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## Process mixes economics, wildfire prevention

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Portable plants that convert woody waste into fuel could help clear fuels for destructive wildfires.

By ANDY PORTER

of the Walla Walla Union-Bulletin

HEPPNER -- A new way to deal with the woody waste that can feed wildfires was on display here Monday.

The fast pyrolysis process that was the subject of the presentation promises an economically viable way to convert forest slash piles and other woody material into bio-oil, bio-char and synthetic gas, researchers told the audience of about 150.

"It provides a way to remove and recover material that would otherwise be wasted," said Phillip Badger, president of Renewable Oil International LLC, the Florence, Ala., company that built the unit. Along with Badger's company, other sponsors included the Umatilla National Forest, the University of Idaho, University of Montana, Rocky Mountain Research Station and Morrow County.

Housed in a self-contained trailer, the mobile plant on display Monday could process about an eighth-ton of woody material a day, Badger said, but larger, modular plants can be built. A key part of the concept is that the equipment can be moved from site to site or set up at a central location, substantially reducing the cost to haul the material to where it can be processed.

"That's the problem we've had in the past, it's very low value, very bulky material," said David Powell, forest silviculturist. Because it isn't profitable to haul it away to a "brick and mortar mill," the usual method of getting rid of the slash piles or other no-value material is to burn it, Powell said. Although it gets rid of fuel for wildfires, it creates other problem such as air pollution.

The fast pyrolysis process is not incineration, Badger told the audience Monday. The woody material is first ground into one-eighth inch diameter particles or smaller, then fed into a oxygen-free generator chamber and mixed with steel shot heated to 750-1,000 degrees Fahrenheit.

This causes instant decomposition of the woody material which yields bio-oil, bio-char and synthetic gas or "syngas." The oil can be sold as-is, blended to create bio-diesel or refined to create other fuels. The bio-char is a valuable soil additive while the syngas can be collected and used to help run the fast pyrolysis plant itself.

Out of a given amount of material, about 57 percent is converted to bio-oil, 27 percent to bio-char, 1 percent to tar and 15 percent to syngas, Badger said.

Mark Kimsey of the University of Idaho discussed the economic assumptions used to project the financial performance of the \$3.4 million unit on display. The good news is that over a 10-year average the unit did show a profit, the not-so-good news is that it was not a large profit under the assumptions used by researchers.

Kimsey said one large variable in the projections is the price paid for bio-oil produced by the equipment. The profit potential is very sensitive to outside market costs and increases in prices can quickly change the profit-loss picture.

Another factor is the need for the equipment to be used almost continuously.



Phillip Badger, president of Renewable Oil International Inc., talks about the first pyrolysis process Monday during a presentation near Heppner, Ore. The trailer behind him is a self-contained unit which can convert woody materials into bio-oil, bio-char and synthetic gas. U-B photo by Andy Porter

The assumptions for the plant on display Monday called for it to be operated 329 days a year, 12 hours a day by two shifts of three employees.

"This machine has to be used," Kimsey said. "It cannot be idle. It has to be run on a continuous basis."

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Background information on fast pyrolysis and links: [www.fs.fed.us/r6/uma/news/2009/pyrolyzer/](http://www.fs.fed.us/r6/uma/news/2009/pyrolyzer/)

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