

## **“Make yourself an environmentally friendly camping stove” (or “A boy scout turns green”)**

### **David Faulkner’s presentation to Colchester Speakers Club 8 February 2011**

Do you remember how much fun it was to cook on a camp fire?  
In this presentation I will show you a 21<sup>st</sup> century alternative which could help to save the planet.

#### **Introduction:**

Firstly I will explain why it is environmentally friendly. Then I will explain how to make it and use it and give some final tips.

You might ask why not use an ordinary butane burner camping stove. A problem is that butane is a fossil fuel which is from a non- sustainable source.

Or, you might ask, why not light an ordinary campfire using wood. In this case the problem is that all the carbon in the wood is emitted into the atmosphere as CO<sub>2</sub>. With this burner a portion can be sequestered in the soil.



In contrast the-is alternative burner produces heat from a sustainable fuel source and a stable form of carbon known as biochar which can be used as a soil conditioner like humus.

To understand its planet saving potential you need to see it in the big picture. The carbon is removed from the normal carbon cycle and can be locked away in the soil for millennia. When this process is massively scaled up to replace all fossil fuels it could help save the planet from global warming!

#### **How to make it**

What kind of stove are we making? It is known as a top lit updraft gasifier (TLUD) with natural air circulation. Two steel cans are needed plus can openers and a hand drill.

The clever trick when choosing your cans is to have one which fits very closely inside the other so that the wood gas does not escape from the ‘cavity wall’ where the two cans meet at the top without being burnt. One of my cans came with a ring pull top and the other was of the type which needs a can opener.

The smaller can originally contained 300g Jersey new potatoes with no ring pull.  
The larger one contained 400g tomato soup with a ring pull.

You might be wondering why I mentioned this! When I went shopping it was the first time I was interested in the can rather than the contents!

The soup and the new potatoes can be saved for heating up later.

Both cans need to have holes made in them. The larger one has holes in the side near the bottom made with a piercing type can opener also known as a 'church key'. This allows air into the can. The pierced triangular holes show up black in the picture. They are spaced one width of the opener apart.



The smaller can has a series of holes pierced in the bottom and 6mm holes drilled in the side near the top and in the bottom. One way to avoid bending the inner can during drilling is to use a round wooden mandrel clamped in a bench vice to hold the can. Drill through into the mandrel then rotate the tin for the next hole.



Put the smaller can into the larger one. This arrangement allows wood gas to circulate down through the bottom of the small inner can and up the inside of the side wall cavity mixing with air as it goes. It burns when it re-enters the small can near the top.



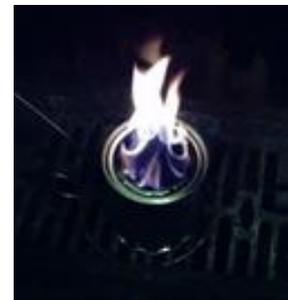
The fuel needs to be from a sustainable source: e.g. hedge trimmings, cut into small wood chips. These should come up to the level of the holes. 57-70g wood chip is sufficient to boil 1 pint (475g) water.

### Using the stove



The burner can be lit with a candle, dripping wax onto the topmost layer.

An alternative starter is white sprit. In this case 8g of spirit was added to the top layer of woodchips.



It is recommended that a non- fossil-fuel starter is found such as for BBQs.



Once it is alight, the wood glows red hot and the reaction continues down the can from top to bottom with little smoke production.



A pint of water (575g) can be boiled in a saucepan standing on a tripod made

from bent wire such as found in wire coat hangers. It is recommended that a lid is used on the saucepan and the smoke is not inhaled as all smoke sources are carcinogenic. [see <http://www.burningissues.org/car-www/education/simple-facts.htm>]

When the flame goes out the reaction can be stopped by pouring cold water onto the char or immersing the stove in a bucket of water. This stops it from continuing to burn to ash. A 70g charge of woodchip produced 30g char. This was weighed after 3 days drying in air.



The charcoal retains the original porous structure of the wood. This is a good soil enhancer because it soaks up moisture like a sponge together with any fertilizer that may be added.



### **Some final tips**

Wear old clothes. The burner produces very woody-smelling smoke until it gets going.

Beware of using a saucepan without a lid, as your tea will taste very woody!

Avoid using your wife/mother's newest saucepan as the sides will be covered in tar!

Some kinds of wire banana hangers are suitable for hanging a kettle of water over the stove as an alternative to a saucepan.

Make sure that your wood has been dried out before you try to use it. A microwave oven is a climate-unfriendly way of doing this.

You can use the stove outside for camping or in a conventional hearth indoors. Avoid breathing in smoke.

### **Summing Up**

I hope I have inspired you to make one of these environmentally friendly stoves yourself. It's fun to do and need only take an hour or two to get going.

You can find a similar one to copy by web-browsing on 'YouTube' and typing "Simple biochar making gasifier". The one I made is a scaled down version of this 'gallon can' project. When you have tried it yourself, show all your friends how to do it too.

This project is a small step towards restoring the carbon and water cycles to their pre-industrial state. Together we can have a big impact on the future of our planet. This process needs to be massively scaled up, replacing fossil fuels, to have a significant impact on global warming. Millions of tons of carbon need to be locked away in the ground where it can contribute to reforestation or growing healthier crops.