comprehensive energy policy for the state that addresses:

1. The policy of this state to stimulate the development of renewable and traditional fossil-based energy within the state with the goal of providing secure, diverse, sustainable, and competitive energy supplies that can be produced and secured within the state to assist the nation in reducing its dependence on foreign energy sources.

2. The policy of this state to promote the development of new technologies, provide innovative opportunities, create additional employment and wealth that contributes to economic development, and decrease dependence on foreign energy supplies.

3. Growth of the fossil fuel and renewable energy industries within this state to encourage the state's competitiveness for both the domestic and export markets.

4. The assistance the state provides in research, development, and marketing of North Dakota-produced energy sources, including biodiesel, biomass, coal, ethanol, geothermal, hydroelectric, hydrogen, natural gas, oil, solar, and wind.

5. The need to:

   a. Expand the use of existing energy resources such as coal, oil, gas, wind, and hydropower by supporting continued research and development of technologies designed to enhance the use of traditional fuels.

   b. Examine ways to diversify the state's energy resource base by encouraging the growth of renewable sources such as wind, biomass, geological, solar, and water.

   c. Evaluate existing tax credits and incentives for all energy resources.

   d. Modernize and expand the state's energy infrastructure to ensure that energy supplies can be safely, reliably, and affordably transported to homes and businesses.

   e. Examine potential innovations that will be necessary to improve environmental conditions through the use of new technologies designed to encourage the continued use of fossil fuel as well as renewable resources.

   f. Review energy industry workforce and training needs and educational opportunities to enhance the future productivity of the energy industry.

   g. Develop a strategy to maximize the state's market opportunities in regional and global markets.

TABLE OF CONTENTS

Executive Summary 1

Commissioners 3

EmPower ND Goals 4

Overall Policy Goals and Initiatives 5

Wind 6

Transmision 8

Lignite 10

Ethanol 13

Biodiesel 16

Biomass 18

Energy Efficiency 20

Refining 22

Oil & Gas 24

Natural Gas Processing 26

Petroleum Marketing 27

Solar, Geothermal, Hydrogen and Hydro Power 28

Workforce 29

Infrastructure 30

EXECUTIVE SUMMARY

North Dakota is poised to be a model for America in the development of innovative, long-term energy resources to meet our nation's growing demand for energy in a clean, environmentally friendly, and sustainable way.

North Dakota's energy resources are more diverse than any other state in the nation. North Dakota:

- Is home to the largest deposit of lignite coal in the world.
- Is the 8th largest oil producing state in the nation.
- Is the top producer of 16 different agricultural commodities.
- Has great wind energy potential.
- Boasts the nation's only National Center for Hydrogen Technology.
- Has a university system with world-class energy research and training programs.
- Has a positive business climate and fair regulatory environment for energy development.
- Has a talented workforce with a strong work ethic.

Recognizing the incredible potential of these energy assets, in 2001 Gov. John Hoeven initiated the development of the state's first multi-resource state energy policy as part of his statewide economic development strategy.

Key ND Energy Policy Initiatives, 2001-2008

- Creation of Renewable Energy Development Fund to promote North Dakota-produced energy.
- A sales and use tax exemption for construction of co-generation power plants in conjunction with value added agriculture projects, and waste heat electric generating facilities.
- The Governor's Counter-cyclical Ethanol Production Incentive makes up to $7.3 million available to ethanol plants in the 2007-2009 biennium.
- Biofuels PACE and Biodiesel PACE programs to provide interest buy-down for ethanol and biodiesel facilities, livestock operations, renewable fuel pumps and grain storage.
- A property tax reduction for wind generation.
- Creation of a North Dakota Transmission Authority to promote new investment in transmission lines in North Dakota. A property tax exemption for new or expanded capacity electric transmission lines.
- Continuation of the Lignite Vision 21 incentives including up to $10 million in matching funds demonstration project.
- Expanded funding for the Lignite Vision 21 program.
- Creation of the Oil and Gas Research Fund to stimulate the production and development of oil and gas in North Dakota.
- A tax exemption for the first two years on any new shallow natural gas well developed in North Dakota to stimulate the production of natural gas.
- An expanded tax incentive for tertiary recovery of oil

and gas using CO2 gas. The incentive provides a use and sales tax exemption for carbon dioxide that is used for enhanced oil recovery.

- Creation of a Pipeline Authority to help private industry construct additional capacity to ship crude oil, natural gas, carbon dioxide ethanol, biodiesel and other energy products to market.
- Tax reduction for new drilling in the Bakken Formation.

A New Approach

Partnerships between traditional energy industries and the emerging renewable industries are a central component of North Dakota's approach to energy development. This strategy recognizes that meeting our nation's long-term energy needs in an environmentally and sustainable way requires all players in the energy industry to be engaged and successful.

Examples abound of these partnerships at work in North Dakota. Blue Flint Ethanol joined forces with Great River Energy to use waste energy from the coal-fired power plant to produce ethanol. North Dakota oil companies are interested in using captured CO2 from coal-fired facilities such as power plants, coal gasification and liquefaction facilities and ethanol plants, to enhance oil recovery.

North Dakota's broad-based energy policies have helped trigger more than $5.1 billion in new energy-related investments since 2005.

- The oil industry is producing 151,000 barrels a day as of April 2008, a record production.
- Four years ago, North Dakota had only two small ethanol facilities and no biodiesel facilities. Today, existing and planned facilities have the potential to produce a half billion gallons of ethanol and 85 million gallons of biodiesel.
- A few years ago North Dakota produced less than 1 megawatt of wind power. Today, current and projected projects will produce up to 1500 megawatt of wind power.
- Three major projects are under construction or being planned as a result of the state's Lignite Vision 21 program. Construction has started on a combined-use energy plant in Spiritwood and planning is occurring for a potential coal gasification plant in South Hearth and a coal liquefaction facility in McLean County.
- Great River Energy is implementing a coal-drying system at its Coal Creek Station power plant that promises to significantly increase the efficiency of lignite and reduce emissions.
- Basin Electric is undertaking a major CO2 capture and sequestration project in North Dakota.
- The oil and gas industry is constructing four new natural gas processing plants.
- Pipeline companies are planning to nearly double oil pipeline export capacity.

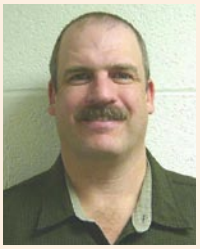
EmPower ND Commission

The 2007 Legislature approved House Bill 1462 which established an energy policy commission to take a comprehensive look at the state's energy industry with the goal of enhancing overall energy policy.

Governor Hoeven appointed the 14-member EmPower ND Commission, which includes representatives from all sectors of the energy industry. Shane Goettle, Commissioner of Commerce, chairs the committee.

