Unlocking the Stored Solar Energy in Wood:

A Primer on Wood Gasification

-What is Wood Gasification?

-How Can it Fortify Your Home Energy Needs?

-How Much Power Can You Make From Free Wood Waste?

-How Do You Use the Gas In An Engine?

-What are the Benefits of This Improved Design?

-How Can it be Used to Replace Petroleum: The WWII Case Study

Includes:

Study Schematic
Tool List
Flow Chart
Resource Links
& more

Presented by:

WoodGasifierPlans.com

Version 1.0

Wood Gas Power

Solar Power Backup

Fuel Trucks & Tractors

Greenhouse Heating

Electrical Generators

Pumps & Equipment

Activated Carbon

Resources

FAQ
WoodGasifierPlans.com/faq

Videos
Youtube.com/user/VictoryGasworks

Books
WoodGasifierPlans.com/order

What is Wood Gasification?

Wood Gasification is the process of using heat to thermally shift solid matter into a gaseous state, sort of like using heat to shift a solid ice cube into a steamy vapor.

It's a thermal chemical phase shifting process that breaks down the structure of wood to release it's most basic elements of hydrogen and carbon, i.e. hydro carbons.

Very similar to what goes on in large scale refineries, just done in a simpler way, on a much smaller scale, without the mess and pollution. And since the wood used is a waste source, it's both free and sustainable.

Wood Gasification is a very clean way to make biogas in mere minutes. The wood is really just a storage battery for solar energy. Wood gas is a form of solar chemistry. The perfect compliment to solar thermal and solar electric because you can tap into the energy day or night and even during the winter.

Most notable it solves a big problem that photovoltaic panels don't. How to fuel existing engines that power much of our society without petroleum.

Powering Your Home With Distilled Sunlight

More and more people are waking up to the need for personal power production as a hedge against price inflation, storms, grid down scenarios and oil shocks.

A new generation of off grid home owners and home steaders are using distilled wood gas to fuel backup generators, tractors, power equipment and heating barns and green houses too.

The wood is free and the peace of mind is priceless. It's not without some effort to dry and size the wood for use, but it's not any more effort than you would use to dry and store hay.

Efficiency is still the most effective money spent while you prepare to shift to renewable energy. Because the wood can be turned into energy at night, homesteaders can use smaller battery banks for storage.

How Much Power Can You Make?

Between 3 and 20 kilowatts/ hr are realistic numbers. Each kilowatt hour requires about 2.5 pounds of dry wood.

The gas has some inert elements like nitrogen and CO_2, so the output is generally 50-60% of the rated output on petroleum fuels, but since the cost of a larger engine or generator is negligible, many folks just size up their equipment a bit.

A 10 kilowatt generator making 5 or 6 kw's is usually the perfect blend of power and efficiency.

To avoid lot's of feed handling costs and expensive automation, the machine is usually run in batch runs of 2-6 hours depending on feedstock capacity. A fill in the morning, solar during the day and a fill at night are easy and cost effective. Trying to run 24/7 is impractical because of engine oil changes and maintenance.

Quick Conversion

1 kwh = 2.5 lbs dry wood

1 mile driving = 2.25 lbs

How do you use the gas in an engine?

You pipe the gas into the engine intake system and provide a smaller air inlet control valve to act as an air-fuel mixer or carburetor.

Simple systems operated on DC power or used in tractors can be as simple as a ball valve controlling air flow at the right setting. Find the sweet spot and make tiny changes to the valve position when needed.

For AC power and variable loads a more dynamic air management system is needed. These can be crafted out of:
- An O2 sensor
- Small micro-processor
- Servo
- Butterfly valve

For a detailed build of this nature and a full engine conversion see the book the Electronic Carburetor Workshop at the end of this report.

Can you store the gas?

Wood is the primary storage medium. You can store the gas in bags, experts can compress it and batteries are a way to store the electricity.

