Problem Statement

•Lack of an efficient conversion method for corn stover to usable energy via cogeneration.

Objectives

• Investigate pathways for small scale conversion of stover into useable energy.

•Research different tools, equipments and processes to develop a cost, time and energy efficient process.

•Determine the cost and energy efficiency of each step of the process.

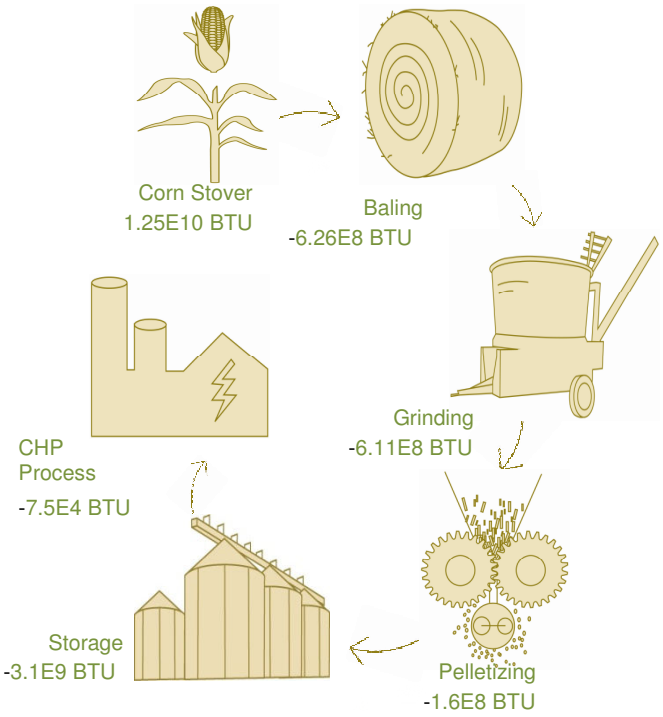
•Develop a detailed process for a small scale CHP process

Background

Renewable energy is one of the most important and widely researched topics today. This may include solar and wind as well as biomass or biofuels. Specifically, we have narrowed the scope to biomass derived from corn stover (leaves and stalk) left in the ground after harvesting. Corn stover has been shown to have an energy content of 8,000 Btu/lb. It may be possible to utilize what would otherwise be considered “waste” to produce useable energy, since stover makes up 50% of the yield of a crop.

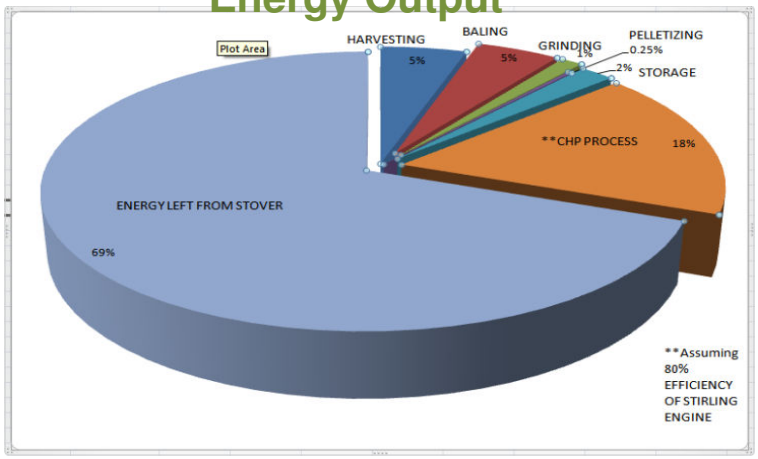
For the purposes of this project, cogeneration (combined production of heat and electricity) has been examined with a focus on a small scale application.

Conversion Process

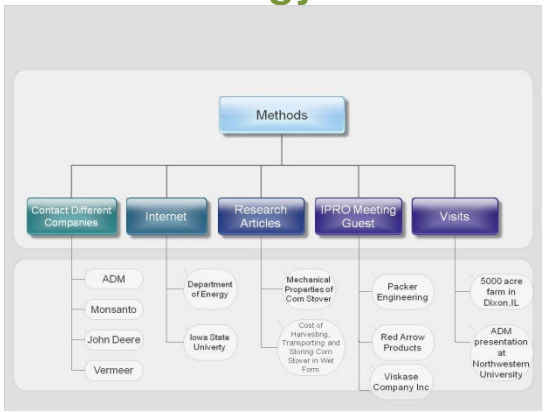


**The negative values are energy lost during the process
This calculation is for a 400 acre farm

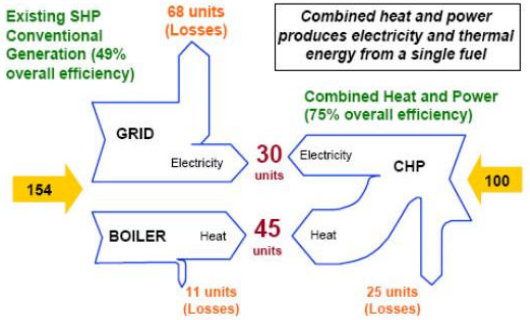
Energy Output



Methodology



CHP Process



•Increased efficiency of energy usage and conversion.
•Lower emissions to the environment, in particular CO_2, the main green house gas.

•An opportunity to move towards more decentralized forms of electricity generation.

• High efficiency by avoiding transmission losses and increasing flexibility in system use.