



SEBESTA
BLOMBERG

PROVIDING SUSTAINABLE TECHNICAL
AND BUSINESS SOLUTIONS

CASE STUDY

Central Minnesota Ethanol Cooperative - Little Falls, MN

FAST FACTS

- One bushel of corn yields about 2.8 gallons of ethanol.
- 2006 ethanol production reached 4.6 billion gallons—a 24.3 increase over 2005.
- By 2010, U.S. ethanol production could displace the equivalent of 311,000 barrels of imported crude oil per day—more than one large oil tanker per week.
- 2006 closed with no fewer than 73 biorefineries under construction and 8 expanding that will add 6 billion gallons of new production capacity by 2009.
- For every barrel of ethanol produced, 1.2 barrels of petroleum are displaced.



In August 1994, the Central Minnesota Ethanol Co-op (CMEC) Board of Directors came together to pursue a common vision: build an ethanol plant with a 15 million gallon a year ethanol plant in Little Falls Minnesota. After overcoming numerous hurdles, CMEC began production in March 1999.

In 2004, rising natural gas prices prompted CMEC to look for ways to reduce energy consumption. Along with rising energy prices, the plant was under court Consent Decree to lower emissions using the Best Available Control Technology (BACT); this involved

installing a gas-fired thermal oxidizer. With gas prices rising, it was projected that using a thermal oxidizer would add almost a million dollars to the annual operating cost. CMEC wanted to find a more reasonable solution that would reduce emissions while stabilizing the long-term cost of energy. 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.

Sebesta Blomberg proposed a combined heat-and-power energy system fueled completely by a local source of biomass fuel. The gasification system produces a synthetic gas from biomass. The gas is mixed with the exhaust from the DDG dryer and fed through a thermal oxidizer, which oxidizes the mixture to reduce emissions. The hot gas from the thermal oxidizer discharge is sent to a boiler to produce steam. The steam is then sent to a turbine to produce electricity before going to the ethanol process. A local source of biomass allows CMEC to contract its daily supply, while providing long-term price stability. Using local biomass provides a variety of benefits to CMEC, to the local economy and to the environment.

The system provides two advantages to CMEC. Almost one megawatt of green power is generated; and the biomass replaces up to \$500,000 per month in current natural gas costs. A gallon of ethanol produced using the new equipment will contain three-times the fossil fuel energy used to produce it.

Today, the USDA estimates the overall energy ratio of ethanol production to be 1.34 units of energy output in the form of ethanol for every unit of energy input in the form of fossil fuels. This project is expected to increase that ratio to 2, thus making ethanol production a clearly beneficial energy source.