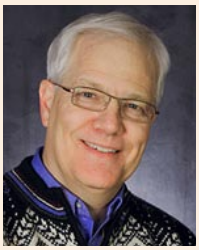
EmPower ND Commission Members

Chairman
Shane Goettle,
Commissioner of Commerce



Refining Industry
Ron Day,
Tesoro

Agriculture Industry
Terry Goerger,
Farmer



Petroleum Marketers
Paul Goulding,
Goulding's Oil

Biodiesel Industry
Eric Mack,
Archer Daniels Midland

Oil and Gas Industry
Ron Ness,
North Dakota Petroleum Council

Generation/Transmission Electric Coops
Curtis Jabs,
Basin Electric Power Cooperative

Wind Industry
Mark Nisbet,
Xcel Energy

Ethanol Industry
Randy Schneider,
North Dakota Ethanol Producer's Association

Investor-Owned Utilities
Andrea Stomberg,
MDU

Lignite Coal Industry
David Straley,
North American Coal Corporation

Transmission
Sandi Tabor,
North Dakota Transmission Authority

Biomass Industry
John Weeda,
Great River Energy

Ex officio member
Chuck MacFarlane,
Ottertail Power Company

The group held its first meeting in Bismarck in September 2007, and seven subsequent public meetings throughout the state. Developing this policy consisted of three phases: information gathering and public input as mentioned via the eight public meetings, analysis of the information, and development of the policy.

The EmPower ND Energy Policy includes 21 goals, 40 policy statements and 98 action items. The policy offers a balanced approach to encourage growth in all energy sectors, emphasizing energy efficiency, environmentally friendly policies and practices and strongly supporting research and development of cleaner technologies.

EMPOWER ND GOALS

In this document, the EmPower ND Commission outlines 40 policy statements that reflect positions the state needs to take in order to achieve these 21 energy goals. The action items provide a roadmap for getting there and include items that require immediate attention, issues that should be addressed in the 2009 Legislative session and long-term initiatives that may require further policy development and/or study. EmPower ND also makes recommendations for actions at the federal level that will require attention from our state's Congressional delegation.

1. Double North Dakota's energy production from all sources by the year 2025 to drive economic growth and help the nation achieve greater energy independence.
2. Support the nation's 25X25 Initiative to derive at least 25 percent of all energy produced from renewable sources by 2025.
3. Increase installed capacity of wind generation to 5,000 megawatts by 2020, for existing and regional markets conditioned upon a prior commensurate increase in North Dakota transmission export capacity and a cost-effective and equitable allocation of the associated cost to North Dakota customers.
4. Increase North Dakota's energy export capacity to 7,500 megawatts in coordination with other states and regional planning entities to facilitate permitting, construction and upgrading transmission systems by 2020.
5. Build one, and possibly more, clean-coal electric generation plants in North Dakota.
6. Produce 450 million gallons of ethanol by 2011 and develop both in-state and out-of-state markets for ethanol and associated byproducts.
7. Build new biodiesel plants in North Dakota to produce 135 million gallons by 2015.
8. Encourage development of economically feasible refining projects in North Dakota.
9. Be recognized as the 6th largest oil producing state nationally, up from current position as the 8th largest oil producing state.
10. Increase the amount of natural gas processed in North Dakota by 64% to 75 billion cubic feet per year by 2012.
11. Retrofit existing electric generation units to meet new environmental standards.
12. Facilitate the development of new lignite gasification/liquefaction facilities in North Dakota to produce lignite-to-liquid fuels, hydrogen, and other chemicals or natural gas.
13. Develop commercial biomass production and use in North Dakota. This would include, but not be limited to, efforts in biomass for heating and processing, co-firing of biomass with coal and other fossil fuels, anaerobic digestion, landfill and other waste gas recovery and perennial grass.
14. Become a national leader in the development of economically viable, production-scale cellulosic ethanol production facilities.
15. Increase energy efficiency in North Dakota through education and promotion of energy savings best practices and programs.
16. Exceed North Dakota's 1984 historic peak production of 148,000 barrels of oil a day by producing 175,000 barrels a day.
17. Sustain a level of oil production of at least 150,000 barrels a day for 10 years.
18. Support a market for all energy products driven by consumer demand.
19. Attract a sufficient number of workers to fill energy related jobs due to retirements, attrition and growth within the energy industries.
20. Ensure adequate water, power, and infrastructure for energy development and for the communities in which energy development exists.
21. Encourage research and development programs that deal with solar, geothermal, hydrogen, hydro power, pumped storage and other alternative energy sources.

OVERALL POLICY GOALS AND INITIATIVES

Goal: Double North Dakota's energy production from all sources by the year 2025 to drive economic growth and help the nation achieve greater energy independence.

Goal: Support the nation's 25X25 Initiative to derive at least 25 percent of all energy produced from renewable sources by 2025.

Policy: Educate the people of North Dakota and their representatives on the impact of the state's energy industry.

- Develop aggregate impacts of each sector and the industry as a whole to serve as an education, marketing and recruitment tool for North Dakota.
- *(Federal)* Encourage Congress to base any legislation impacting North Dakota's energy industries on sound science and sound economics.
- *(Federal)* Provide sufficient lead time for industry to adapt to new regulatory standards affecting production or product.

Policy: The EmPower ND Commission does not support state energy mandates.

WIND

Opportunities: North Dakota's wind resources have been documented as the most abundant in the nation. Advantages for growing this industry include:

- Unlimited, carbon-free energy source that does not require water.
- The presence of experienced manufacturers of wind generation equipment and potential to expand this manufacturing niche.
- The presence of experienced wind farm construction companies in the state.
- Abundant land, receptive landowners, and public support for wind development.
- Opportunities to form diverse coalitions by combining wind development with other energy (hydrogen) or economic development projects.
- Attractive state incentives.
- Job and industrial growth through spin off industries.

Challenges: Despite all the opportunities and strengths of wind energy development, the industry faces investment hurdles, transmission and export challenges, and questions concerning the economic viability of the industry without government support. Other challenges:

- Short window of opportunity (three-four years) to take advantage of market conditions to secure a wind generation equipment manufacturing base in North Dakota.
- High demand for components is restricting their availability and limiting construction of new wind farms.
- Variability of resource.
- Lack of dispatchability, due to variability of the resource, and limited ability to store the energy.
- Long distance to markets where demand is strong, requiring costly high-voltage transmission infrastructure.

energy fact

North Dakota's wind resources are among the most abundant in the nation.

- Inconsistent incentives affect demand and development rate.
- Siting issues including: aesthetics, environmental impacts, equity among landowners, and cultural issues.
- Economics don't support large scale transmission development.
- Focus on wind energy for electric generation may limit the vision for using wind energy for other purposes.
- Federal Production Tax Credit requires corporate ownership, which limits opportunities for locally owned projects that build wealth in the state.

Goal: Increase installed capacity of wind generation to 5000 megawatts by 2020, for existing and regional markets conditioned upon a prior commensurate increase in North Dakota transmission export capacity and a cost-effective and equitable allocation of the associated cost to North Dakota customers that:

- Maintains grid stability.
- Preserves affordability for North Dakota electric rate payers.
- Maintains and expands opportunities for North Dakota lignite coal and natural gas industries, including offering base-load, peaking and other services for large-scale exporting of energy .
- Maintains availability of competitively priced natural gas supplies for all North Dakota based businesses and homes.

Policy: Maintain a fair regulatory environment for wind development that encourages companies to transform the state's extensive wind resources into energy in a way that protects the state's scenic beauty and the rights of property owners.

- The state should address boundary issues and property owner's rights (wind wake issues).
- Review siting standards for transmission lines to encourage growth of transmission infrastructure.

Policy: Maximize the availability of research dollars to be a leader in cutting edge wind harnessing technology.