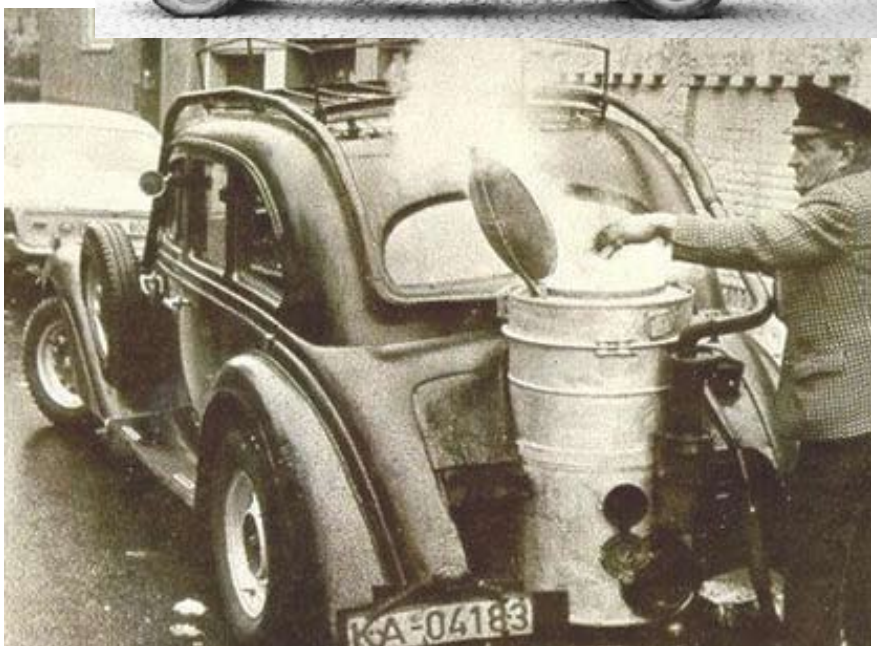
World War II: A Case Study in Petroleum Replacement

After WWI the countries of Europe embarked on the deployment of renewable fuels, fearing another war.

20 years later much work had gone into evolving earlier gasifier designs. Just in time to be rolled out as oil blockades made fuel a scarce commodity.

With the help of woodgas and producer gas made from charcoal, over 1 million installations (mostly personal scale) fueled everything from trucks and buses to factories and homes. It was the most successful alternative to petroleum.

Unfortunately the knowledge was lost as the generations following switched back to gasoline and diesel. The keepers of the knowledge aged out.



Benefits of an Advanced DIY Wood Gasifier

Resurrecting and expanding on the early WWII gasifiers has been the passion of Author Ben Peterson. In his new book the **Wood Gasifier Builder's Bible**, he shares a step by step process to build an advanced, ***tar cracking wood gasifier*** featuring:

- Simple automation for hands free control
- Superior grate system for maximum flow
- Aggressive heat recycling and air preheating for greater efficiency and smoother operation
- High intensity jets and quick change hearth and much more...

Not all gas is created equal

It's very easy to turn wood into gas. Fill a garbage can with dry wood and place it over a hot fire and soon flammable gases and oils will start escaping.

But to make good engine gas, you need to fully shift the oils to gas or they will burn and make tar which can seize up an intake valve. Not an issue if you are just making heat though.

Many other homemade gasifier designs make some tar and try to filter it out. This can work OK for a while, but eventually your valves will get coated, needing major maintenance with some acetone and an old tooth brush.

Do it the right way! Crack those oils

This design does an excellent job of cracking oils and tars to make fully distilled gas.

You'll notice the difference.Your engine will be happier too.

