



CHIP ENERGY CLEAN RENEWABLE FUEL

401 W. Martin Dr. PO BOX 85
GOODFIELD, IL 61742
PH 309-965-2005 Fax 309-965-2905

BIOMASS STOVE / GRILL (MODEL 818-1630)



INSTRUCTION MANUAL

*Thank you for choosing
Chip Energy's Model 818-1630 Biomass Stove / Grill.*

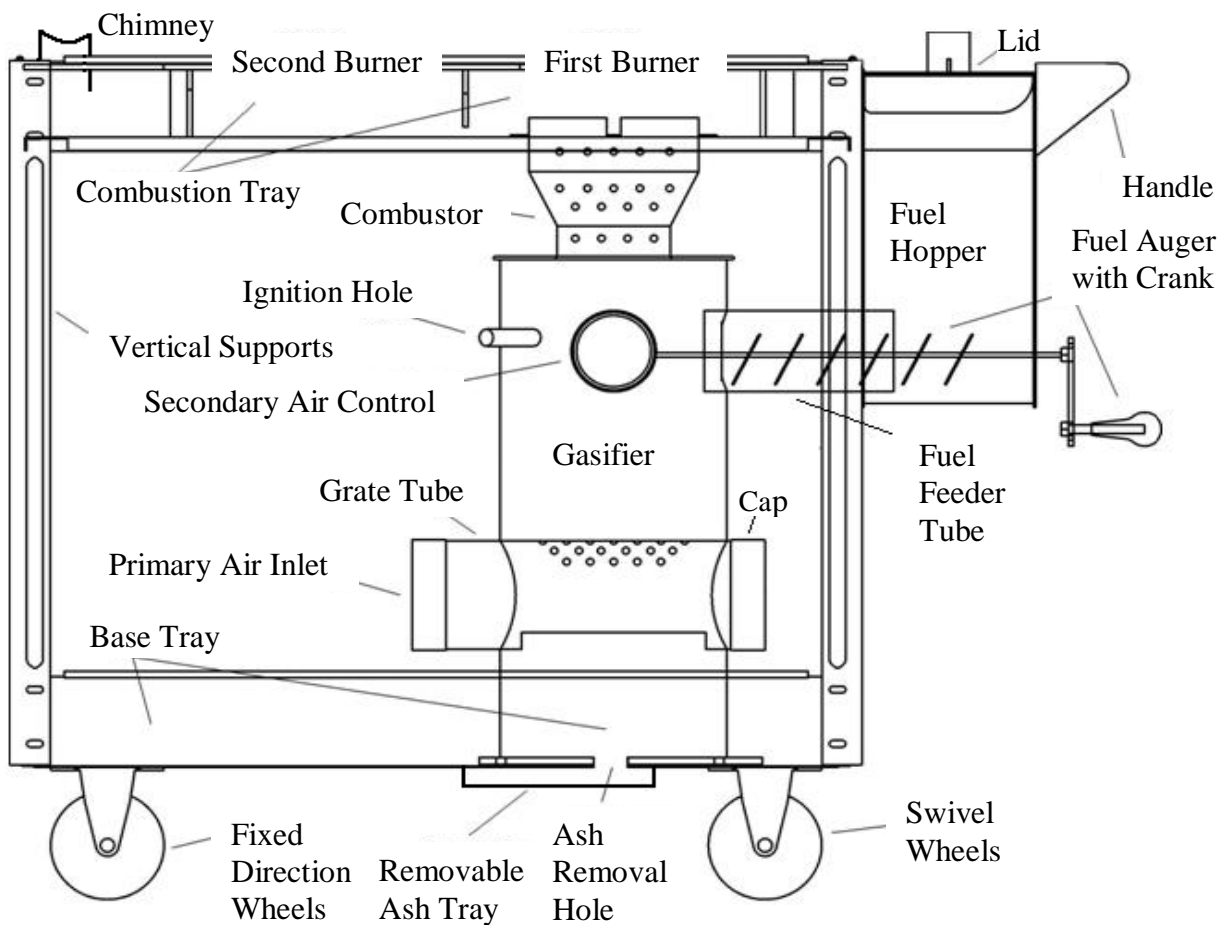
I. SAFETY FIRST: WARNING

- A. This appliance is designed and manufactured for outdoor use only.
- B. Always wear protective gloves or appropriate skin protection when assembling or operating this appliance. Some parts have sharp edges, and many surfaces become extremely hot when the appliance is operating. Safety glasses are **required** when operating near gasifier openings.
- C. Do not store or use combustible or explosive materials (gasoline, LPG cylinders, *etc.*) near this appliance. Also, do not operate this portable unit near anything that can be damaged by radiant heat, such as vinyl, plastic, or painted walls, fencing, furniture, *etc.*

II. LIMITED 6-MONTH PARTS WARRANTY COVERAGE

- A. Chip Energy warrants against any and all defective parts during the six-month warranty period that begins on the date of purchase from the manufacturer or authorized distributor.
- B. Chip Energy will replace or repair any defective part at its discretion.

III. DIAGRAM OF ASSEMBLED UNIT



IV. ASSEMBLY INSTRUCTIONS

1. The Biomass Stove / Grill is shipped partially assembled. Open the box and position it so that the cart rests upright on its wheels.



2. Remove all parts from the shipping box.

- a. Stove / Grill Cart
- b. Chimney Sections (2)
- c. Fuel Hopper
- d. Fuel Hopper Lid
- e. Secondary Air Control
- f. Stove / Grill Top



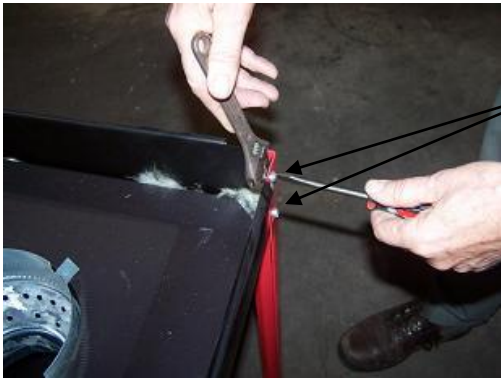
3. Gather the two tools needed for assembly.