- Support sufficient funding for the Renewable Energy Development Program to leverage private sector dollars for wind research including using wind for alternative energy uses such as converting wind to hydrogen or compressed air.

Policy: Support sensible, effective incentives to encourage investment in renewable wind resources that can play a vital role in addressing our nation's energy needs.

- *(Federal)* Support the extension of the wind energy production tax credit.
- Study the property taxation of wind farms based upon installed capacity and production.
- Study the use and effectiveness of existing incentives and the costs associated with proposed tax incentives.
- Extend the reduction of taxable value to 1 ½ percent for wind generating units until 2015. This action is only applicable if the above action, capacity/production based taxation, is not accepted before the 2009 legislative session.
- Make permanent the sales and use tax exemptions for building materials, production equipment, and other tangible personal property used in the construction of a wind-powered facility.
- Extend the 15 percent income tax credit (3 percent for first five years for a total of 15 percent) on the costs associated with installing a wind, biomass, geothermal, or solar energy device until 2015 and extend the income tax credit carry forward from five to ten years. The income tax credit is currently set to expire in 2011. The proposed extension of the carry forward is supported assuming that the sellable tax credit provisions for wind will sunset in 2011.

TRANSMISSION

Opportunities: Despite the significant needs and challenges surrounding the transmission in our state and nation, North Dakota has some positive factors working in its favor:

- Reliable and adequate transmission system for serving current load.
- Favorable regulatory environment.
- Favorable terrain for new transmission lines.
- Proximity to markets where energy demand is high.
- Reasonable landowners.
- Renewable Energy Portfolio Standards in neighboring states (driving demand).
- Funding capability, e.g. tax-exempt bonds.

Challenges:

- Exporting additional generation will demand enhancements and/or expansion of transmission systems across a complicated network of multi-jurisdictional authorities including North Dakota, South Dakota, Montana, Minnesota and Wisconsin.
- Renewable development is occurring in areas with limited access to markets.
- No solutions exist for addressing the intermittent and largely uncontrollable nature of wind generation.
- Renewable project developers must consider the cost or timing of interconnection to transmission infrastructure.

energy fact

Constructing new transmission lines is estimated to cost $500,000 per mile.

- Transfer of electricity between MISO and non-MISO operating systems in North Dakota is expensive.
- Public policy in other states may inhibit the ability to site new transmission facilities.

Goal: Increase North Dakota's energy export capacity to 7,500 megawatts in coordination with other states and regional planning entities to facilitate permitting, construction and upgrading transmission systems by 2020.

Policy: The Transmission Authority will facilitate and coordinate new transmission initiatives to benefit North Dakota.

- (Federal) Encourage Congress to support a tax exempt status for state issued revenue bonds issued by the North Dakota Transmission Authority.

- The Transmission Authority will take an active role in working with regional transmission owners, Midwest

Independent System Operators (MISO), Integrated System (IS) and Federal Energy Regulatory Commission (FERC).

- The Transmission Authority will assess the value of any regional transmission initiative and support those that will actually benefit North Dakota.

Policy: The Transmission Authority should encourage cooperation between energy producers and transmission owners about the future of transmission.

- The Transmission Authority will facilitate discussions between energy developers and transmission owners about transmission issues by initiating round table meetings.

Policy: State policy makers must monitor how costs of building new transmission facilities are allocated and the impact on system reliability.

- The Transmission Authority will continue to work with regional transmission owners, MISO, IS and FERC on cost allocation issues.

LIGNITE

Opportunities: North Dakota has an 800-year supply of lignite reserves, the largest in the world, that offer an economical, reliable domestic source of energy and fuel that is in high demand and located near high-growth markets.

- The industry has a positive environmental record and history of developing clean coal technologies, e.g. mercury, sulfur dioxide and fly ash.
- Research and development (coal drying, carbon dioxide (CO2) sequestration, saline aquifer storage, etc.) is reducing environmental footprint, improving efficiency and creating new uses for lignite and its byproducts.
- Existence of North Dakota Transmission Authority, North Dakota Pipeline Authority, the Lignite Research Council (public-private partnership) and cooperation between lignite and oil and gas industries.
- Geologic formations in North Dakota offer strategic advantages for CO2 storage and are a short distance from CO2 producers
- Enhanced oil recovery offers a strong, in-state market for captured CO2.
- Strong public and political support for existing CO2 research and development.
- Progress is being made on CO2 management and joint projects through Plains CO2 Reduction partnership (PCO2R).
- Favorable tax incentives, proactive state CO2 regulations, and favorable state regulatory environment, and cooperative state officials create a positive environment for business.

Challenges: North Dakota's lignite industry faces pressures from environmental and emission standards that will increase costs and jeopardize existing and future coal-based power generation.

energy fact

North Dakota has an 800-year supply of lignite reserves.

- North Dakota lignite has low BTU value and high moisture content resulting in higher CO2 emissions per kilowatt hour than higher grade coals.
- The timing of climate change legislation is not synchronized with the availability of technology to meet the new standards.
- Limited growth for in-state electric demand.
- Construction of new coal-powered plants is expensive and legally challenging.
- Production costs will increase due to parasitic power requirements associated with CO2 capture equipment and increasingly lower Best Available Control Technology for nitrogen oxides.
- CO2 capture and storage technologies are in infancy stage – cost to sequester, transport or capture are significant.
- Lack of commercially viable and economically feasible technology to capture CO2, lack of infrastructure to transport it and lack of CO2 sequestration regulations.
- Low public awareness or support about CO2 uses and unknown risks of long-term storage and associated liabilities.
- Uncertain federal regulatory environment.

Goal: Retrofit existing electric generation units to meet new environmental standards.

Goal: Build one, and possibly more, clean-coal electric generation plants in North Dakota.

Goal: Facilitate the development of new lignite gasification/liquefaction facilities in North Dakota to produce lignite-to-liquid fuels, hydrogen, and other chemicals or natural gas.

Policy: Promote public education on energy policy including CO2 sequestration.

- Incorporate the tools already created by the Energy and Environmental Research Center (EERC) and the North Dakota CO2 Storage Work Group.

Policy: CO2 legislation should be based on sound science and the capacity of current technology.

- *(Federal)* Encourage Congress to oppose any cap and trade legislation that fails to recognize the need to time the implementation of law with the development of cost-effective and deployable CO2 capture and sequestration technology.

- *(Federal)* Encourage Congress to support pre-emption of state and local regulation of CO2 emissions.

- *(Federal)* Encourage Congress to support legislative solutions to global climate change that include equitable funding for each coal type to encourage research, development, demonstration and deployment of CO2 capture and sequestration technologies.

- Examine the opportunity and funding mechanism for a carbon capture and storage technical fund.

- Support state legislation to direct a portion of any allowances allocated to the state under a federal cap and trade program to the lignite research program.

- Seek state financial support to conduct an analysis of the cost/benefits of building a synfuels plant and the cost/benefits of retro-fitting an existing lignite-fired electric generating plant.

Policy: Support legislation for legal and regulatory statutes regarding long term CO2 sequestration and for programs that encourage the use of CO2.

- *(Federal)* Support a regional demonstration approach to CO2 sequestration that can help prove the viability of CO2 sequestration across multiple states.

