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# **Release of Liability Notice**

Legal Mumbo Jumbo

**This book is for educational purposes only.**

Life is inherently dangerous. If you want to avoid danger, you should curl up in a ball, watch tv and pay taxes until you die. But that isn't a life is it?

By viewing this book you agree to hold harmless and indemnify the author Benjamin Peterson, the publisher Reinvent the World, LLC, it's ownership, partners and affiliates.

**Use at your own risk.**

In this book we chronicle the construction of a **Wood Gas Generator**. The reader should mind the following warnings:

**Metal fabrication involves sharp metal, loud noises, hot surfaces and electrical arc welding. Use appropriate safety equipment.**

**This machine gets hot- wear gloves.**

**This machine makes flammable gases- keep sparks away.**

**This machine makes gases you should not breathe- use in a well ventilated area.**

**This machine can release pressurized gases- wear eye protection.**

**An electrical generator can shock you- use a qualified electrician.**

# Introduction

Meet the Author

## **You Are Awesome!**

Thank you for purchasing this book and taking the time to read it fully.

Whether you know it or not, you are joining an elite society of heroes, innovators and problem solvers building a better future. The Wood Gasifier Builder's Bible is your guide to the forgotten art & science of wood gasification.

## **2nd Edition**

In the two and a half years since the release of the first edition of this book I have been delighted to see the sheer number of people that are building wood gasifiers and the positive feedback has been great, so my heartfelt thanks to everyone who is a part of this community.

This second edition is going to expand on the build process with more assembly diagrams & upgrades. Plus new sections on theory and operation. I added a 2nd gasifier design for our Mustang project and I take you into the future with Wastebot, a machine that uses gasification principles to transform plastic into fuel. Whew! Lot's of new stuff!

## **Gratitude for Wood**

Everything we have achieved as a human species can be traced back to wood. Wood gave us warmth in any season. Wood cooked our food and made it safer to eat. Wood made our spears and bows to hunt. Wood construction gave us shelter from the elements. Wood was used to build our bridges. Wood wagons allowed us to travel and expand. Charred wood was used to forge steel and cast metal. And wood pulp makes the paper we use to communicate ideas in newspapers and books like the one you hold in your hands now.

Never take for granted how much human creativity can do with wood. Wood has even powered nations through World War as a fuel for combustion engines. In this book you are going to learn exactly how they did it.

Plant trees because it's in our own self interest and that of future generations to have fresh air and abundant wood.

## **Back to the Land**

My wood gas story starts back in the spring of 2007. I realized that we were headed for a major financial crash, so I **did something that everyone thought was crazy at the time**. I bought a beat up old farm house on 20 acres out in the sticks in the Pacific Northwest and moved my young family out there to get prepared in case the worst happened. I had never watched a prepper TV show, or thought about going off grid, but the facts and evidence made it clear I needed to take action.

It's far too cloudy up here to rely on solar panels alone so I went looking for other power options. Most of it was tinker toys like stirling engines and "free energy" bunk. I wasn't impressed and I was growing more skeptical by the day.

The farm was a total tear down. The house sat in a low spot and flooded. The electrical was old and gnarly. The well was so full of iron, that you had to settle the water before you could even filter it. Every building needed to come down to make way for steel shipping containers. It was a bad purchase, but a great learning experience. After tearing down the buildings I was left with piles of wood. At first I burned them in big viking pyres and marveled at all the heat. "If only there was a way to harness all this energy," I thought.

Summer time means burn ban, so you have to be sneakier in how you burn your wood off. After the fire department sent out 6 trucks to put out one of my fires I was put on probation. While I plotted and planned my off grid fortress I started researching steam. Steam has some power and it was used in our early history, but as I dove deeper, it seemed dangerous and the efficiency is low. You can only make electricity with a turbine and those aren't easy to find. No one would even sell a working system for fear of getting sued if it blew up! But while steam wasn't a fit I stumbled on something called "wood gasification."

## **A Decade Long Weekend Project**

Searching for steam I found all these old pictures of gas generators that used either wood or charcoal. Wood being used to make flammable fuel? How could I not know about this? This has to be an internet hoax. Did someone photoshop this just to mess with me?

Left with no other renewable fuel options I decided to build one of these things using a set of free plans from FEMA. In hindsight I was mistaken to use “free” plans instead of “good” plans, but I digress. It was 4th of July weekend 2007. I scrounged up some parts and started welding together the ugliest gasifier you have ever seen.

1st try... no gas.

2nd try... no gas.

3rd try... no gas.

4th try... no gas.

Goddammit! The internet got me again!

This thing is going to make gas if I have to shit in it and light my own flatulent gas!

5th try... no gas. Erg!

6th try... GAS! A belch of GAS!