Build Photos
Using Mostly Common Parts

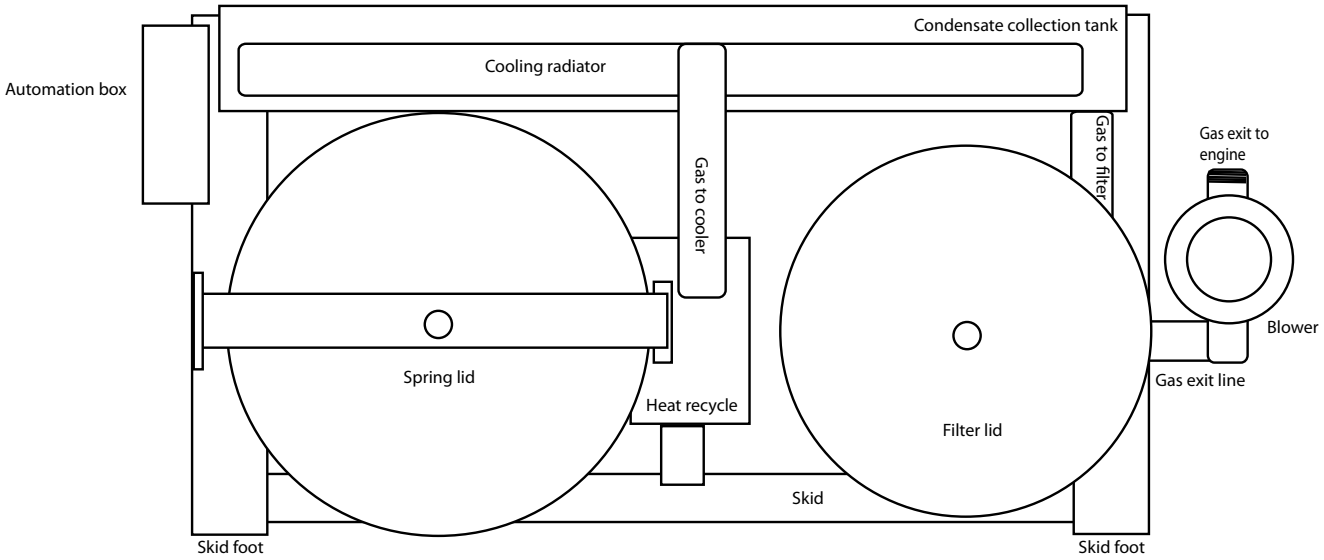
Check out the schematics and flow charts on the following pages.

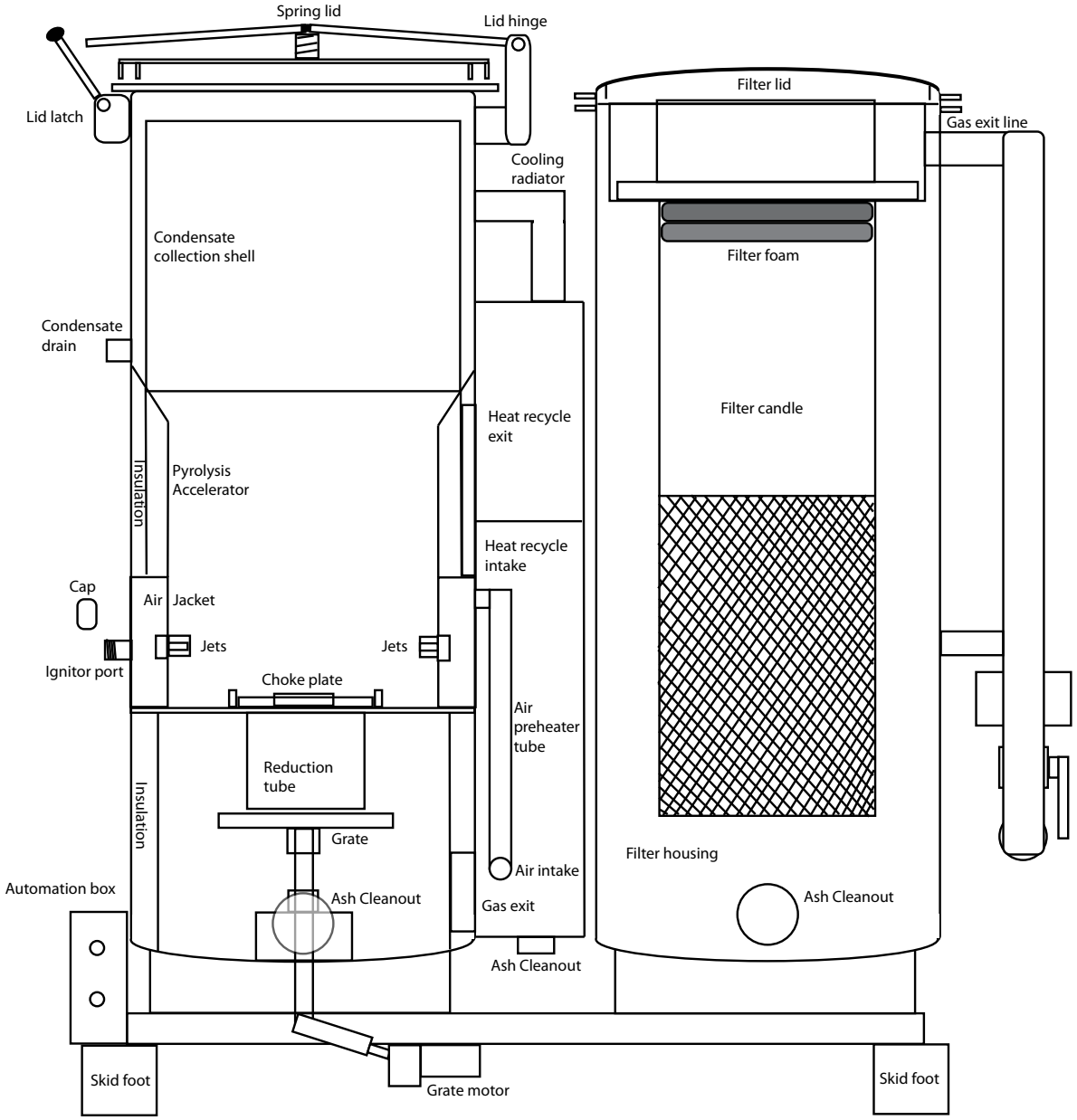
Ready to learn more? We have a 7 part video series called the **Wood Gas Crash Course** available on our Youtube channel. Definitely check it out. 45 minutes of valuable insight and behind the scenes footage.