- Conduct an evaluation of the traditional tax framework for lignite and electric generation projects and determine which incentives should be expanded to provide for new projects that allow for the future growth of the lignite industry.

- Make the tertiary extraction tax exemption permanent on any projects using CO2 for enhanced oil recovery. The sunset may create a disincentive to continue injecting CO2 in the long run when the tax rate increases in the future.

- Support the long-term sequestration proposals developed by the North Dakota CO2 Storage Workgroup.

- Support efforts of PCO2R to expedite research efforts on the long-term impacts associated with CO2 sequestration.

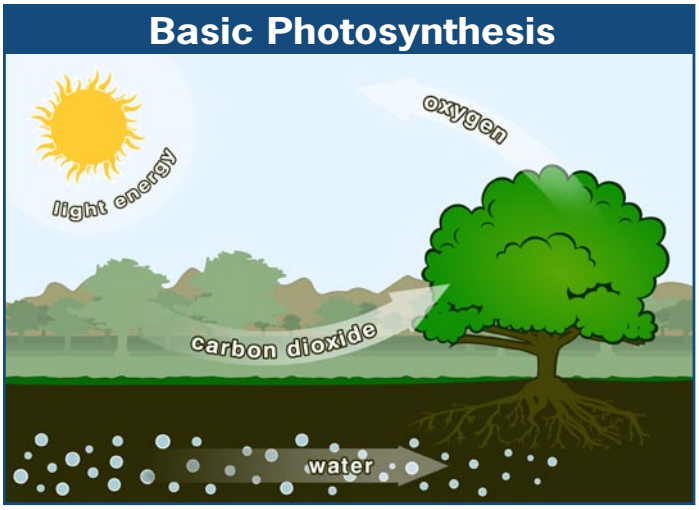
- Continue to engage political leaders in other states in discussions regarding the regional economic impact of generation standards on the North Dakota lignite industry and consumers of lignite-based electric generations.

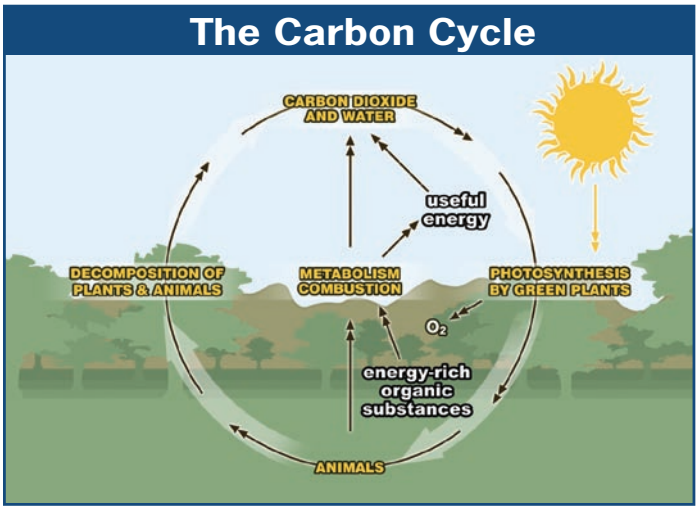
Policy: Ensure beneficiated coal is subject to the same tax treatment as traditional coal, i.e. tax incentives, sales tax exemptions, etc. by taking the following actions:

- Draft legislation to clean up the definition of coal in statute to address the changes in uses of coal.

- Draft legislation to amend the current coal severance tax exemption to include beneficiated coal that ultimately is used in North Dakota agricultural commodity processing facilities.

Policy: Define and incorporate coal to liquids and other emerging technologies into the tax code.





- Ensure the coal conversion tax addresses hybrid plants (plants that may be comprised of more than one type of coal conversion facility).

- Draft state legislation so these new industries/ technologies have "certainty" in tax legislation. Current statutes need to clarify how these new processes will be taxed they can build their business plans and provide a clear financial picture to potential investors.

Policy: Address state taxation issues regarding repowering generation plants.

- Support state legislation that will address tax issues for repowering generation facilities due to new environmental changes.

ETHANOL

Opportunities:

As the first widely used renewable fuel in the United States, ethanol has created sufficient critical mass to contribute to the energy security of the United States. Advantages for producing ethanol in North Dakota are:

- There are more than 29,000 flex fuel vehicles currently in the state.
- The Federal Renewable Fuel Standards requiring the production of 36 billion gallons of biofuel by 2022 will provide strong demand for ethanol produced by current North Dakota ethanol plants as well as those under construction.
- State tax incentives help encourage ethanol production.
- Distribution innovations within the industry promise to increase the sale and use of ethanol. These include higher blends of ethanol fuels (E20, E-25, and E-30) and the development of blender pumps that allow gas stations to blend and sell directly at the pump.
- As the industry matures, facilities are becoming more innovative producing byproducts that provide opportunity for high value spin-off industries.

Challenges:

In order to take advantage of these opportunities, the ethanol industry faces a number of ongoing challenges both in North Dakota and globally.

- World demand continues to drive up the price of corn, fuel and other critical components of ethanol production.
- With current technology, ethanol cannot be transported in existing pipelines so ethanol producers in North Dakota and throughout the Midwest struggle to move their product to urban population centers that offer the greatest market potential.
- Potential new ethanol pipelines in the Midwest are too great a distance from North Dakota and will put the local ethanol industry at a logistical disadvantage.
- The multiple blends of ethanol pose problems for retailers.
- The federal government does not currently provide effective support for improving the blending and distribution infrastructure.
- A final major challenge facing the ethanol industry is public perception and acceptance of ethanol.

energy fact

There are more than 29,000 flex fuel vehicles currently in North Dakota.

Goal: Produce 450 million gallons of ethanol by 2011 and develop both in-state and out-of-state markets for ethanol and associated byproducts.

Policy: Maintain a balanced package of incentives and policies to remain a competitive and attractive location for ethanol production.

- Request the North Dakota Tax Department to analyze existing state tax credits intended to encourage growth of the ethanol industry and associated spin-off industries. Specific issues to address:

1. Identify which incentives are being effectively used to encourage the production and consumption of ethanol.
2. Analyze the livestock investment tax credits and other applicable business tax credits to determine if they have been used effectively.
3. Recommend changes in tax policy to improve the state's overall ethanol incentive package.