- a. Adjustable Wrench
- b. Screwdriver (regular)

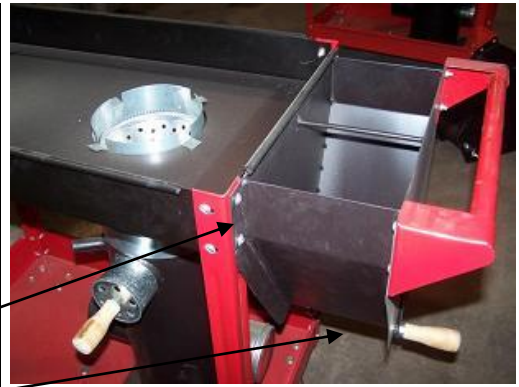


4. Remove the single screw from the gasifier's secondary air opening and use it to attach the secondary air controller.





5. Remove the top two bolts from each vertical support at the end of the cart closest to the gasifier. Attach the fuel hopper using the four bolts after checking that the fuel auger is extended into the gasifier's fuel tube.



6. Place the fuel hopper lid onto the fuel hopper, then set the stove / grill top into the cart tray with the smallest top opening positioned as shown here.



7. Install the chimney by inserting one 2-foot section into the 4-inch opening in the stove / grill top, then attaching the second 2-foot section as shown.

8. The Chip Energy Biomass Stove / Grill is now completely assembled.



V. PLEASE READ BEFORE FIRST USE

When the Biomass Stove / Grill is fueled and ignited for its first use, expect a small amount of smoke to appear from exterior surfaces which have been coated with high-temperature stove paint. This is normal, as the stove paint requires an initial (one-time) high heating to become properly cured. Do not cook food on the stove / grill until this paint curing process has stopped and you relight the grill.

The recommended cookware includes cast iron skillets, griddles, and stainless steel pots. Do not use house pans with Teflon[®] coatings, as these pans can get too hot and leach Teflon[®] into your food. Cast iron will spread the cooking surface temperature more evenly. To better control the variations of surface cooking temperatures, you may place a cookie sheet or a small pie pan (turned upside down) between the burner and your cookware.

