

Wood Gasification - Wayne Keith

Website: www.driveonwood.com

Coal gasification is sometimes called "clean coal" because it can be used to generate electricity without belching toxins and carbon dioxide into the atmosphere. But it's still based on a nonrenewable fossil fuel. And it still requires mining operations that scar the Earth and leave behind toxic wastes of their own. Wood gasification -- or **biomass gasification**, to be more technically correct -- may provide a viable alternative. Biomass is considered a renewable energy source because it's made from organic materials, such as trees, crops and even garbage.

Biomass gasification works just like coal gasification: A feedstock enters a gasifier, which cooks the carbon-containing material in a low-oxygen environment to produce syngas. Feedstocks generally fall into one of four categories:

- Agricultural residues are left after farmers harvest a commodity crop. They include wheat, alfalfa, bean or barley straw and corn stover. Wheat straw and corn remnants make up the majority of this biomass.
- Energy crops are grown solely for use as feedstocks. They include hybrid poplar and willow trees, as well as switchgrass, a native, fast-growing prairie grass.
- Forestry residues include any biomass left behind after timber harvesting. Deadwood works well, too, as do scraps from debarking and limb-removal operations.
- Urban wood waste refers to construction waste and demolition debris that would otherwise end up in a landfill. Pallets -- flat transport structures -- also fall into this category.

The choice of feedstock determines the gasifier design. Three designs are common in biomass gasification: updraft, downdraft and crossdraft. In an **updraft gasifier**, wood enters the gasification chamber from above, falls onto a grate and forms a fuel pile. Air enters from below the grate and flows up through the fuel pile. The syngas, also known as **producer gas** in biomass circles, exits the top of the chamber. In **downdraft or crossdraft gasifiers**, the air and syngas may enter and exit at different locations.

The choice of fuel and gasifier design affects the relative proportions of compounds in the syngas. For example, wheat straw placed in a downdraft gasifier produces the following:

- 17 to 19 percent hydrogen gas
- 14 to 17 percent carbon monoxide
- 11 to 14 percent carbon dioxide
- Virtually no methane

But charcoal placed in a downdraft gasifier produces the following:

- 28 to 31 percent carbon monoxide
- 5 to 10 percent hydrogen gas
- 1 to 2 percent carbon dioxide

- 1 to 2 percent methane

[source: [Rajvanshi](#)].

Now you're ready to make your own wood gasifier. Keep clicking to see how.

Note:

BETTER GAS(IFICATION) MILEAGE

Believe it or not, one of the main uses of wood gasification has been to power internal combustion engines. Before 1940, gasification-powered cars were occasionally seen, especially in Europe. Then, during World War II, petroleum shortages forced people to think about alternatives. The transportation industries of Western Europe relied on wood gasification to power vehicles and ensure that food and other important materials made it to consumers. After the war, as gas and oil became widely available, gasification was largely forgotten. A future petroleum shortage, however, may revitalize our interest in this old technology. The car driver of the future may ask to "fill 'er up" with a few sticks of wood instead of a few gallons of gas.

GEK Gasifier

<http://www.gekgasifier.com/>

Intro

Wood gas, Syngas, Biogas, Producer Gas

Gasification is the use of heat to transform solid biomass or other carbonaceous solids into a synthetic "natural gas like" flammable fuel. Through gasification, we can convert nearly any dry organic matter into a clean burning fuel that can replace fossil fuel in most use situations. Whether starting with wood chips or walnut shells, construction debris or agricultural waste, gasification will transform common "waste" into a flexible gaseous fuel you can use to run your internal combustion engine, cooking stove, furnace or flamethrower.

Sound impossible?

Did you know that over one million vehicles in Europe ran onboard gasifiers during WWII to make fuel from wood and charcoal, as gasoline and diesel were rationed or otherwise unavailable? Long before there was biodiesel and ethanol, we actually succeeded in a large-scale, alternative fuels redeployment— and one which curiously used only cellulosic biomass, not the oil and sugar based biofuel sources which famously compete with food.

This redeployment was made possible by the gasification of waste biomass, using simple gasifiers about as complex as a traditional wood stove. These small-scale gasifiers are easily reproduced (and improved) today by DIY enthusiasts using simple hammer and wrench technology. The goal of this GEK is to show you how to do it, while upgrading the engineering and deployment solutions to something befitting the digital age.

Re: Char

<http://www.re-char.com/>

Hosted by CIAT (International Center for Tropical Agriculture) and the University of Nairobi, hundreds of the foremost soil scientists in the world gathered in Nairobi this past week to discuss the interlinked issues of tropical soil degradation, poor yields, and environmental sustainability. At the center of a number of the discussions was how biochar fits in to the ISFM framework.

ISFM (Integrated Soil Fertility Management) is a holistic approach to agriculture with strong focuses on productivity, sustainability, and scientific rigor. The aim of ISFM is to create integrated farming systems rather than looking at individual farming practices as separate and somehow not intrinsically linked.

Sustainably (and increasingly) productive farms require utilization of the symbiotic relationships that occur in nature, efficient application and use of nutrients (organic when available, inorganic when not), resilient seeds, and proper soil and landscape management.

When all of these things come together you see explosions in agricultural productivity such as those that have been observed throughout the western world over the course of the last century. Food security and environmentalism don't have to be mutually exclusive endeavors as so many have made them out to be. This is especially the case when biochar use is adopted and implemented within an ISFM framework.