

Biochar Production and Feedstock Effects

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Presentation to the meeting on

**Biochar: Production, Properties,
& Agricultural Use**

Sept. 1, 2010 --- University of Illinois
Illinois Sustainable Technology Center

Biochar Production

- Reason for Biochar Production:
 - Sole Product or Co-Product
- Different Biochar Making Processes:
 - Slow Pyrolysis, Fast Pyrolysis,
 - Hydrothermal, Micro-Wave and Gasification
- Devices for Biochar Production:
 - Low Cost Simple Home-Made
 - High Cost Complex Precision Engineering
 - Chip Energy Biomass Furnace, Biochar Co-Product

Types and Uses of Biochar

“All chars are black, but are not created equal.”



- **Fuel Biochar:** High Energy Clean Burning.
- **Environmental Biochar:** Sequestration of CO₂.
- **Industrial Biochar:** Filtration.
- **Ag Biochar:** Adsorption capacity and % fixed carbon

Markets should lead with Biochar Specifications.



- Current markets purchase whatever biochars are available.
- Sustainable business practices will meet market needs.
- Current Biochar production is not driven by market specification requests.

Chip Energy Biochars



- Chip Energy can meet market specifications.
- We control time, temperatures and feedstock type during the production of our Biochars.
- Varieties of feedstock will influence the characteristics of the chars.
- The details of production methods are propriety and are secondary to meeting the specifications.

Chip Energy Biochar Characteristics

ANALYTICAL CHEMISTS
and
BACTERIOLOGISTS
Approved by Fibersol California

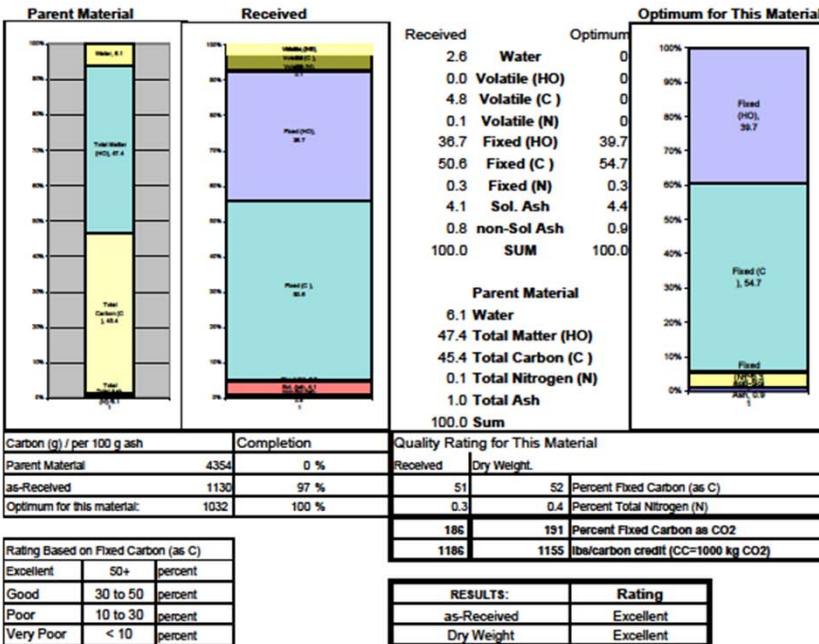
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Date Received: 27 Feb. 09
Sample Id.: Wood Pellets to Biochar
Sample id. Number 1 9020755

Account No.:
9020755 1 5884
Batch
Jan.-Feb.8-09 13
CODE: Char-fuel



Analyst: Frank Shields

Chip Energy

Biochar Material

Received

Optimum

2.6 Water

0

0.0 Volatile (HO)

0

4.8 Volatile (C)

0

0.1 Volatile (N)

0

36.7 Fixed (HO)

39.7

50.6 Fixed (C)

54.7

0.3 Fixed (N)

0.3

4.1 Sol. Ash

4.4

0.8 non-Sol Ash

0.9

100.0 SUM

100.0

Chip Energy Biochar Production

- Chip Energy has a distinctive process of up-draft gasification, with the DUAL purposes of making thermal energy and biochar.
- For centuries, furnace innovations have been focused on NOT leaving behind any carbon atoms.
- Chip Energy Technology can control carbon utilization.



Chip Energy Biomass Furnace



- Per 24 hr period, input of 500 lbs of biomass will yield nearly 100 lbs of biochar and produce 200,000 Btu HR of thermal energy.
- Small size favors decentralized applications, widely distributed feedstocks, and local control.