Your initial “experimentation” (such as using different types of fuels and adjustments of air control) should be done when you do not have others waiting to be served. Like any appliance with a technology new to you, expect to do a little learning to become familiar with the best usage of a modern biomass micro-gasifier cooking device.

VI. INSTRUCTIONS FOR USE

“Practice makes perfect.” The operating procedure is easily learned and may be modified slightly to suit your cooking style and types of fuels. Please refer to this manual’s photographs and diagram of the unit for proper assembly and names of parts. Assembly instructions are found in Section IV, and a parts-labeled diagram of the unit is found in Section III.

A. Verify that the appliance is properly assembled and ready for operation (refer to Section V if this is the unit’s first use). Ensure that the bottom ash tray is closed, the lower primary air inlet is fully open, the secondary air inlet is half open, and cookware (typically skillets, griddles, or pots) is readily available to cover both burner (cooking) openings.

B. Place dry biomass fuel into the fuel hopper and gasifier. You can place fuel directly through the first burner opening. Maximum fuel level is at the bottom of the secondary air inlet (note the location of the secondary air control on the diagram in Section III). Do not overfill.

C. For ignition, use a modest amount of charcoal lighter fluid to moisten the top of the fuel in the gasifier. (**Warning: Never use an igniting accelerant in the fuel hopper, and never use gasoline, alcohol, or diesel fuel as lighter fluid.**) Insert a match or lighter-stick into the ignition hole (note its location on the diagram in Section III). The lighter fluid can ignite with a sudden flame, so keep clear of all openings. Do not cover the cooking openings until you have an established flame.

D. Cover the two burner (cooking) openings with your cookware. (A small amount of water in pots or skillets will keep them from getting too hot too soon.) You can start cooking immediately. To see the flames, you can leave open a narrow gap between your cookware and the edge of the first burner cooking opening. Even though you do not see flames at the second burner cooking opening, it must be covered to ensure that all hot exhaust gases are properly routed to the chimney.

E. The need for additional fuel will depend on the fuel type, duration of cooking, and the intensity of heat. This will require personal experimentation, keeping in mind the information given in Sections VII, VIII, and IX.

VII. NOTES *Customizing your cooking preferences with the Chip Energy Biomass Stove / Grill.*

A. The initial burning period uses TLUD (“Top-Lit UpDraft”) pyrolytic gasification technology for a very clean flame. Pyrolysis leaves behind hot charcoal over which you can continue to cook slowly, or simply allow to burn to ash.

B. Cooking time during the TLUD period: One filling of standard wood pellets burns approximately 50 to 80 minutes, whereas one filling of chipped or shredded softwood burns 25 to 40 minutes.

C. Additional fuel can be added during the TLUD period of operation. Add fuel by turning counterclockwise the handle on the fuel auger. Do not add more fuel than the amount delivered by two or three turns of the auger at one time. This additional raw fuel on top of the hot char bed will also pyrolyze (give off combustible gases) and become charcoal. After adding fuel or adjusting air flow, always allow a few minutes for the fire to stabilize.

D. Air control is the key to successful biomass gasification.

1. You can experiment by adjusting the secondary air inlet from fully open to almost fully closed. (See the Technical Information of Section IX.)
2. You can partially cover the primary air inlet (on the lower side) to reduce the intensity of the fire. When the primary air flow increases (whether by fan, wind, or direct blowing), the fire intensity increases.

E. FLAME-OUT: If you reduce the air supply too much or add too much raw fuel, the flame could extinguish and only smoke would rise from the gasifier. This situation requires you to relight the burner. Only use a lighter-stick or match in the ignition hole to re-ignite the flame. Make sure that the primary and secondary air inlets are fully open. **(Warning: When relighting the gasifier, a build-up of smoke can cause a sudden flame. STAY CLEAR OF ALL OPENINGS WHEN RELIGHTING.)**

F. Ash can accumulate in the bottom until it interferes with the entry of the primary air. This accumulation could take several months depending on the use of the unit and whether low-ash fuels are used. Clean the ash out at least once per year.

