

Fundamentals of Wood to Energy



Fact Sheet – Biomass-to-Energy; New and Existing Technologies

Cogeneration

Cogeneration is the term used to describe the simultaneous production of heat and electricity from a single fuel. Cogeneration is also commonly called combined heat and power (CHP). This is the most common industrial use of wood biomass for energy. Wood biomass or other fuel is burned to create steam and the steam is run through a turbine to generate electricity. Important to successful operation of a cogeneration facility is the profitable utilization of heat and steam, as well as electric power.

Gasification

Gasification of wood and charcoal was used extensively in Europe during World War II to fuel both road and marine transportation systems. These gasifiers were downdraft and air blown, but updraft and side-draft gasifiers were also used as a source of direct heating energy. Today, new systems for gasification are being developed. Gasification, also called pyrolysis, occurs when organic materials are decomposed by heating in the absence of oxygen or other reagents. Gasification is used to make synthetic fuels and chemicals such as methanol, ammonia, and diesel fuel.

Cofiring

Cofiring refers to the practice of introducing biomass as a supplementary fuel for use in coal-fired generating facilities. Cofiring is a low-cost option for utilizing woody residues and reducing coal emissions. Biomass can be successfully substituted for 10-20% of the total fuel need.

Liquid Fuels

Ethanol is made from wood through the use of hydrolysis and fermentation technologies. Ethanol burns much cleaner than gasoline and has a high octane rating.

Methanol is created from wood through gasification to create syngas. The syngas is then converted to methanol. Methanol has a lower density than ethanol but can be made with high yields.

BioOil (pyrolysis oil) is a liquid also made from a gasification process with medium heating value. BioOil can be used to generate electricity and heat or it can be used as a non-polluting diesel additive.