



# Biomass Program

## Bioproducts R&D

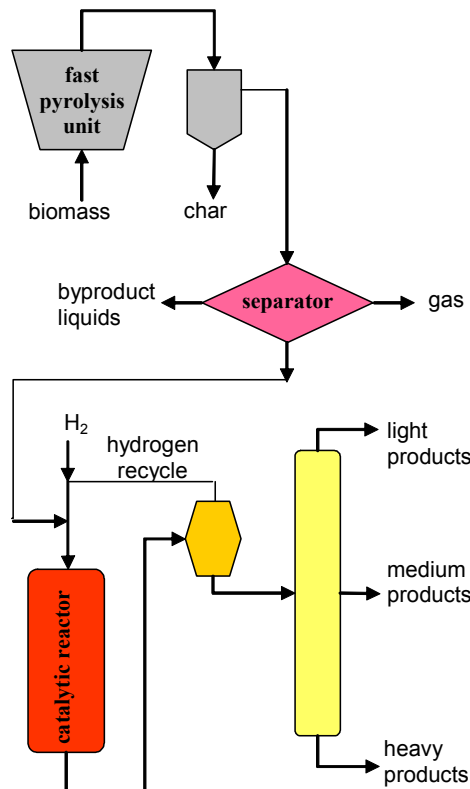
### Pyrolysis Oil Upgrading for Products

Pyrolysis offers a way to convert solid biomass into an easily stored and transported liquid which can be used to produce chemicals and fuels. In pyrolysis, the feedstock is subjected to high temperatures in the absence of oxygen and degrades to a mixture of mostly liquid with some gas and solids (char). The liquid, or bio-oil, is rich in carbon and can be upgraded to yield chemical and fuel products.

Researchers will develop new catalyst systems and upgrading strategies to produce value-added products from the bio-oil. Prior work on the hydrogenation of bio-oil to yield valuable products required large amounts of hydrogen. One goal of this project is to optimize the balance between hydrogen consumption and product value for hydrogenation processes. Researchers will also evaluate the final product quality as a function of processing conditions, their effect on processing costs, and the relationship between the bio-oil composition and the final products.

Although this project focuses on the bio-oil upgrading steps, process integration with the fast pyrolysis step will be studied. The emphasis will be on developing the recovery and separation requirements between the

pyrolysis step and the upgrading processes.



### R&D Pathway

Researchers are evaluating new catalyst systems and upgrading strategies by testing catalysts and processing conditions in bench-scale reactors (batch and continuous-flow), and performing chemical analysis of the resulting products. Non-sulfided catalysts will be investigated for the hydrogenation of bio-oil to liquid fuels and chemicals.

### Benefits

- **Develop new fuel and chemical products from pyrolysis**
- **Improve the economic viability of biomass pyrolysis**

### Applications

The results of this project will improve the economic viability of a biomass pyrolysis biorefinery.

### Project Partners

Pacific Northwest National Laboratory

### Project Period

FY 2004 – FY 2004

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Visit the Web site for the Office of the Biomass Program (OBP) at  
[www.eere.energy.gov/biomass.html](http://www.eere.energy.gov/biomass.html)

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