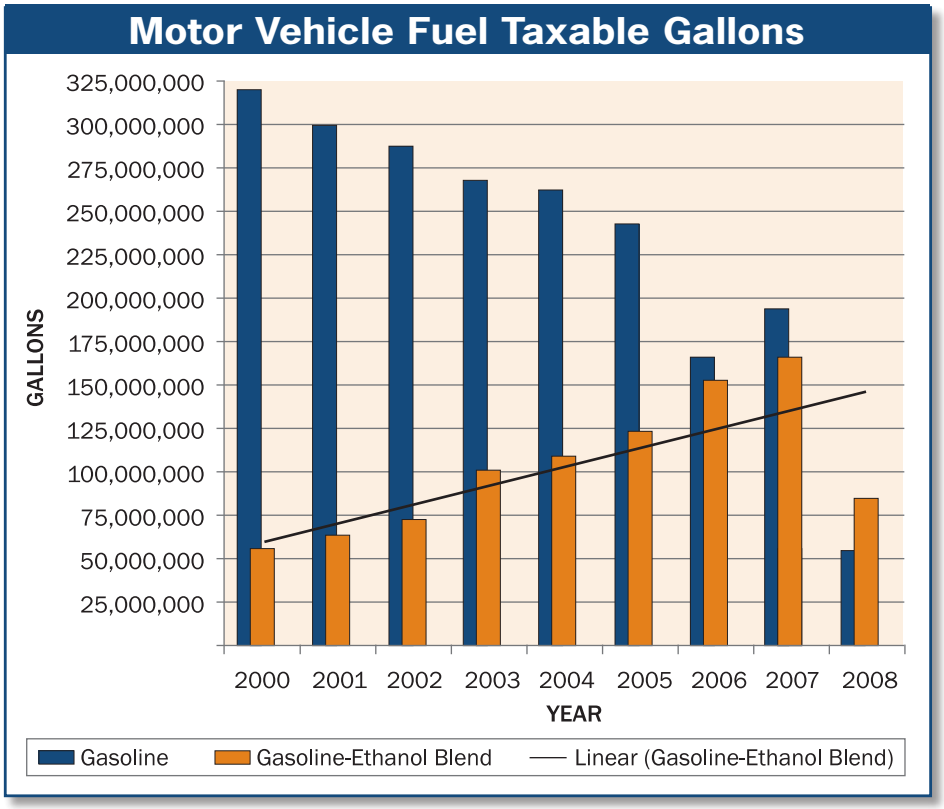
- Maintain continuing appropriations for the state's innovative Counter-Cyclical Ethanol Production Incentive program that helps producers during adverse times when ethanol prices are unusually low and/or corn prices are unusually high. (The program experienced its first payout in Q4 of 2007 in the amount of $468,000.)

Policy: Support initiatives to improve the marketing, distribution and use of ethanol.

- *(Federal)* Advocate for/support federal legislation that standardizes the labeling of pumps so consumers can clearly identify gasoline that includes ethanol.

- *(Federal)* If the federal government establishes national renewable fuel standards, those standards need to be consistent and have clearly identified timeframes that allow industry, including the refinery industry which operates on a 10-year capital plan, to make the infrastructure investments needed to support the standards.

- Establish a North Dakota Ethanol Utilization Council for ethanol promotion funded by check-off dollars from ethanol plants.



- Provide cost-sharing grants for retailers to install new pumps (i.e. E85 pumps, blender pumps, etc.) for new kinds of fuels that come into the market.

Policy: Examine and improve state and federal programs for developing infrastructure to transport and blend ethanol.

- *(Federal)* Support continuation of the federal blender's credit that is set to expire December 31, 2010.

- *(Federal)* Encourage the building of blending facilities on the East and West Coast to significantly expand the markets for selling ethanol in population-dense areas.

- *(Federal)* Support increased federal research to improve the transportation of ethanol via pipeline and ensure that North Dakota secures access to ethanol pipelines.

Policy: Support research to improve the use of ethanol byproducts.

- State institutions should increase research into potential products derived from ethanol byproducts.

- Study the permitting process for livestock feeding facilities to evaluate ways to streamline the permitting process and consider ways to expand the use of byproducts from ethanol production as a feedstock.

Policy: Support research for ethanol production technology and feedstocks development.

BIODIESEL

Opportunities:

Biodiesel is an environmentally friendly fuel with a favorable emissions and carbon foot print. The wide variety of feedstock produced in North Dakota positions the state well to be a leading producer of biodiesel. Other advantages include:

- Good North Dakota tax incentives for new business ventures.
- New federal renewable fuels standards will stabilize demand.
- Federal government mandate in 2007 Energy Bill (1 billion gallons of biodiesel by 2012)
- Reducing U.S. dependence on foreign oil.
- Creating new value-added agriculture opportunities in rural areas.
- Stabilizing production agriculture.
- Availability of high-value co-products which can help build North Dakota's livestock and feed industry.
- Engine manufacturers' warranties cover use of ASTM quality biodiesel blend.
- Promoting clean air and reducing carbon emissions.
- Industry is supported by diverse interest groups (industry, environmentalists, politicians and farmers.)
- New diesel technology is bringing increased efficiency for diesel engines which may increase diesel engine use.

energy fact

Wide variety of feedstocks position the state as a leading producer of biodiesel.

Challenges:

- High feed stock costs can create negative margins.
- Lack of adequate distribution and blending infrastructure.
- Need for more education of cold temperature flow issues and storage properties.
- Low utilization of existing production capacity.
- Some state production incentives are limited, of questionable benefit and not as attractive as production incentives offered in other states.
- Lack of North Dakota state certified lab.
- Inconsistent quality. Meeting the industry quality standard (ASTM D 675 1) is imperative.
- Lack of markets in North Dakota for meal co-product.
- Federal incentives offer short-term guarantee.
- Competition for acres to be used for feedstock.
- Inappropriate use of biodiesel tax credits by foreign produced biodiesel.
- Difficulty obtaining methanol.

Goal: Build new biodiesel plants in North Dakota to produce at least 135 million gallons by 2015.

Policy: Improve tax policy and incentives for producing, consuming, blending and transporting biodiesel.

- Initiate a Tax Department analysis of the use of biodiesel tax credits to determine their effectiveness.
- Develop tax incentives to encourage the purchase of biodiesel by North Dakota consumers.
- Evaluate and develop alternative incentive programs instead of income tax credits to support infrastructure for blending and transport, retail, and production facilities.
- Continue the sales tax exemption on biodiesel equipment.
- Develop a Biodiesel Counter Cyclical Production Incentive, similar to the Ethanol Counter Cyclical Production Incentive, to provide a safety net for the producers.
- *(Federal)* Lengthen the time-span on federal incentives to provide long-term security for investors in the industry. Support the continuation of the blender's tax credit at the federal level, and the continuation of the Commodity Credit Corporation (CCC) program in the farm bill.
- *(Federal)* Eliminate the loophole that allows foreign produced biodiesel to take advantage of the domestic biodiesel tax credit.

BIOMASS

Opportunities:

North Dakota has a diverse agricultural system that includes leading the country in the production of 16 different agricultural commodities. North Dakota has also been identified as being a great potential producer for perennial grass and other dedicated energy crops. These natural resources offer a huge opportunity for biomass development.

