



Wednesday, July 21, 2004

UH shows money does grow on trees

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**Processing coal from plant waste
could net \$100,000 per year**

How it's made

By Kawehi Haug
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The University of Hawaii plans to start converting its trash into cash, thanks to new technology developed by professor Michael Antal Jr.

UH-Manoa's Hawaii Natural Energy Institute held an open house yesterday to show off Antal's discovery of flash carbonization -- a process that uses heat and pressure to convert green waste into commercial-grade charcoal.

The Hawaii Natural Energy Institute, a research unit of the UH School of Ocean and Earth Science and Technology, is building a plant that will utilize the technology to convert wood, corn cobs, macadamia nut shells and kukui shells into charcoal that can be used for cooking, as plant fertilizer, or as a clean alternative to coal.

The plant is big enough to process all of the school's green waste. Instead of paying to dispose of the waste, the school will be able to market the charcoal and make a profit. Now, the school spends \$10,000 a year for green waste disposal; with the conversion plant it will be able to make an estimated \$100,000 a year by selling the charcoal.

The plant is expected to be completed and fully operational this fall. It will be

able to convert 25 tons of green waste into 10 tons of charcoal in eight hours. That's the equivalent of 50 barrels of oil, said Antal, who holds the title of Coral Industries professor of renewable energy.

"We believe we can make coal so cheaply that we can compete with imported coal," Antal said to the small crowd while they snacked on s'mores toasted over a fire fueled by charcoal he had converted in his laboratory.

The technology was developed by Antal in response to a colleague's request to improve charcoal yields from forests in Thailand. He began researching flash carbonization in the 1980s and gradually improved the process until he was certain that the same technology that worked in his laboratory could be applied to a large-scale conversion plant.

The school has applied for a technology patent, which is pending. The royalties from the patent are expected to generate income and fund further research and development.

UH has licensed the technology to one company, Pacific Carbon & Graphite LLC, which has purchased the rights to manufacture the charcoal in Alabama, Georgia, Mississippi, North and South Carolina, Pennsylvania and Tennessee, said Dick Cox, director of the UH Office of Technology Transfer.

"I get one or two e-mails a week from around the world from people interested in this technology," Cox said. "Many of those e-mails are from underdeveloped countries of the world, and many of them are from developed countries. The interest in this technology is great, significant and widespread."

Hawaii Natural Energy Institute

www.hnei.hawaii.edu

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Making charcoal

How flash carbonization works:

1. 1000-1,500 pounds of green waste (wood, corn cobs, macadamia nut shells, kukui nut shells) is loaded into a large steel canister.
2. The canister is placed inside a larger pressure vessel that is weighted under about 48,000 pounds of force.
3. A fire is ignited at the bottom of the canister of green

waste and pressurized air is delivered to the top of the canister. The air flows down the canister and ignites a flash fire.

4. Due to the high pressure, the fire ignites instantly and burns quickly through the green waste and converts it to coal. The conversion process takes about 30 minutes.

5. The canister of newly produced charcoal is removed from the larger vessel and left to cool.

Hawaii Natural Energy Institute

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