

A black and white photograph of a pile of charcoal briquettes serves as the background. Overlaid on this is a semi-transparent white box containing the word "Charcoal" in a large, white, sans-serif font. Below it, the text "A value added opportunity for woodland owners" is written in a smaller, white, sans-serif font. In the bottom left corner of the white box, there are three logos: "Virginia Cooperative Extension" in green, the "V SU VIRGINIA STATE" logo, and the "VirginiaTech Invent the Future www.ext.vt.edu" logo. In the bottom right corner of the white box, the text "Adam K. Downing, Extension Agent Forestry & Natural Resources, Northern Piedmont Area" is written in a white, sans-serif font.

Charcoal

A value added opportunity for woodland owners

Virginia Cooperative Extension

V SU VIRGINIA STATE

VirginiaTech
Invent the Future
www.ext.vt.edu

Adam K. Downing, Extension Agent
Forestry & Natural Resources, Northern Piedmont Area

Market Niche for Lump Coal

...Sales of lump charcoal have more than quadrupled in the past 7 years and more than **doubled since 1998**. About 91,000 tons were sold in 2002, up 9.64% from the year before. While lump charcoal still accounts only for about one-tenth the amount of traditional pillow-shaped briquettes sold annually, it is definitely an exciting trend for lump processors...

USDA Forest Service, June 2003, *Forest Products Conservation & Recycling Review*

Outline

- History
- How To
- Economics
- Marketing
- Considerations
 - legal



Three Forms (Pyramid, Sphere, Cube)

David Nash, Artist

Briquetts VS. Real (lump/natural)

Briquetts

- Orin F. Stafford & Henry Ford
- Sawdust & stuff
 - Binders (starch)
 - Paraffin or petroleum
 - Limestone to color ash



Real

- Since fire was discovered
- Charred wood



Charcoal History

US pig-iron Industry

- An average furnace would consume from 600-800 bushels of charcoal every 24 hours. This required about 30-40 cords of wood from trees 25-30 years old.
- 8 cords of wood to for one ton of pig iron.
- One iron season (summer) would consume 4,428 cords of wood a year
 - 150 acres of woodlands each year.
 - 5 furnaces in Massanutten area > 750 acres/year.
 - In a 30 year “cycle” 19,000 and 23,000 acres of forest had been clear-cut in continuous bands.

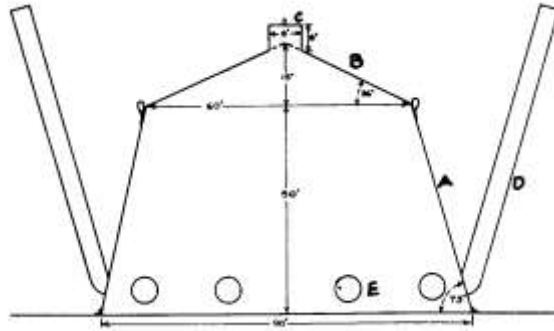


the day...



Portable metal kilns

- Ancient technology “mastered” in 1930s



Portable metal kilns

Modern version
(modified New-Hampshire style kiln)



Portable metal kilns: Fabrication

- Specifications/goals
 - Portable – transport on full size pickup
 - Inexpensive – materials cost under \$500 - \$1000
 - Minimal – tools/skill/time needed for fabrication



Kiln operation

- 48-72 hours production time
 - Unattended overnight / low maint. daytime
 - One person operation during most of production
- Nontechnical
 - Load, light, and “leave it alone”
- Safe
 - Minimal fire hazard, risk to operator, loss of product, etc.
- Ideal for multiple kiln operation
 - One-half to two-thirds cord of wood per batch
 - Yields 200 – 300 lb marketable charcoal

Photo-torial



Air-dry wood



Kindling in the middle



Load it, tight



Seal it



- Drywall compound
- Caulking (high temp)
- Sand
- Dirt
- Foil tape

Light it



Add stacks



“Burn” the volatiles, reduce oxygen,
watch the smoke



After ~ 20 hrs

- Close
- Seal every air gap
- Let it sit for at least 24 hours.
 - 48 hrs. better
- Be sure it's cool before opening



Take off the top



Sorting





Product: The best darned BBQ fuel

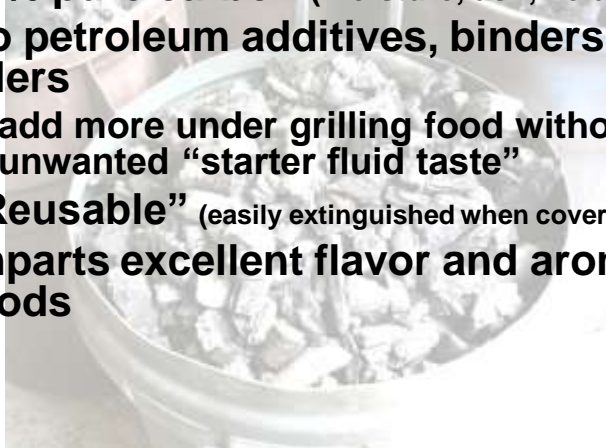


Puffergas...



Product: Natural Hardwood Charcoal

- **90% pure carbon** (moisture, ash, volatiles)
- **No petroleum additives, binders, or fillers**
 - add more under grilling food without unwanted “starter fluid taste”
- **“Reusable”** (easily extinguished when covered)
- **Imparts excellent flavor and aroma to foods**



How to use it

- Use a “chimney” to light charcoal
- Lights fast (5-10 min)
- Burns clean, hot, long (600°, 25-45 minutes)
- Can add more charcoal directly
- Sensitive to oxygen
- Low ash build-up



Economics - “Black Gold?”

- Cost of raw material = \$0.00
 - Stuff that’s not even good for firewood
- Think of this as a “profitable hobby”
 - Great winter work
 - Great way to improve your forest
- Niche Marketing

Firewood Comparison

Figuring ½ cord of firewood (2'x4'x8')	
Sells for ~ \$75.00 cut, dried and stacked	Value as charcoal ~ \$390.00 bagged
Costs: labor ~ 3 hrs. ?(\$30.00)	Costs: Labor & bags ~\$150.00 (13 hrs. + bags)
“Profit” ~ \$45 (60%)	“Profit” ~ \$240 (61%)
Additional costs = delivery, drying time, saw, splitter, etc.	Kiln ~ \$1500 – \$2000 Bag closer ~ \$150.00 Other materials ~ \$20.00

Marketing Ideas

- Farmers Markets: *Local Fuel for Local Food*
 - Local markets & brands
- Tailgaters
- BBQ events
- Demos at festivals
- Bulk to restaurants & caterers



- Applying for



Additional Considerations

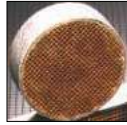
- Legal
 - Burning ordinances
- Waste
 - Fines... are they waste or “bio-char”?
- Smoke

Smoke

- A big deal depending where you are
 - May not be permissible without permit in some areas
 - Reduce smoke with catalytic converter
 - Be considerate of neighbors
 - EPA research shows charcoal making smoke less polluting than open burning.
- Check with authorities
- <http://www.deq.state.va.us/air/regulations/airregs.html>

Work in Progress

- Cost Revenue Analysis
- Bio-char utilization
- Emission-free operation
 - Catalytic conversion
 - After-burners
- New producer support
 - Kiln loan



Acknowledgements

- Virginia DOF – Charlie Becker
- Virginia Tech Forestry – Phil Radke
- New River-Highlands Resource, Conservation and Development Area – Dave Richert
- USDA Forest Service