Youtube.com/user/VictoryGasworks

Layout: Front

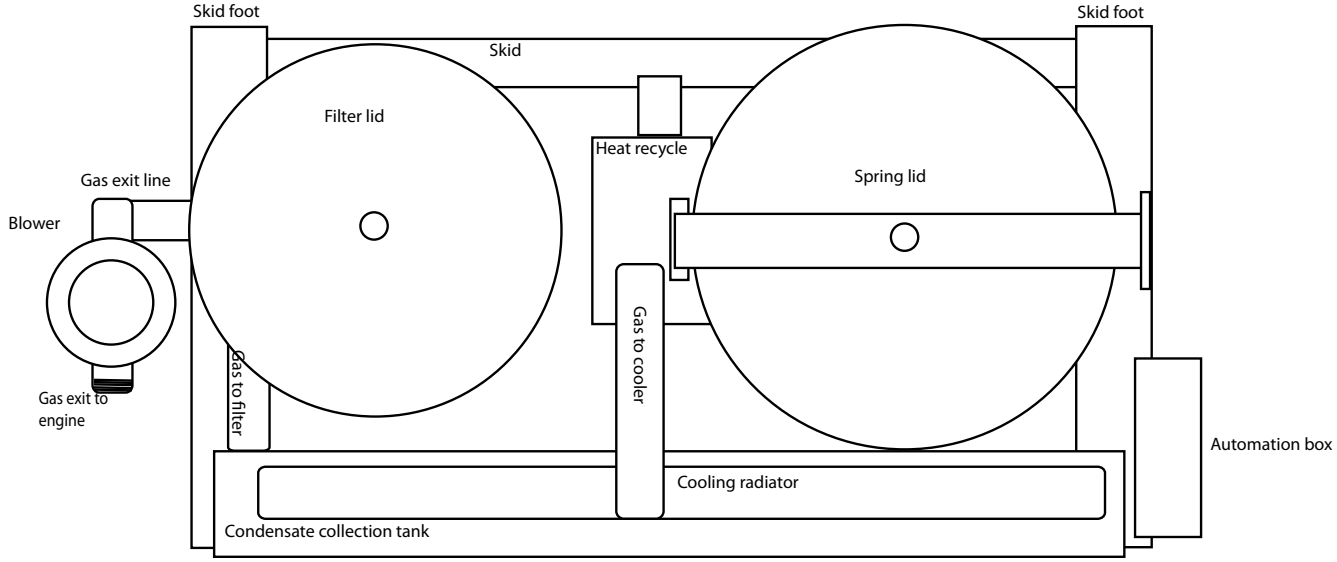
http://WoodGasifierPlans.com

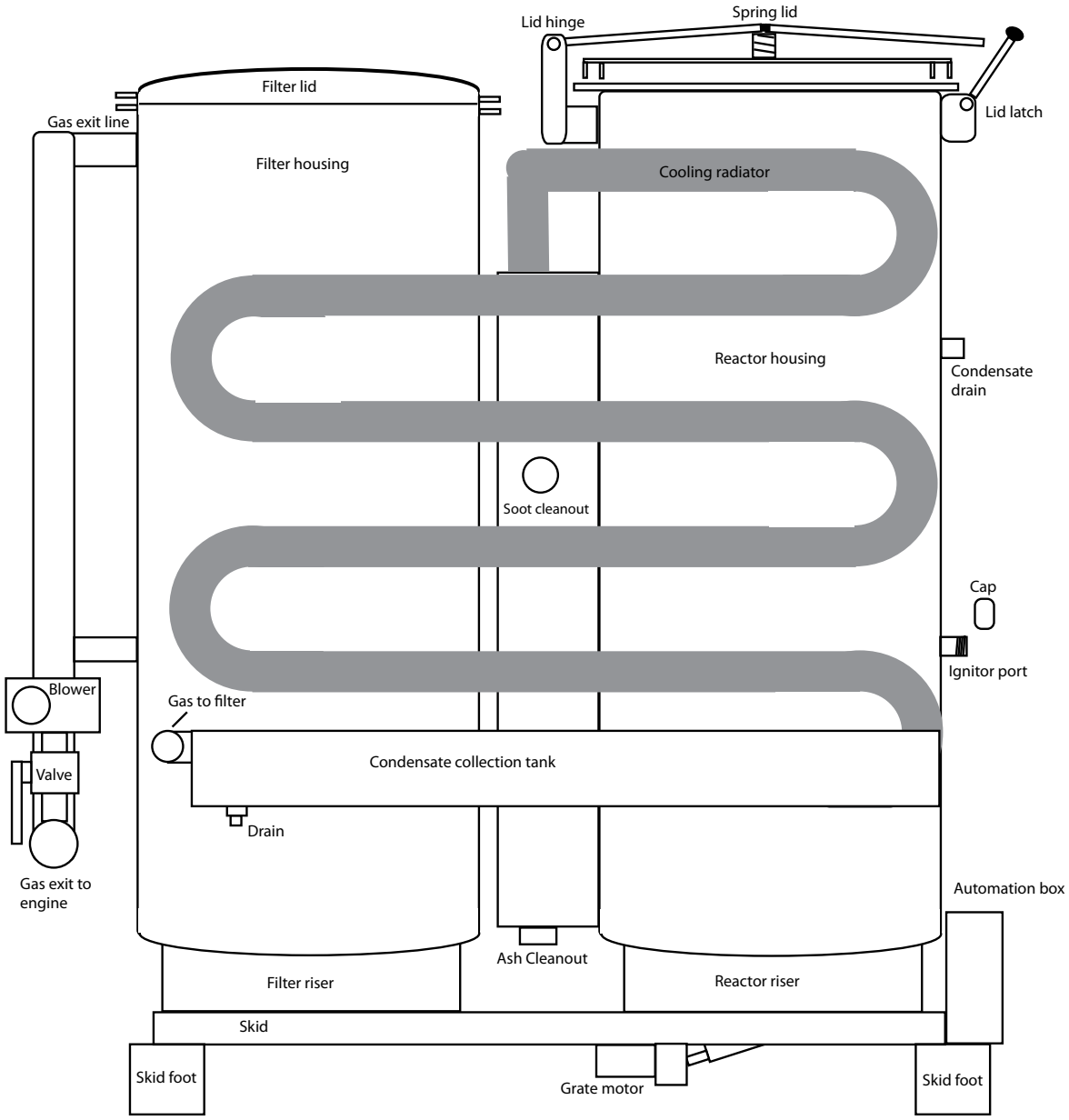




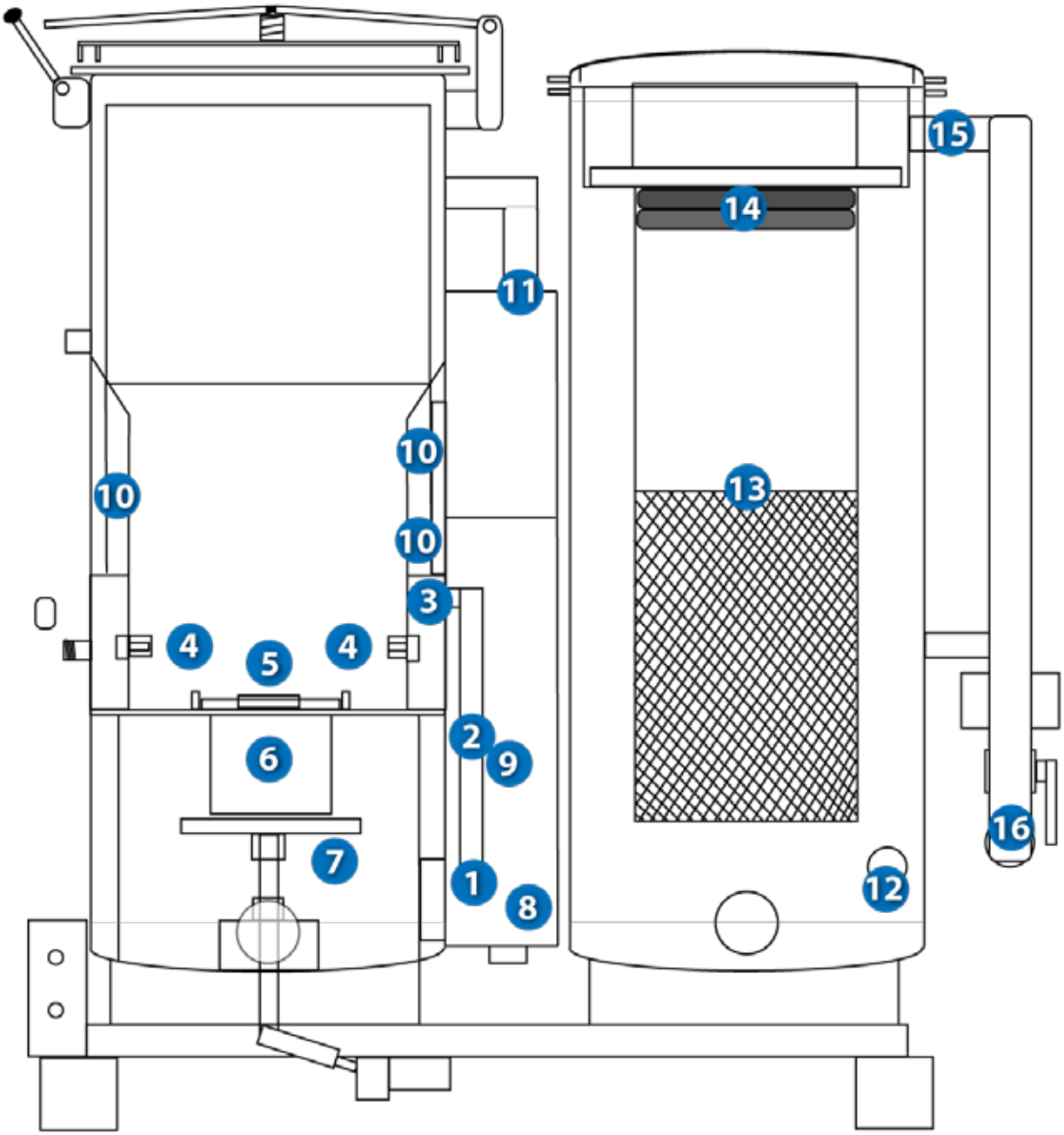
Layout: Back

http://WoodGasifierPlans.com





Flow Chart



Wood Gasifier System Flow Chart

1) Cold air enters air inlet check valve

2) Air is pre-heated from post reduction heat

3) Air enter air jacket, cycles around to all jets

4) Air blasts through jets into charcoal

5) Partial oxidation occurs, creating a zone 2000+ degrees that decomposes the wood and charcoal

