

Ag Bio-Power

CASE
SUMMARY

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AG BIO-POWER

Tama, Iowa
Tama County

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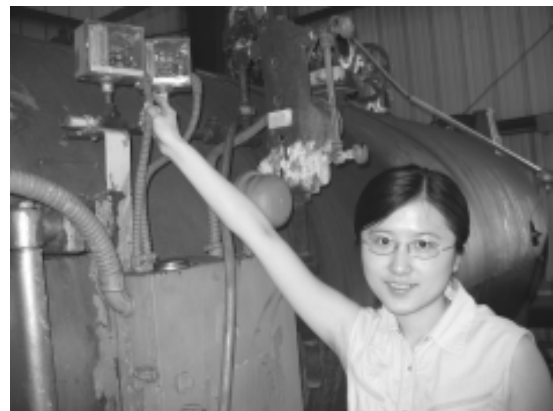


The Company

Ag Bio-Power, an innovative company established just 4 years ago, is committed to the research and development of gasifiers, using biomass as fuel. Ag Bio-Power has developed four generations of gasifiers, with 2 gasifiers now in use; one inputs corn and plastic as fuel, another uses railroad ties as fuel.

Project Background

The goal of Ag Bio-Power is to recycle agricultural and manufacturing wastes as fuel to generate useful energy, such as steam production, and at the same time decrease the environmental impact associated with waste disposal. In August 2002, a 750,000 Btu per hour gasifier was built to use discarded or waste seed corn and ground plastic as fuel. The intern researched the operation of this unit.



Incentives to Change

The waste seed corn used as fuel is provided by several companies. Because the seed corn has chemical additives to protect it from insects, landfill disposal of waste seed corn requires special treatment, which increases the disposal cost to about \$86 per ton. The waste plastic used as a fuel source is scrap provided by a manufacturing facility. The cost for disposing of the waste plastic is 3.5 cents per pound for landfilling and 5 cents per pound for recycling.

Results

Potential annual savings:

1. Seed corn as fuel: \$12,480

The gasifier burns more than 32 bags of corn every 8 hours, at 43.5 pounds per bag. When gasifying the corn, 25 to 30 percent char by volume is produced, which also contains some ash. The gasifier can reburn some char, but the percent of char in the fuel cannot be too high, or the excess ash will cause the flame temperature to fluctuate. Alternatively, the ash could be used as fertilizer because it contains a good deal of nitrogen, which is a main component of fertilizer.

2. Waste plastic as fuel: \$1,924

Waste plastic can often be recycled, however the type of plastic used in the gasifier consists of three components: foam, PVC and plastic insert. This composition makes it difficult to recycle.

Further, because the heating value of plastic is high, at more than 14,000 Btu per pound, using it as fuel is a preferred method of disposal. The percent of plastic in the gasifier cannot be too high or the plastic will melt and stick together. Therefore, the plastic is burned with corn to provide separation for the plastic material.

3. Steam produced by the waste fuel: \$7,800

An on-site gasifier at the manufacturing site that generates plastic scrap could supply steam necessary for production processes, supplementing the current reliance on natural gas.

Environmental Recommendations

Biomass gasification is an excellent opportunity to achieve both economic and environmental benefits. The use of biomass for energy causes no net increase in carbon dioxide emissions to the atmosphere. As trees and plants grow, they remove carbon dioxide from the atmosphere through photosynthesis. If the amount of new biomass growth balances the biomass used for energy, bio-energy is carbon dioxide “neutral.” That is, the use of biomass for energy does not increase carbon dioxide emissions and does not contribute to the risk of global climate change. In addition, using biomass to produce energy is often a way to dispose of waste materials that otherwise would create environmental risks. At the same time, this could help decrease energy dependence on nonrenewable fuel. As mentioned above, the ash produced from gasifying biomass could be used as fertilizer.



Project Summary Table

Project Description	Environmental Impact	Economic Cost Savings	Status
Corn as fuel	Landfill reduction of 144.6 ton/year	\$12,480/year	Implemented
Plastic as fuel	Landfill reduction of 25 ton/year	\$1,924/year	Implemented
Steam generation	Reduce fuel consumption	\$7,800/year	Recommended