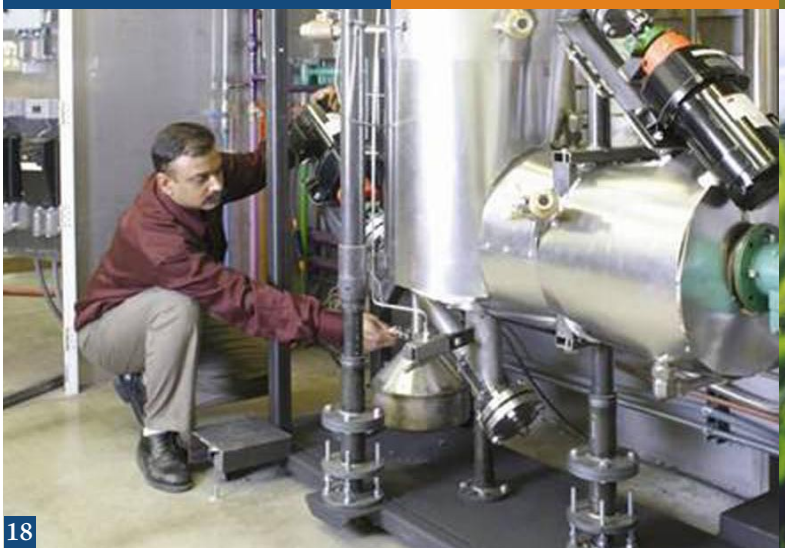
- The 2007 Energy Bill mandates production of 16 billion gallons of cellulosic-based ethanol by 2022.
- Land suitable for biomass crops is available in abundance in North Dakota.
- North Dakota has an excellent research and development base for developing new biomass crop and fuel technologies, including demonstration projects.
- North Dakota's lignite power plants and extensive lignite resources offer opportunities for co-firing/co-generation that can significantly improve the economics of biomass.
- A diverse package of state and federal incentives for biomass development exists:
  - Programs promoting green power
  - Carbon neutral or renewable fuel premiums.
  - $2 million program for biomass development
  - $3 million Renewable Energy Development Program.
- Biomass offers promising new value-added agriculture opportunities for rural areas that can help expand businesses, create jobs, grow population, and expand the tax base.
- Biomass crops offer environmental and economic advantages including extremely low input costs, suitability for marginal land and CRP, and the creation of wildlife habitat.
- Biomass development garners strong support from the public, political and conservation groups.
- The negative carbon footprint of perennial grasses creates the possibility for the sale of carbon credits
- According to the Farm Service Agency, 544,000 (18%) of North Dakota's 3 million CRP acres are set to come out of contract by September 30, 2009.

energy fact

North Dakota has an abundance of land available for biomass crops.

Challenges:

- Significant technological advancements are necessary to make biomass fuel production economically feasible.
- Current economics don't support the significant infrastructure investments required for biomass.
- State and federal incentives are limited and the private sector is not currently investing in the research necessary to develop biomass technology.



- North Dakota has a short growing season, dry climate, inhospitable climate for trees, and is remote from major markets.
- Premium lands are used for higher return food crops limiting biomass crops to marginal lands.

Goal: Develop commercial biomass production and use in North Dakota. This would include, but not be limited to, efforts in biomass for heating and processing, co-firing of biomass with coal and other fossil fuels, anaerobic digestion, landfill and other waste gas recovery and perennial grass.

Goal: Become a national leader in the development of economically viable production scale cellulosic ethanol production facilities.

Policy: Support increased funding for state and federal biomass research and development programs.

- *(Federal and State)* Continue federal and state programs that promote biomass energy development.
- Increase funding for the Renewable Energy Development Fund and the Biomass Incentive Research Fund.
- Encourage market studies on the development possibilities of biomass.

Policy: Support policies aimed at improving the long-term economic feasibility of biomass production.

- Ensure language in the North Dakota Century Code includes cellulosic ethanol in existing ethanol tax incentives.
- *(Federal)* Encourage Congress to authorize the Secretary of Agriculture to allow Conservation Reserve Program (CRP) lands to be harvested for biomass, including the possibility of planting new, perennial grasses in CRP land for future biomass feedstock.
- *(Federal)* Continue Clean Renewable Energy Bonds for biomass.

ENERGY EFFICIENCY

Opportunities:

- Increasing the efficiency of energy use is the most cost effective method of reducing the impact of rising energy costs on families, farms and businesses in North Dakota.
- Energy efficiency is the most cost effective method of reducing the environmental effect of energy production.
- Energy efficiency will allow North Dakota businesses to be more competitive in national and world markets.
- Modifications in regulatory structure will remove disincentives for regulated utilities to pursue cost-effective energy efficiency actions.
- Vocational training programs see opportunity in incorporating energy efficiency practices and procedures into their curriculums.
- Existing measures at state facilities provide positive examples of energy efficiency benefits and allow state government to lead by example.

Challenges:

- Energy efficiency is often not considered a high priority due to the state's abundant supply of and a history of relatively low-cost energy.
- North Dakota ranked last on the nationwide American Council for an Energy Efficient Economy (ACEEE) energy efficiency scorecard.

energy fact

Energy efficiency is the most cost-effective method of reducing the environmental effect of energy production.

- The state energy building code should be reviewed.
- State and federal funding for energy efficiency and low-income home weatherization programs is limited.
- The upfront cost of energy efficiency measures can be high.
- North Dakota's low population density limits the effectiveness of mass transportation.

Goal: Increase energy efficiency in North Dakota through education and promotion of energy savings best practices and programs.

Policy: Initiate state policies that encourage and increase energy efficiency.

- Develop a state energy building code.
- Develop a North Dakota state government carpooling program.
- Promote the use of public transportation.

Policy: Create incentives and education programs that promote energy efficiency.

- Recommend that the Resource Trust Fund, originally created for water and energy conservation projects, be used to promote energy conservation while maintaining a priority for water projects. Today this fund is used only for water projects. To preserve the priority for water, perhaps a trigger could be placed on the balance of the fund such that water projects receive 100% of the fund below the trigger, and a split allocation of the fund above the trigger.

- Initiate a statewide education plan to teach consumers how to save energy and consider providing financial incentives for businesses and individuals who adapt successful energy efficiency efforts.

- Promote energy efficiency education in high school and higher education construction programs.

- Recommend the Public Service Commission secure the necessary authority to approve energy efficiency programs that are cost effective and initiated by the utilities. The plan should include cost recovery and a return on investment comparable to supply side investment.

- Consider putting the North Dakota geothermal tax credit on the ND-1 short form.

- *(Federal)* Continue and enhance federal programs that promote energy efficiency and increase federal energy efficiency tax incentives.

REFINING

Opportunities: North Dakota's vast oil and coal reserves create the potential development for additional refining. However, the refining industry requires significant capital investments, new or expanded capacity operates on extremely tight margins and requires new pipeline infrastructure for transporting refined product to growing markets. Four possible refining projects are currently under consideration or development in North Dakota:

- Tesoro expansion in Mandan: An increase in production capacity is being considered.
- American Lignite Energy, coal liquefaction: Possible 1.38 million gallons of refined fuel per day. Currently considering whether to move forward with a Front End Engineering and Design (FEED) study.
- Three Affiliated Tribes near Makoti: 15,000 barrels per day of Canadian synthetic crude.
- Northwest Refining near Williston: The Industrial Commission allocated funds to study a facility capable of producing 50,000 - 100,000 barrels a day of refined product.

Competitive strengths for refining in North Dakota include:

- Availability of high quality crude and vast coal reserves.
- Increasing oil production in the Williston Basin.

energy fact

Mandan Tesoro Refinery has a crude oil capacity of 60,000 barrels per day.

- Significant community support for refinery expansions and development.
- Excellent environmental performance of existing refineries.

Challenges:

- High crude oil prices and volatility.
- Obtaining economies of scale to realize long-term competitiveness and sustainability.
- Profit margins in refining are cyclical and historically tight.
- Expansion of existing refining capacity beyond current capacity requires a substantial capital investment.
- Development of new refineries have significant capital requirements and timeframes.
- Not all crude oils are of the same quality (40 percent of North Dakota's crude cannot be processed in North Dakota's existing refining facility).
- North Dakota currently produces more refined product than it consumes.
- Lack of pipeline infrastructure for transporting

to growing retail markets inhibits expansion and development.

