Green Power

Fuel Briquettes from Waste Materials
An Alternative Fuel for Cooking

Enviro-Coal
Kampala, Uganda

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About a billion people in our world rely upon wood and charcoal for cooking, resulting in wide-spread deforestation and loss of about 3% of the world’s forests each year. In countries where the average income is $1-2 per day, cooking fuel can consume half of a family’s income.

Fuel briquettes can be made from readily available waste materials. In urban areas, this can be sawdust and shredded paper. In villages and rural areas, they can be made from leaves, grass, coffee and rice husks and other agricultural waste in many combinations. Waste plastic material can not be used because the plastic gives off toxic gases when it burns. Green raw materials like leaves and grass are moistened and partially decomposed under black plastic for several days, then dried and pounded or chopped into small pieces about the size of cornflakes. The raw materials are soaked, mixed in a slurry and pressed with a fuel briquette press into a 4 inch (10 cm) diameter cake with a 1” (2.5cm) center hole.

The pressure interlocks the fibers without the need for glue to hold the briquette together. The briquettes are dried in the sun for 3-5 days prior to being burned. Charcoal fines, the small particles that crumble off charcoal are a waste material found in charcoal markets, can be added to any mix.

Fuel Briquette projects have been started in many countries in Africa, Southeast Asia, Central & South America. Enviro-Coal and Beaverton Rotary are working to spread the knowledge of this technology as an alternative fuel to additional areas. Please join us in teaching individuals how to make fuel briquettes for their own use as well as to establish sustainable small businesses that produce a product that helps the producers earn a living wage, provides their customers with a less expensive cooking fuel and improves the environment by reducing deforestation.

**Cooking Fuel from Waste Materials**

**Complete Peterson Press Model 3 Kit**

Back Row — Left to Right:
- Ejection Stand (PVC pipe mounted on wood base.)
- Press frame made from available lumber. The height varies with height of jack—typically 32” to 38” (81 to 96 cm)
- Hydraulic bottle jack (1 or 2 ton capacity)
- White 4” (10cm) PVC mold

Front Row — Left to Right:
- 4” (10cm) Spacer with center hole (Can be made with metal or plastic or even cut from the side of an old jerry can.)
- 3/4” (2 cm) Center PVC pipe drilled with 1/8” (3 mm) drain holes.
- Metal mold set base with center drain hole.
- 4” (10cm) Spacer with center hole.
- Black 3” (7.5cm) PVC Piston
- Two sample fuel briquettes.
Making Fuel Briquettes

Raw Material

An urban example using 5 parts sawdust, 3 parts shredded paper, and 1 part charcoal fines. The sawdust was soaked 5 days and the paper was soaked 1 day.

A wide variety of mixes of raw materials can be used, depending on what is available. If briquettes fall apart, adjust the mix until one is found that holds together. Waste paper has long fibers that help make good briquettes when added at 15-20%.

Charcoal fines turn the briquettes black, making them initially more acceptable to people used to charcoal.

Finished briquettes on a drying rack.

Drying times depend primarily on heat, humidity and air flow.

Drying times will be shorter during the dry season and longer during the rainy season.
Assemble mold on base and insert center pipe

Add a cup of mixed material

Insert spacer and press with piston to make spacer level

Add second cup of material on top of spacer
Insert second spacer on top of raw material, then piston. Place mold on jack inside press frame and pump handle to compress material and squeeze out water.

Remove mold set from frame and place upside down on ejection stand. Press down until briquettes slide out of mold set.

Remove center pipe from mold set and separate briquettes from spacers. Dry in sun 3-5 days until no moisture remains, otherwise they will smoke.

Briquettes burning in a side-fed rocket stove. Hang briquettes on the knobs on the sides of the stove to warm them before burning. This stove is more efficient and produces less pollution than a top-fed or three stone stove.
Videos of making fuel briquettes and various Peterson Press designs are available on YouTube:
- Demonstration of Stage III Peterson Press (http://www.youtube.com/watch?v=0ICvd4UkNuQ)
- Design Progression of Press and Mold Sets (http://www.youtube.com/watch?v=ofGzAG0e09k)

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Enviro-Coal is a small business cooking solutions store that sells fuel briquettes, high-efficiency household cooking stoves and Peterson Presses and conducts classes on how to make fuel briquettes. Enviro-Coal also sells briquettes to large-scale users including schools.

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The Beaverton Rotary Foundation sells plans for making Peterson Presses, mold sets, high speed jacks and press frames.

Groups travelling from the United States to other countries can take a complete press kit with them in their checked baggage. This allows them to immediately demonstrate making briquettes with waste material like sawdust and shredded paper. Local craftsmen can quickly replicate the press frame and mold set from the sample. Hydraulic jacks can be purchased from local auto supply and hardware stores. This can be an excellent secondary project for groups going on medical, construction or environmental trips.

Individuals can make fuel briquettes for their own home cooking use and sell their excess production to earn modest incomes. As we have leaned in Uganda, fuel briquette making can be a sustainable business helping the producers, their customers and the environment.