

Sunnyside Smallholding; A mystery machine



Being self-sufficient is not just about growing our own food. Harnessing our own energy is an important part of a self-sufficient life and a makes a valuable financial contribution to the smallholding. We have solar panels and heat the house with log burners and wood that I cut and dry myself but for some time now, I have been researching a more off-beat, fascinating and long forgotten technology.

A wood gasifier magically turns wood into combustible gases. With a few modifications, these gases can then be used to power a petrol engine. I have a lot of wood so this possibility is very attractive. Wood gasifiers have a fascinating history but most people have never heard of them. During the second world war, when oil was in short supply, many tractors and buses were converted to run on wood-gas. You occasionally see one of these strange, hybrid machines in a museum and they helped keep our country running when petrol was rationed. As recent as 1989, the American 'Federal Emergency Management Agency' (FEMA) published 'Construction of a Simplified Wood Gas Generator for Fueling Internal Combustion Engines in a Petroleum Emergency'; quite a snappily titled and very interesting bedtime read. FEAM's comprehensive and informative manual was intended to help farmers and other key operators to build their own wood gasifier and keep producing in the event of oil shortages. I certainly found it a useful reference document to help my own research.

For the technically minded, a gasifier heats wood in a limited oxygen environment to produce charcoal, carbon dioxide and a variety of combustible hydrocarbon gases. The very hot charcoal then breaks down the carbon dioxide to produce flammable carbon monoxide.

Additionally, the charcoal gets hot enough to split water molecules (from residual moisture in the wood) into flammable hydrogen and oxygen. This oxygen then instantly reacts with the charcoal to produce even more carbon monoxide. Carbon monoxide is a very unpleasant gas but the gasifier burns it safely and cleanly. As an aside, carbon monoxide is the same gas that used to be produced by the local gas-works and piped into our homes to fuel the oven before we switched to 'natural' gas. Understanding the chemistry is not essential but the end result is a very useful cocktail of flammable gases.

It has taken me a couple of years of study, design, fabrication and testing but I have finally managed a successful test run of my own, home-made wood gasifier. My gasifier can now produce a large flaming gas flare, like you see on oil rigs (maybe not quite that big). This has felt like a major achievement and there is even a video on the Sunnyside Smallholding Facebook page to prove it. More work is needed but my plan is to use the gasifier to power a petrol-electric generator to charge my off-grid battery system and maybe even the electric car. I feel like a modern-day alchemist but instead of turning lead into gold, I'm turning wood into electric. Possibly, just as profitable.

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