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- Profitable Use of Biomass at Ethanol Plants
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North Mankato, MN
February 19, 2008

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Xcel Energy Renewable Energy Objectives (REO)

1994 Prairie Island Agreement

Mandated Xcel Energy to purchase 425 MW wind power electric generation by 2002, and another 400 MW if found to be cost effective.

Mandated Xcel Energy to purchase biomass electric generation

By December 31, 1998, to purchase

- (1) 50 megawatts of electric energy installed capacity generated by *farm grown closed-loop* biomass; and
- (2) an additional 75 megawatts of installed capacity so generated by December 31, 2002

Xcel Energy REO (con't)

- Over time reduced requirement from 125 MW to 110 MW
- Expanded to include open-loop biomass and waste

cost per Mwh for each project over the PPA term

PROJECT(S)	NOMINAL \$	REAL (2000\$)	Generation
Fibrominn	\$87.27	\$59.04	55 MW
District Energy	\$95.25	\$67.38	25 MW
Laurentian Engy	\$105.37	\$73.04	33 MW

Minnesota's Renewable Energy Standard (RES)

2007 Legislative requirement that the state's electric utilities obtain the following percentages of energy from renewables:

Year	utilities	Xcel
2012	12 %	15%
2016	17 %	18%
2020	20 %	25%
2025	25 %	30%

Total 27% renewable by 2525

Minnesota RES (con't)

Eligible technologies are those for solar, wind; 100 MW or smaller hydroelectric, renewable hydrogen, and biomass which includes, without limitation:

landfill gas, an anaerobic digester system, and an energy recovery facility used to capture the heat value of mixed municipal solid waste or refuse-derived fuel from mixed municipal solid waste

State goal; all energy and fuels are 25% renewable by 2525

2007 Governor and Legislature agreed on state goal to have 25% of all the energy Minnesotan's use (heat, power and transportation) come from renewable resources

GHG reduction goal

Reduce our global warming pollution to reach an 80% reduction below 2005 levels by 2050.

Required offset of CO₂

After August 1, 2009 a moratorium on new power plants unless they can offset their CO₂ emissions

Cap and Trade

Bills introduced this 2008 session

Regional Biofuels Promotion Plan

Minnesota has joined Indiana, Iowa, Kansas, Michigan, Ohio, South Dakota, and Wisconsin in adopting the Energy Security and Climate Stewardship Platform

- establishes shared goals for the Midwest region
- increased biofuels production and use.
- commercial cellulosic ethanol and other low-carbon fuels by 2012
- Increase E85 retail fueling stations in the region to 15% by 2015, 20% by 2020, 33% by 2025
- Reduce the amount of fossil fuel used in the production of biofuels by 50% by 2025
- By 2025, at least 50% of all transportation fuels consumed in Midwest from regionally produced biofuels and other low-carbon transportation fuels

Federal Public Utility Regulatory Policies Act (PURPA)

Federal law passed in 1978 to promote greater use of renewable energy

Created a market for non-utility renewable electric power by forcing electric utilities to buy power from these producers at the "avoided cost" rate

Biggest result has been cogeneration plants

Energy Policy Act of 2005 (EPAct) made substantial changes to PURPA.

- Requires federal standards relating to fuel sources, fossil fuel generation efficiency, net metering, smart metering, and consumer interconnections.
- EPAct does not require adoption of any of the standards; only their consideration

Federal Renewable Electricity Production Tax Credit (PTC)

Corporate Tax Credit

Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal
Electric, Municipal Solid Waste, Refined Coal, Indian
Coal, Small Hydroelectric

2.0¢/kWh for wind, geothermal, closed-loop biomass

1.0¢/kWh for other eligible technologies

Applies to first 10 years of operation

Long history of annual renewal, currently pending

Federal Renewable Energy Production Incentive (REPI)

Energy Policy Act of 1992 expired 2003

Energy Policy Act of 2005 reauthorized appropriations for fiscal years 2006 through 2026

Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Geothermal Electric, Livestock Methane, Ocean Energy and Thermal, Fuel Cells using Renewable Fuels

Amount: 1.5¢/kWh Term: 10 years

If insufficient appropriations to make full payments; 60% of funds are assigned to facilities that use solar, wind, ocean, geothermal, or closed-loop biomass technologies; and

40% of appropriated funds for the fiscal year to other projects.

questions repi@ee.doe.gov

Renewable Electricity and Refined Coal Federal Tax Credit

Business tax credit of 1.9¢/kWh for projects installed by December 31, 2007 for 10 years.

- IRS Tax Form 8835 (www.irs.gov)
- Five-year depreciation schedule tax benefit for businesses

Federal Clean Renewable Energy Bond (CREB)

Established by the federal Energy Policy Act of 2005

Up to \$800 million in tax-credit bonds for public power companies

Tax-credit bonds **pay the bondholders by providing a credit against their federal income tax.** In effect, the new tax-credit bonds will provide interest-free financing for certain renewable energy projects.

Borrower must be a cooperative electric company or a government body, and must use the financing for wind, biomass, geothermal, or solar energy projects, or for hydropower expansions, trash combustion facilities, or refined coal production facilities.

Minnesota - Renewable Energy Production Incentive

Supported by the \$10.9 M/yr from Renewable Development Fund

Qualifying projects receive payments for 10 years

Biogas and small **hydro** apportioned \$1.5M/yr, rate is 1.0¢ to 1.5¢ per kWh for electricity generated by small hydro or on-farm anaerobic manure digesters

- Beginning July 2007 heating fuel produced by on-farm anaerobic digesters eligible to receive the incentive

Wind apportioned \$9.4M/yr, rate is 1.0¢ to 1.5¢/kWh for electricity generated by new wind-energy projects less than two MW in capacity

- Due to payments already committed, *wind* program was closed to new applicants on January 1, 2005.

Minnesota Ethanol Production Incentive

\$0.20 per gallon of ethanol from qualified facilities that began production before June 30, 2000, for ten years or until June 30, 2010, whichever is later.

- Appropriated funds temporarily reduced this incentive to \$0.13 per gallon for fiscal year (FY) 2004 through FY 2007. Annual payments are limited to \$3 million to any one producer. (Reference Minnesota Statute 41A.09)
- The program is closed to new applicants.

Federal and Regional CHP

Midwest Combined Heat and Power
Application Center

<http://www.chpcentermw.org/home.html>

Oak Ridge National Laboratory's Support of the
Federal Energy Management Program
Combined Heat and Power Core Team

<http://www.ornl.gov/sci/femp/index.shtml#ghp>

Renewable Energy Grant Round



- \$2.2 M for FY08 RE Grants
Applications due February 28, 2008
 - \$2.0 M for FY09 RE Grants
New fiscal year begins July 1, 2008
- <http://www.commerce.state.mn.us>