



# Biomass Program

## Thermochemical R&D

### Materials Evaluation for Black Liquor and Biomass Gasifiers

Gasification of black liquor and biomass involves high-pressure, high-temperature, and sometimes caustic conditions. Materials used in gasifier equipment must be robust and able to withstand the chemical and thermal conditions as well as the cycling aspects of gasifier operation.

The purpose of this project is to collect data on the behavior of candidate metals and refractories that could potentially be used in black liquor and biomass gasifiers. To test materials performance, researchers will simulate the chemical, thermal, and mechanical cycling aspects of gasifier environments in laboratory experiments. Critical materials issues such as fatigue, corrosion, stability, and longevity of materials will be the primary focus.

### R&D Pathway

Laboratory corrosion and corrosion fatigue studies will be conducted with the intent of identifying possible degradation mechanisms for metallic and

refractory materials. Test environments will simulate black liquor and biomass gasifiers and gasifier beds.

The durability of the air heater used to provide hot gas to a turbine in the biomass gasification system is a top materials concern. Various alloys that could be used for the heater will be tested in an environment simulating that of the air heater.

To gain more information on the performance of black liquor and biomass gasifier system materials, components from pilot and demonstration-scale facilities will also be examined.

### Benefits

- Improved materials will contribute to reduced capital and maintenance costs, and enhance technical viability of biomass and black liquor gasifiers.

### Applications

This research will help researchers develop process equipment materials that are more robust and suitable for black liquor and biomass gasification.

### Project Partners

Gas Technology Institute (GTI)  
Institute of Paper Science and  
Technology  
Lawrence Berkeley National Laboratory  
Oak Ridge National Laboratory  
University of Missouri-Rolla

### Project Period

FY 2003 – FY 2005

### For more information contact:

Aaron Yocum  
National Energy Technology Lab  
[Aaron.Yocum@netl.doe.gov](mailto:Aaron.Yocum@netl.doe.gov)

EERE Information Center  
1-877-EERE-INF (1-877-337-3463)

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)

September 2004