6) Reduction chemistry, fuel gas is formed in high heat, zero oxygen environment

7) Gas passes through grate

8) Gas reaches expansion chamber, velocity slows, heavy particles drop

9) Heat exchange to air

10) Pyrolysis acceleration

11) Gas to cooler

12) Gas leaves cooler enters filter housing

13) Gas is filtered through organic media

14) Gas is filtered through foam filter

15) Gas exits filter housing

16) Gas exits gas producer

Tool list

Good

Crescent wrench
Hammer
Screw drivers
Allen wrenches
Tape measure
Black marker
5” angle grinder
5” cut off blades
Dust mask
Safety glasses
Gloves
Mig welder .035 weld wire, solid core
Welding hood, #10 lense
Drill
Hole saw blades 1”, 1.5”, 2”, 3.5”
3/8” drill bit
Caulking gun
Hardwood scrap 2” x 6” x 1”
Scrap pipe lengths for blacksmithing
Wire stripper/cutter
Wire crimpers
Table saw- to cut wood

Better

Plasma torch or oxy-acetylene torch
Air compressor

Best

Roller
Bender

Supreme

CNC plasma torch table

Skills

Basic welding
Basic grinding/drilling
Basic hand tools
Basic cutting
Basic painting
Basic 12 volt wiring
Basic metal forming
Basic machining - Optional

General Budget Guidelines

Basic materials, hand cut parts, self welded
$1500

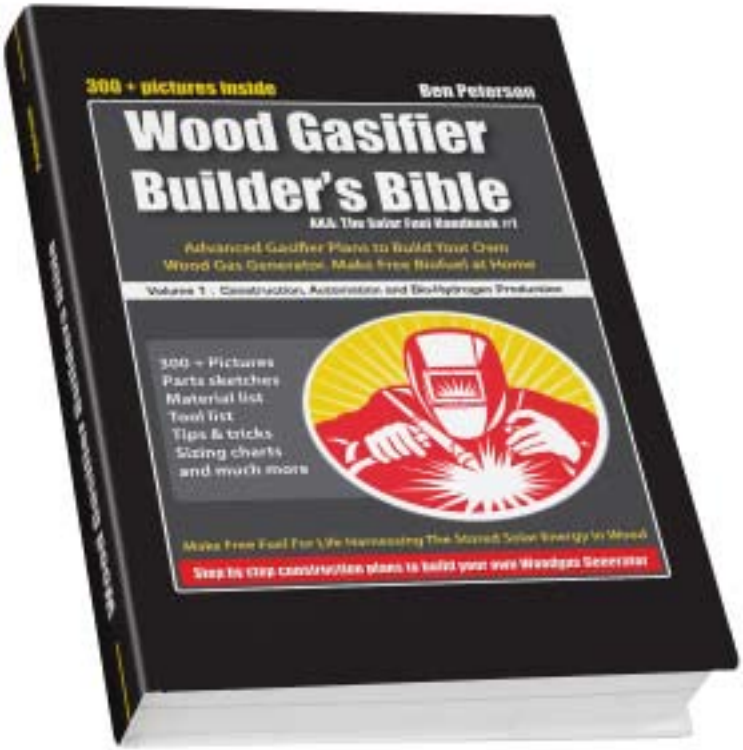
Basic materials, laser cut parts, self welded
$2500

Basic materials, laser cut parts, hired welding
$3800

Turn-key gas production, done for you build
$5800-$6500 in mild steel.