Eureka! I felt like I had discovered gold. My whole world changed and I was grinning from ear to ear. I was now an accidental alchemist. It wasn't just that I could now make fuel. It was like a crack in the matrix that allowed me to see that there are truths that are hidden from us. What other secrets were there to discover in the world we think we understand so well?

### **A Gasifier a Day Keeps the Wife Away**

After building and scrapping my first machine I did some more research. I bought a set of plans from Mother Earth News. A better decision. I got started again the following spring. I built the MEN gasifier and it was definitely better, but I was still making tar for a variety of reasons. Many of them user error and not having a good blower motor with deep suction. Learning gasification with no teacher and a crappy gasifier is a smoky mess. I smelled like a mesquite barbecue and looked like a coal miner. I wasn't allowed in the house until I stripped and hosed off outside.

I built out a few more designs from the internet, but they weren't up to the task of making consistent reliable fuel. Much of the WWII gasifier knowledge was lost at this point and the designs reflected this amnesia. I didn't go to college, so I had no academic background for studying thermal chemistry, but what I did have was a decade of prolific welding and fabrication skills, so I took the Edison approach and I built a new gasifier every week and made new changes each day. This allowed me to test all of the assumptions and form a few of my own based on observation and testing. What a valuable endeavor. There is no substitute for experience.

## **2008: Crash, Splash, Freeze**

By the end of the summer of 2008 I had a working gasifier contraption hooked up to an old lincoln welder generator. And not a moment too soon. Soon thereafter the stock market crashed, my property flooded, the wife and kids left me and a 100 year winter storm paralyzed the Pacific Northwest. My flooded property froze. The power was out for two weeks. The local gas station couldn't pump gas. And my water lines were frozen. No this ain't the lyrics of a country song, but it was the perfect opportunity to put the gasifier to the test. Luckily I had plenty of wood. Running the generator twice a day I was able to defrost my water lines and run my pressure pump so I could take a shower and get a few hours of light in the evening. I kept on welding and building more gasifiers. Life went on.

After that experience I was hooked. Wood gas had proven itself in a real survival situation, not the made up crap you see on TV. I went on to become one of the leading developers of wood gasification technology in the world. Earning awards from Popular Mechanics magazine and the prestigious Clean Tech Open. Features in Mechanical Engineering and Mother Earth News too. And while my work has progressed beyond scrap metal builds, I have never forgotten my DIY roots. This book is my gift to future generations of back yard builders and problem solvers.

## **My Advice**

Wood gasification is both very simple in nature, yet extremely difficult if you aren't accurate in your thinking. Magical (post modern) thinking and intellectual sounding bullshit won't make your gasifier work. Facts, observation and reason will. This is old school technology that requires an old school work ethic.

When I first started, it was the dark ages of gasification. I made every mistake you can make. Learning felt like a zen teacher beating you with a stick and asking "Does a dog have Buddha nature?"

In the last 10 years I have put in over 20,000 hours and well over \$1,000,000 into development. I've used really low tech solutions and really high tech solutions. I have built machines for backyard tinkerers and I have built machines for governments, energy companies and billionaires. I have run more engines than I can count.

My advice to you is this: Treat the gasifier like an ecosystem. All of the design characteristics have to work together as a team. You can't run around changing things willy nilly. Test each variable in isolation. **Don't change multiple things at once.**

**CHARCOAL is the secret sauce that makes gasifiers work. Wood chunks make the best charcoal.** Read that twice.

Gasifiers can be touchy like women. Treat them nice and remember, just like with women, it's all about the CHEMISTRY. Learning to operate a gasifier is like learning to operate a vehicle, it will take a little practice at first. Start with an old jalopy electric generator and upgrade when you get good.

And finally remember... to be patient with your gasifier. It has a new user operating it. (That's you!)

## About This Project

Based on my years of experience in gasification I put together this set of plans to give you the most bang for your buck. High performance features like active grate technology, concentrated heat exchange, super insulation, etc. Plus, it's in a platform that uses mostly common and affordable parts like propane tanks, pipe fittings and tubing. It's designed to be compact for a wide range of applications like: electric generators, tractors, trucks, and trailer mounted systems.

As with any "one size fits most" design, you WILL need to make changes to suit your application. You can use the hearth sizing chart to dial in the design to your exact engine displacement. You may want to add more cooling tubes for colder, denser gas. Or you may want to recoup heat for water heating and thermal mass. The possibilities are endless!

## The Adventure Begins

Making your own fuel from the tree branches at your feet is a pretty magical process. Watch your friends and neighbors burst into cheers when you crank up an engine for the first time. If the power is out when you do it, you will attain instant hero status. "The neighborhood genius."

The oldest form of solar power is of course trees and plants. Hacking the stored sunlight in wood instantly removes the gatekeepers that create toll roads between you and your freedom. It's like being Prometheus, snatching fire from the gods to give to mankind.

Thank you for reading the book and pursuing life and liberty. God speed.

Cheers,  
Ben Peterson  
March 2017