VIII. DRY BIOMASS FUELS

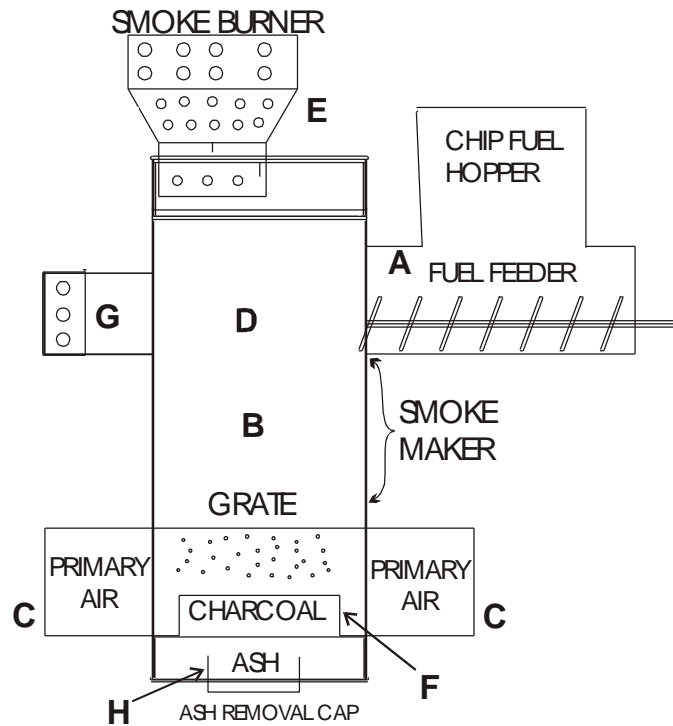
The following table illustrates a wide variety in types of dry biomass fuels. Keep in mind that any fuel chosen must be dry and must pass through (by auger) the 3-inch diameter fuel feeder tube of the Chip Energy Biomass Stove / Grill. When mixed with chipped wood or wood pellets, many of these fuels perform very well. Note: Dry cherry pits are known as an excellent fuel for handling and combustion, but like any “light weight” fuel, the net fuel volume needed increases as the fuel type becomes lighter.

Wood Pellets	Paper Shreds	Corn	Cardboard	Mesquite
Wood Chips	Peanut Shells	Rice Husks	Sawdust	Cherry Pits
Switch Grass	Pine Cones	Coconut Husks	Sunflower Seeds	Leaves
Miscanthus	Corncobs			

IX. TECHNICAL INFORMATION

HOW MICRO-GASIFICATION WORKS

- A. Fuel is added from hopper onto fuel pile above grate.
- B. Fuel is top lit with lighter fluid.
- C. Air enters upward through fuel.
- D. Hot smoke fills the “smoke maker” above the fuel.
- E. Air enters the “smoke burner” for clean combustion.
- F. Used fuel becomes hot char and keeps the in-coming raw fuel heated to release smoke (pyrolysis gases).
- G. Openings for lower secondary air help control draft.
- H. Ash and excess char are released after build up.



1. The Chip Energy Biomass Grill *literally* “burns the smoke,” but smoke will not burn if it is too cool, is deprived of sufficient air mixing, or contains excessive moisture. Because there are so many variables (fuel types, fuel moisture content, wind, thinner air at higher elevations, over-filling or under-filling of the fuel, air controls, *etc.*), you should experiment to fully learn how to operate the gasifier and combustor. With some practice, you will master and appreciate the art of cooking with biomass gasification.

2. During extended burning times, the Biomass Grill will change over from TLUD gasification to AVUD technology, a variation of traditional updraft gasification that consumes existing charcoal at the bottom and creates more charcoal from the new fuel entering at the top. With AVUD technology, the Biomass Grill can be operated continually because only a small amount of ash accumulates at the bottom.

3. Visit our website for further information: www.chipenergy.com

X. CONTACTING CHIP ENERGY

Chip Energy's website (www.chipenergy.com) is an excellent resource for our products and services, and it provides the most up-to-date listing of our postal and electronic contact information.



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To help us improve our services and expand the applications of the Biomass Grill, we encourage you to send comments on operations and successful recipes to Chip Energy at: comments@chipenergy.com

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