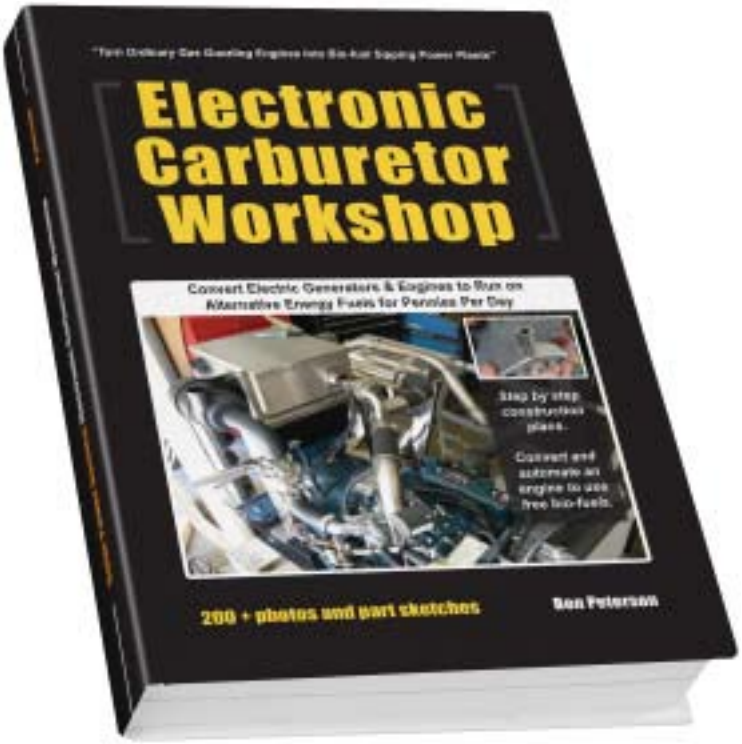
Learn How to Build a Reliable, Powerful Wood Gas Distillery.
Start Harnessing the Stored Sunlight in Wood Any Time of Year

+ Convert Your Engine With Simple Automation



A step-by-step construction manual

Learn how to build an advanced wood gasifier with local parts on a DIY budget.



A step-by-step construction manual

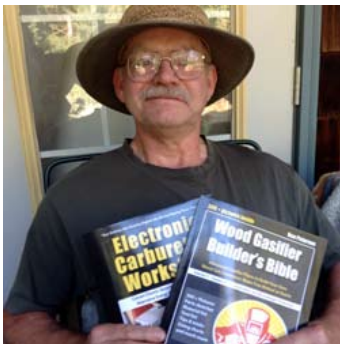
Learn how to convert an engine to run on biogas.

Then learn how to build a simple computer controlled carburetor.

http://WoodGasifierPlans.com

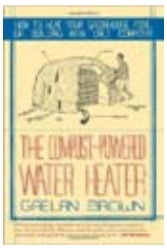
Early Book Reviews

Now Shipping!



I see a design that is thermal-chemically very balanced and adaptable for the widest range of engine usages. Home generators, tractor saddle mounted and mid sized power equipment (think sawmill). It is designed to be built in a home garage shop. He gives you a three level tool list and his own proven supplier sources by NAME.
I am now buying extra copies to gift to all of my true off-grid and solar friends to fill promises I made years ago. That day has finally come thanks to Ben's gift of knowledge and experience in this DIY book system. Thank you for this gift Ben. And to any one reading this… BUY THIS BOOK!

Washington State Steve Unruh
Woodgas contributor to: Drive On Wood, MicroCogen, the old Victory community site, Lister Engine Group, and GEK Owners forum.



This is an amazingly valuable book. Ben has boiled down his many years of R&D into a very well written book that makes it clear how anyone can make a wood gasifier. Thank you Ben!

Gaelan Brown
Author of the Compost Powered Water Heater
http://compostpower.org

I have to say it is an honor and a privilege to able to review Ben's plans… This is a straightforward approach with zero guess work to building a high quality gasifier from what I can see. Not only that but the advanced features and build techniques are the stuff we manufactures are using today. These types of systems are a must and Ben lays all this out for you… Cheers!

Matt Ryder
CEO Vulcan Gasifier LLC
http://www.vulcangasifier.com/

This is the book I've been waiting for…There is no one I trust more than Ben for this information. Thank you for taking the time to write such a detailed manual. My hats off!"

David P.
Track Engineer, BN Santa Fe

Hey Ben I was running the generator today and admiring the electronic carburetor. It was really just ingenious how you set up the whole system… You truly have something special here, I pray others can benefit from your dedication to this underrated technology!

Godbless sir –
David, Victory Owner

Well done on the book bro! The design is so advanced and yet so simple. You literally spelled out every step.

Issac S.
Underwater welder, Gulf coast

http://WoodGasifierPlans.com

Thanks for reading