



Ethanol Case Study: Proposal to establish an ethanol processing facility.

The following plant description is fabricated. Any resemblance to a facility near you is coincidental.

Plant Specifics:

- 50 million gallons year (mgy) dry mill corn grain ethanol processing facility;
- By-products: 160,000 tons of dried distillers grains with solubles (DDGS); CO₂ capture.
- State of the art production technologies:
 - computer controls on machinery to achieve higher ratio of ethanol production relative to corn grain inputs
 - reduced water usage due to state of the art equipment
 - combined heat and power system: gas turbines to generate electricity and recover lost heat for steam.
 - In the future, potential for use of methane from area manure digesters for DDGS processing system.
- Design for future expansion and ability to accept alternative feedstocks, after pre-processing.

Feedstock Needs and Procurement:

- 19 million bushels of corn are expected to be purchased annually from region.
- 50% of feedstock through forward contracts; 50% through on-line day of sales contracts.

Ethanol and DDGS sales:

- 75% of the ethanol produced to be shipped via rail to markets within the U.S.
- Approximately 25% of the production will be shipped by truck regionally (within 100 mile radius) for blending at regional facility.
- Wet distillers grain to be shipped to farms within 25 miles of the facility (to reduce the costs and energy input of drying the DDG).
- Dried distillers grain to be shipped by truck within a 100 mile radius, or by rail, if distance exceeds 100 miles.

Siting:

- Plant will be in an existing industrial park facility 3 miles from the town center, the hospital, and area schools. The facility will be expanded to accommodate the ethanol plant and additional structures, requiring some road building and extension of sewer and utilities lines.
- Adjacent to a railroad line.
- In a region with 322,000 acres planted for grain corn and 2008 yields of 443,000,000 bushels of grain corn produced within a 100 mile radius.
- 103,000 dairy cows within a 100 mile radius.

Benefits to Community:

- Construction jobs: estimated 10 construction foremen, 50 construction crew for 2 years
- Plant operation jobs: 35 full-time jobs. Of these, 5 will be highly technical managerial positions. These will likely be recruited from outside of the community. An additional 20 jobs will be paying wages upwards of \$15.00/hour. The remaining 10 jobs will be custodial and labor jobs, paying \$12 - \$15/hour.
- Economic spin-offs: Workers will support the local economy, through sale of food, clothing, household, and other products.

- Market for corn growers: Farmers will have an assured market for their product. Corn growers can only benefit from increased demand.
- Tax base: Tax deferment for 10 years, along with some road construction financed through TIF districting. After the deferred period, the facility will pay taxes typical to industrial facilities.

Estimated Water use:

- Estimated 3 gallons of water utilized per gallon of ethanol produced. At 50 mg/y ethanol, water usage would be approximately 150 million gallons of water per year.
- Water from an on-site private, high capacity well.
- “Well assurance program” - provisions for neighboring landowners within 10 miles of the facility if they experience impaired water availability or quality due to the facility.

Estimated Energy Use:

- 15 MW Combined (2 gas turbines of 7.5 MW capacity per turbine) Heat and Power (CHP) system. Turbine drive generator provides electricity for the ethanol plant; captured heat from turbine exhaust provides steam.
- Annual electric demand = 37,500 MWh; Average demand = 4.4 MW (based on industry averages for CHP systems); Typical steam use is 40,000 to 150,000 pounds per hour (lb/hr).
- The CHP system will provide 100% of the total electric requirements of the ethanol plant, has the capability of providing up to 65% of the steam requirements of the ethanol production process. The ethanol facility can purchase electricity from the city facility, should CHP turbines be down.

Traffic and Shipping:

- Truck traffic to bring feedstock is estimated at 80-90 trucks/day.
- Corn grain will be purchased regionally, if available. Truck traffic will increase during the corn harvesting season. Grain will be stored on site.
- Two-thirds of the ethanol and DDGS will be shipped out by rail. The remaining 1/3 of ethanol and dried distillers grain (and other co-products) will be shipped by truck.

Water Discharge:

- Water will be cooled, treated, and tested at an on-site treatment facility prior to discharge.
- Waste water, after treatment, will be discharged into feeder streams of the main river.

Air emissions and odor:

- We do not anticipate any noxious odors. Scrubbing technologies will reduce odors that come from the fermentation and drying processes.

Noise:

- Noise anticipated during the construction process.
- During operations, noise level should be no more than similar industrial facilities.
- Noise from diesel truck operation is anticipated.

Dust:

- Dust associated with construction process.
- Dust from biomass chaf expected to be limited to grain elevators and silos.

Emergency Management:

- All facility personnel and the municipal and county fire departments will be trained in emergency management procedures.