- Significant refining expansions are occurring in North Dakota's key export markets.
- Market uncertainty and uncertain growth potential due to federal energy policy and surrounding state mandates.

Goal: Encourage development of economically feasible refining projects in North Dakota.

Policy: The state's role in the development of future refining capacity through Industrial Commission programs is to cost-share in feasibility and FEED studies and to support and fund research and development.

- Continue sufficient funding for the Industrial Commission research programs.

Policy: Maintain North Dakota's existing tax and regulatory structure that supports refining growth.

- Continue the sales tax exemption for new or expanded refining capacity.

- Continue the sales tax exemption for environmental upgrades.

Policy: Support and assist in pipeline infrastructure development through the North Dakota Pipeline Authority.

OIL AND GAS

Opportunities: North Dakota has the biggest continuous oil deposit in the lower 48 states, estimated at 2.1 billion barrels of oil in the Bakken formation that is recoverable using current technology. In addition, the use of new technology has the potential to make many other formations in the state more productive.

- The oil and gas industry has significant and sustainable long-term growth possibilities. It is currently attracting major outside investments for oil and gas exploration and generating thousands of good-paying jobs.
- Producing considerable new wealth for mineral and surface owners.
- Significantly increasing populations in western North Dakota.
- Increasing the state and local tax base and collections.
- Increasing the domestic supply of crude oil.
- Widespread use of new technology that minimizes environmental impact.
- Potential to expand oil activity/production with the development and application of new drilling and completion technologies.
- Favorable business climate for low-volume wells (stripper) that add stable employment.
- Availability of CO2 from coal-fired power plants and ethanol plants that is potentially available for enhanced oil recovery.
- Good working relationships with other energy players to create win-win synergies within the state's overall energy industry.
- Significant opportunities to capture more of the natural gas released by drilling and reduce the loss of natural resources.

energy fact

North Dakota has the biggest continuous oil deposit in the lower 48 states.

Challenges:

- Lack of sufficient pipeline capacity for continued growth in oil production could restrict surging oil development.
- The state's oil tax structure is difficult to understand. The top rate is 11.5 percent of gross profit. The overall effective tax rate on all production is estimated at 9.3-9.5 percent.
- Large base of low-rate production stripper wells that are sensitive to changes in tax policy.
- Need better public understanding of the industry and the actual surface impact of development.
- Rapidly increasing development costs for drilling, services, steel, leases, and wages.
- Industry is under increased scrutiny and criticism from regulatory groups.

- Federal legislation seems intent on shrinking the industry with policies such as the proposed windfall profit tax and restricted access to federal land.
- Drilling and production in the Bakken formation is expensive, requiring higher crude prices to make it economically feasible.

Goal: Exceed North Dakota's historic 1984 peak production of 148,000 barrels a day by producing 175,000 barrels a day.

Goal: Sustain a level of oil production of at least 150,000 barrels a day for 10 years.

Goal: Be recognized as the 6th largest oil producing state nationally, up from current position as the 8th largest oil producing state.

Policy: Maintain a regulatory and business environment that supports and encourages oil exploration.

- Examine the taxation of the oil and gas industry and consider a flatter tax that is more competitive on the high-end and provides more revenue to the state on the low end. Any new tax structure should provide for stability, predictable state revenue, a competitive business climate, and help sustain long-term oil development in North Dakota. A flatter tax structure might include fewer rates ranging between 7% to 9.5% rather than the current range of 5% to 11.5% and would make budgeting and planning easier for both the industry and the state.

- Streamline the permitting process for upgrading oil and gas pipelines to eliminate the need for completing a full-scale permitting or siting process on an upgrade of an existing facility.

- Clarify the sales tax exemption (HB 1462) to include gas gathering systems from oil wells in order to encourage the connection of more gas and eliminate flaring.

Policy: Support policies and research that maximize the extraction of all the state's oil resources.

- Examine the impact of the Bakken formation tax incentive on the first 75,000 barrels produced during the first 18 months. This exemption expires July 1, 2008.

- Consider the value of this type of exemption to stimulate new wells in any underperforming areas of the state.

- Maintain the state's stripper well tax provisions as vital to the long-term health of the industry.

- Support research of horizontal drilling, completion and production techniques through the Oil and Gas research fund.

Policy: Support funding for research and development of new or expanding refining infrastructure.

- Consider raising the biennial cap on the Oil and Gas Research Fund. Additional funds could be used to develop a public education program to increase understanding of oil and gas exploration and refining; how oil and gas gets to markets; and the barriers involved in the process. Additional funds could also be used to create an Oil and Gas program similar to the Lignite Vision 21 program to advance economically feasible projects.

NATURAL GAS PROCESSING

Opportunities: In 2007, North Dakota produced 70.7 billion cubic feet of natural gas. With increased drilling and oil exploration, North Dakota has the opportunity to significantly increase natural gas production and processing. Opportunities include:

- Strong natural gas prices, demand and growing natural gas production.
- Excess capacity on the export pipelines.
- High natural gas liquids (NGL) content.
- Existing production growth has created interest in expanding existing and building new natural gas processing facilities.
- Eastern North Dakota contains shallow gas reservoirs that could have production potential.
- The industry has an excellent environmental record, is a significant tax payer and offers good-paying jobs for highly skilled people in rural areas.
- Stranded gas could be connected to commercial or value-added agriculture facilities to provide an economical power source.
- Natural gas is being wasted by flaring due to lack of gas-gathering infrastructure.

Challenges:

- Limited availability of rail car and truck services for NGL and sulfur take away.
- Infrastructure and resources limitations:
  - No high-end ethane NGL pipeline infrastructure.
  - Bakken wells are farther east than existing gas infrastructure.
  - Limited pipeline/compressor capacities to sell additional natural gas volumes.
  - New equipment delivery delays.
- Low-volume natural gas wells cost too much to connect to existing pipelines.

energy fact

North Dakota produced 70.7 billion cubic feet of natural gas in 2007.

Goal: Increase the natural gas processed in North Dakota by 64% to 75 billion cubic feet per year by 2012.

Policy: Support policies that encourage the capture, refining and distribution of more of the state's natural gas resources.

- Clarify the sales tax exemption (HB 1462) to include gas gathering systems from oil wells in order to encourage the connection of more gas and eliminate flaring.
- Continue to promote and provide tax incentives for shallow-well gas production.
- Streamline the permitting process for upgrading petroleum and natural gas pipelines to eliminate the need for completing a permitting or siting process on an upgrade when the footprint of infrastructure doesn't change.
- Encourage research and development through the Oil and Gas Research Council for shallow natural gas exploration and production in Eastern North Dakota. Possibilities include connecting wells to ethanol plants, to other commercial facilities, or communities or farms for use in heating homes or facilities.

PETROLEUM MARKETING

Opportunities: In 2007, 362 million gallons of gasoline and 466 million gallons of diesel were sold in North Dakota. Of the total gasoline sold, 165 million gallons (46 percent) included some blend of ethanol. North Dakota's petroleum marketing industry is poised to be a partner in delivering alternative fuels and fuel blends that benefit the environment and help our nation address energy challenges.

