

Making Smart Energy Choices:

North Dakota's Future Options for Meeting its Energy Needs

Theo Eggermont

Department of Environmental Studies

Ernie Diedrich and Gordon Brown

Introduction:

North Dakota wants to double energy output from all sources, but have not adopted a renewables portfolio standard. To double energy output, North Dakota will have to tap into a vast supply of coal, wind, and farmland to produce ethanol. North Dakota has a seemingly endless supply of each.

What is the best choice for North Dakota to meet their energy needs?

Coal:



Coal is used extensively. It is cheap and ND has an 800 year supply. But coal is problematic. Burning coal releases several pollutants such as SO_x, NO_x, CO₂, and mercury.

Releasing these into the atmosphere causes health problems and contributes to climate change. Since there are these problems legislation will emerge.

If a cap and trade system is enacted coal generated electricity could cost more than 50% more.

Coal is trying to clean up its act. Two forms of clean coal options currently exist: IGCC and CO₂ sequestration.

Thesis: As coal is becoming a less desirable way of meeting energy needs, North Dakota needs to displace dirty coal with an alternative; with environmental impact, the economy, policies, and feasibility in mind, wind should be implemented first.



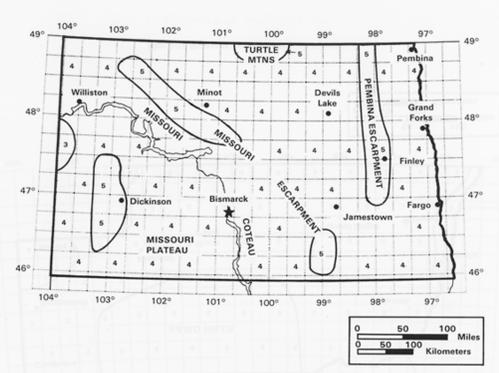
<http://blog.americanfeast.com/environmental/>

Wind:

Wind has very few environmental impacts and has recently become cost competitive with coal. It is expected to become less expensive in the future.

The fuel is free, it releases no emissions, and generates most electricity when demand is highest.

North Dakota is the Saudi Arabia of wind. Limited production of wind turbines is due to the uncertainty of a federal production tax credit, supply, transmission, and financing.



<http://redc.nrel.gov/wind/pubs/atlas/maps/chap3/gifs/map3-12.gif>



<http://ngm.nationalgeographic.com/2007/10/biofuels/clark-photography>

Ethanol:

Ethanol is transportable, reduces dependence on foreign oil, and burns more efficiently than gasoline. Yet all the corn grown in the US would only displace 12 % of gasoline. Corn requires fertilizer inputs, heavy machinery, and distillation, making ethanol less efficient. It requires extensive land use and does not mitigate climate change since land could be used to grown native prairie which takes CO₂ out of the atmosphere. It also raises food prices and takes land out of conservation programs.



www.co.jones.ia.us

Ethanol has great potential when derived from switch grass or when lignocellulosic technology is developed.

Conclusion:

Generating electricity by burning coal traditionally is inefficient and the technology is outdated. IGCC and carbon sequestration are better options than traditional coal, but wind should be adopted first since it is the most environmentally responsible and will become the cheapest form of electricity.

Ethanol may be an effective way to provide for transportation fuel in the future when the technology is developed and becomes mature.