Biomass

Background

Biomass offers opportunities to preserve Crop Reserve Program (CRP) acreage and increase wildlife habitat leading to support from the public, elected officials and conservation groups. According to the Farm Service Agency, 544,000 (18 percent) of North Dakota's 3-million CRP acres are set to come out of contract by September 30, 2009.[1] 1 ton of CRP grass yields 50 gallons of ethanol according to the Energy and Environmental Research Center (EERC).[2] The negative carbon footprint of perennial grasses opens the door to possible carbon credit revenues.

Opportunities also exist for co-generation of biomass with lignite, which can improve the economics of biomass while lessening the carbon exposure of lignite.

Potential

North Dakota leads the country in the production of 16 different agriculture commodities. The state has been identified as ranking first in potential among the 50 states for perennial grass and other dedicated energy crops that can produce cellulosic biomass feedstocks.[3] This presents a huge opportunity for biomass in North Dakota.

Billion Gallons of Biomass

In 2009, the updated Renewable Fuels Standard (RFS) mandates that 11.1 billion gallons of renewable fuels must be blended into energy supplies; 10.5 billion of which is corn-based ethanol, and the other 600 million gallons must be "advanced biofuel," 500 million gallons of which is to be biomass-based diesel. By 2012, 1 billion gallons of biomass-based diesel is required under the mandate.[11]

Ethanol Cooperative Installing Biomass Energy System For On-Site Energy Needs

Central Minnesota Ethanol Cooperative (CMEC) installed a biomass-fueled energy system at its ethanol plant near Little Falls, MN.

The plant was the first in the nation to generate the energy needed in the production of ethanol using a system fueled by wood waste. The biomass gasification system will generate both thermal energy and electricity for the plant. The cooperative will cut its need for its current supply of natural gas and about one-quarter of its electricity needs.

The $17 million system at CMEC is expected to have a payback of under six years as a result of energy cost savings.

The system will use approximately 280 tons of waste wood per day. The biomass gasification system will produce syn-gas that will be combusted to generate steam for the ethanol plant's thermal energy needs. Excess steam will be used to power a 1 MW steam turbine electric generator. CMEC has contracted locally for the waste wood fuel supply, which is expected to come from within a 50 to 60 mile radius.

Supplanting natural gas consumption with energy from the renewable fuel also reduces greenhouse gas emissions and can lead to additional revenue streams from sale of greenhouse gas credits. It will also allow CMEC fuel to qualify as a cellulosic bio-fuel under the rules of the new EPA renewable fuels trading program, bringing greater value to the CMEC fuel under that market as it develops.[4]

In addition, the negative carbon footprint of perennial grasses creates the possibility for the sale of carbon credits. This biomass potential ranges from electric power to a hydrogen feedstock. Biomass could be key for augmenting wind and increasing the utility of our transmission investments throughout the region.

Goals

Goals set by others in the region:

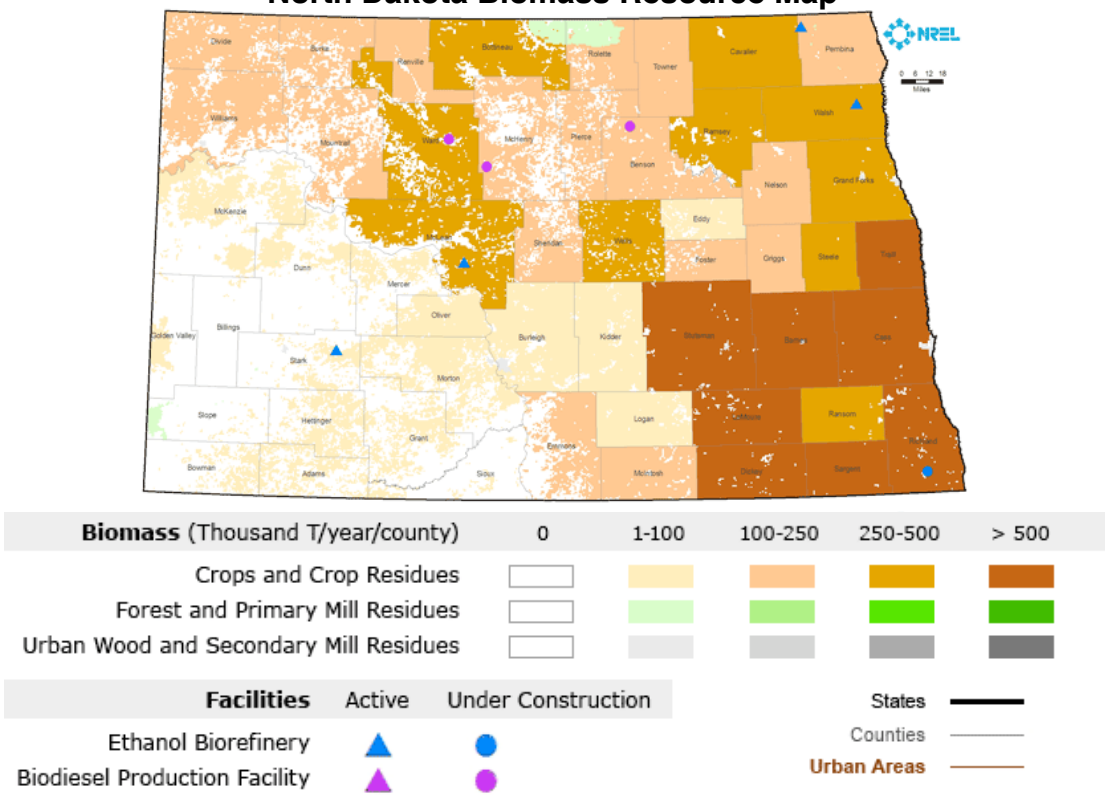
Note: Refer to Midwestern Governors Association measurable goals in wind and ethanol sections, which also apply to biomass to power and biomass to liquid fuels.