Varieties of Feedstocks



Woody Biomass

Corn Stover

Pine Cones

Cherry Pits

Mesquite

Paper

Corn Cobs

Tropical Maze

Peanut Shells

Cow Manure

Wheat Straw

Cardboard

Grasses

Sorghum

Miscanthus

Poultry Litter

Rice Husks

Cotton Seed

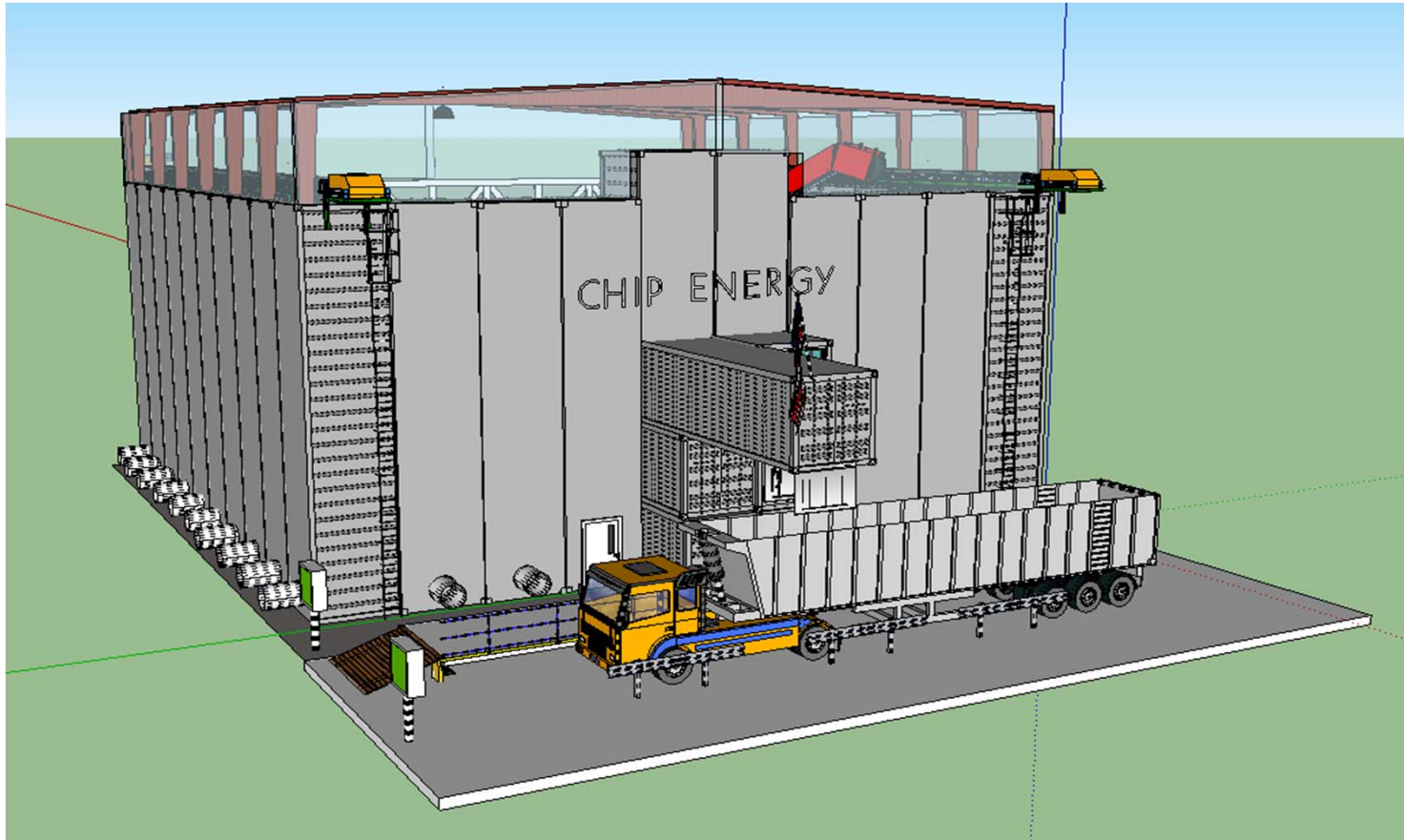
Potato Peel

Penny Cress

Horse Manure

Bio Solids

Handling of Feedstocks



- Economical biomass recovery and processing is possible with the Chip Energy Biomass Conversion Facility.

Chip Energy's Position

- Our future can be advanced by:
 - Furnaces for needed thermal energy
 - Economical supplies of biomass fuels
 - A market for quality biochar
- Chip Energy is active in Illinois, sells biochar to several states, has outreach for international projects, and is attending the International Biochar Initiative (IBI) Conference in Rio de Janeiro this month.

**We look forward to working
with you!!**

Thank You

For MORE INFORMATION

WWW.CHIPENERGY.COM

WWW.PWCE.COM

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