- North Dakota petroleum marketers are locally owned, civic minded businesses.
- Steady employment is provided for thousands of North Dakotans.
- North Dakota petroleum marketers have an excellent environmental record.
- The state's growing economy offers growth potential for the industry.

Challenges:

- Lack of consistent fuel supply.
- Public perception that petroleum marketers are responsible for the high price of fuel.
- Low return on investment compared to the risk involved.
- Increasing government mandates and regulation.
- Consolidation in the oil industry (i.e. fewer number of brands).

Goal: Support a market for all energy products driven by consumer demand.

Policy: If the federal government establishes national fuel standards, those standards need to be consistent and have clearly identified timeframes that allow industry to make the infrastructure investments needed to support the standards.

energy fact

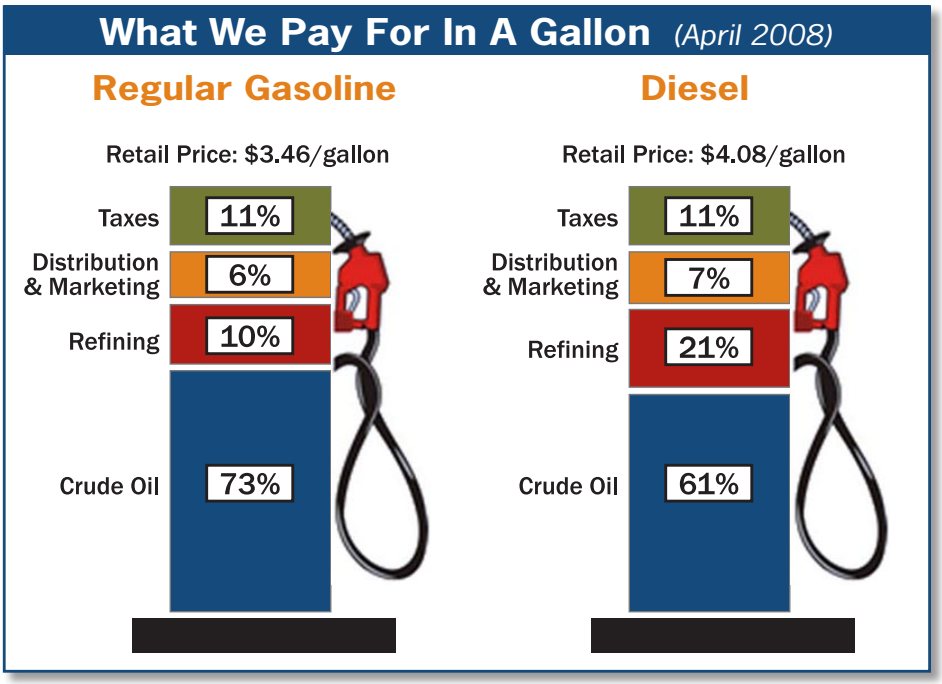
In 2007, 362 million gallons of gasoline and 466 million gallons of diesel were sold in North Dakota.

Policy: Encourage retailers to invest in the new infrastructure needed to sell the new varieties of fuel that become available.

- Provide grants for retailers to install infrastructure for new kinds of fuels that come into the market.

Policy: Support energy education programs that help consumers make informed fuel purchase decisions.

- Consider authorizing legislation to allow petroleum marketing to access Industrial Commission research funds to enhance innovation in safety, environment, and education.



Source: Energy Information Administration

SOLAR, GEOTHERMAL, HYDROGEN AND HYDRO POWER

The state of North Dakota has already invested $2.5 million in a Centers of Excellence project at the EERC, which has helped to attract hydrogen based business to the state. There isn't expected to be any new hydroelectric development in the state in the near future.

Goal: Encourage research and development programs that deal with solar, geothermal, hydrogen, hydro power, pumped storage and other alternative energy resources.

Policy: Continue any existing incentives that affect solar, geothermal, and hydro power.

energy fact

North Dakota is home to the nation's only National Center for Hydrogen Technology.

WORKFORCE

Goal: Attract a sufficient number of workers to fill energy related jobs due to retirements, attrition and growth within the energy industries.

Policy: Expand the state's workforce recruitment and marketing strategy to include other states and international talent pools to serve the extraordinary needs of North Dakota's energy industry.

- Support the continued development and implementation of a comprehensive state workforce strategy, including potential recommendations of the Interim Workforce Committee.
- Consider increased funding for workforce marketing efforts in the next biennium.
- *(Federal)* Simplify and streamline requirements for recruiting international workers.

Policy: Create an all-encompassing resource for job seekers that helps them identify opportunities that match their skills and directs them to resources regarding relocation issues such as housing, community information, and job training programs.

- *(Federal)* Simplify and streamline requirements for states to provide the necessary workforce marketing tools.
- Develop an industry-led task force to recommend improvement to state workforce recruitment strategies and streamline jobsnd.com process for energy related jobs.
- Support federal and state funding for the establishment of and maintenance of dynamic workforce recruitment tools.

energy fact

Nearly 12,000 new employees are needed in the petroleum industry in North Dakota by 2010 to accomodate growth, replacements, and retirements.

Policy: Attract and train more students into energy industry and energy research jobs by building stronger connections between industry and education and improving awareness of energy career opportunities among teachers and career counselors.

- Continue, enhance and fund state career promotion efforts that direct students to both vocational and degree programs.
- Continue, enhance and fund Operation Intern.
- Continue, enhance and fund demand-driven education and training programs at two-year post-secondary institutions.

INFRASTRUCTURE

Goal: Ensure adequate water, power, and infrastructure for energy development and for the communities in which energy development exists.

Policy: Evaluate the impact energy development is having on North Dakota's water and power supplies.

- Direct the State Water Commission and the EmPower North Dakota Commission to study the effect energy development is having on North Dakota's water resources and to recommend ways to minimize this impact and maximize the available water supply to support future energy growth.

- Support initiatives to provide economic tools that enhance the development of energy related infrastructure.

Policy: Increase state funding for local jurisdictions to off-set the infrastructure costs related to growth in the energy industry.

- Update the formula used for Energy Impact Grants to reflect newer technologies such as heavier trucks and equipment being used for oil development.

energy fact

The increase in energy production will require significant infrastructure investments.

- Establish a fund managed by the Emergency Commission to appropriate funds to counties based on current drilling activities to alleviate some of the up-front infrastructure needs and better correlate road repair funds. The purpose of the fund would be to fill the funding gap until oil taxes revenues are received by the local governments. As oil taxes come in, those revenues would be used to replenish the fund.

- Create an up-front funding mechanism for roads and other infrastructure needs associated with energy development in other segments of the energy industry.

ENERGY FACTS

Wind energy is the fastest growing segment of all renewable energy sources.

World coal consumption is more than 5.3 billion tons annually of which three quarters are used for generating electricity.

Oil together with coal and natural gas supply about 88 % of the world's energy needs.

The manufacturing related to biomass is going to happen where biomass occurs. Biomass occurs in rural areas meaning more manufacturing jobs in rural areas.

Biodiesel is currently available at around 300 filling stations across the United States.

There are 6 million flex fuel vehicles on America's highways that can run on up to 85 percent ethanol (E85).

2008-2025

North Dakota
DEPARTMENT OF COMMERCE