Best Practices

California is developing a strategic biomass plan with multi-agency collaboration.[5]

Colorado: Clean Energy Fund - New Energy Economy Development (NEED) Grant Program. In 2007, the Colorado Legislature appropriated money to the Governor's Energy Office (GEO) from the limited gaming tax and the severance tax to establish and maintain the state's Clean Energy Fund. The New Energy EconomiDevelopment (NEED) program receives its funding from

North Dakota Biomass Resource Map



DOE Energy Efficiency and Renewable Energy State Assessment for Biomass Resources

the Clean Energy Fund, and provides grants, loans and other financial incentives to attract manufacturers of renewable energy and energy efficient products to the state.[6]

North Dakota Policy in Place

Biomass Program. The Biomass and Incentive Research Program (BIR) was established by the Legislature in 2007 under the control of the North Dakota Industrial Commission.[7]

Biomass Incentive and Research Fund. $2 million dollar fund from existing agriculture programs.[8]

Tax Credit: Electrical Generating Facilities—Other. A sales and use tax exemption may be granted for purchasing building materials, production equipment and other tangible personal property used in the construction of an electrical generating facility other than a coal- or wind-powered facility. To qualify, the facility must produce electricity for resale or for consumption in a business activity and have at least one single electrical generation unit with a capacity of 100 kilowatts or more.[9]

Biomass, Geothermal, Solar, or Wind Energy Credit. (See State Policy under wind section.)

State Renewable Energy Objective. (See State Policy under wind section.)

Toyota Eyes Bioplastics

Toyota, the auto manufacturing powerhouse that made hybrid cars a mass-market phenomenon, is on an ambitious mission to dominate the world's market for bioplastics. The company is aiming to supply no less than two thirds of the world's total output of bioplastics by 2020. According to the company's own estimates, this would represent 20 million tons of Toyota-manufactured bioplastics worth about $38 billion in annual revenues.

Source: The Clean Tech Revolution (2007) [12]

Federal Policy in Place

See Appendix A

North Dakota Provides Funding for Biomass Projects

Grant rewarded to the North Dakota State University Agriculture Experiment Station and professor Larry Leistritz for research on establishing a biomaterials industry in the state. The $1.7 million project, which received an $800,000 grant, will complete a front end engineering and design study for a pilot scale plant to demonstrate the commercial potential of technology for producing materials and fuel from biomass feedstock. The first project will examine the technical and economic requirements for technology to produce bio-based cellulose nanowhiskers.

The Spiritwood Industrial Park east of Jamestown, N.D. received $109,000 for a $534,000 joint project of Great River Energy, Great Plains Institute, North Dakota Natural Resources Trust, North Dakota Farmers Union and North Dakota Association of Rural Electric Cooperatives. The funding will support a detailed technical evaluation of integrating a biomass supply into the Spiritwood Station, which is part of the new Spiritwood Industrial Park. Great River Energy proposes to co-fire up to 10 percent biomass in the Spiritwood Station. The types of biomass, their delivered costs, production, raw material handling and baling, loading, transportation, and on-site handling will be evaluated. The study will also look at the prospects for recruiting existing farmland into perennial energy crops.

ComPAKco LLC was awarded $72,275 to develop its densification technology for biomass. Its device, the ComPAKer, will use much less power than existing biomass compacters due to its design improvements and use of binder material. The anticipated cost of the ComPAKer is anticipated to be a fraction of comparable pellet making machinery. The company's total project cost will be $145,000.[10]