

## CONTACT POINTS

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## BIOMASS COFIRING PROGRAM

The National Energy Technology Laboratory (NETL), acting on behalf of the Office of Energy Efficiency and Renewable Energy's (EE's) Biomass Power Program, will award and manage several grants for "Biomass Cofiring" research and development. The participants, depending on the project maturity will share 20 to 50% of the cost. The Biomass Power Program will help establish the necessary infrastructure for developing a new source of clean energy.

Biomass cofiring is the burning of non-traditional fuels such as waste wood, crop debris, forestry residues, and agricultural wastes with coal in fossil fuel-fired power generation plants and utility steam boilers. Cofiring has significant environmental benefits, including a net reduction in greenhouse gases, and lower NO<sub>x</sub> and SO<sub>2</sub> emissions.

## Summaries of the research work sponsored by EE's Biomass Power Program follow.

### Blending Biomass with Tire-Derived Fuel for Firing at Willow Island Generating Station

Researchers will demonstrate the blending of fuels for cofiring at the Willow Island Generating Station in West Virginia. Biomass fuels are expected to reduce harmful emissions from the power generating station.

### Development of a Validated Model for Use in Minimizing NO<sub>x</sub> Emissions and Maximizing Carbon Utilization when Cofiring Biomass with Coal

This project involves developing a computer model to calculate optimal energy and environmental benefits derived from cofiring biomass and coal. The model will be validated through an extensive set of tests at Southern Company Services and Southern Research Institute, and from other full-scale demonstrations.



## PROJECTS

### **Blending Biomass with Tire-Derived Fuel for Firing at Willow Island Generating Station**

Principal Investigator:

Mr. William C. Guyker, (724) 838-6410  
wguyker@alleghenyenergy.com

Grantee: Allegheny Energy Supply Company, LLC, Greensburg, Pennsylvania

### **Development Of A Validated Model For Use In Minimizing NO<sub>x</sub> Emissions And Maximizing Carbon Utilization When Cofiring Biomass With Coal**

Principal Investigator:

Mr. P. Vann Bush, (205) 581-2269  
bush@sri.org

Grantee: Southern Research Institute, Birmingham, Alabama

### **Urban Wood/Coal Cofiring in the NIOSH Boiler Plant**

Principal Investigator:

Dr. James T. Cobb, (412) 624-7443  
cobb@engrng.pitt.edu

Grantee: University of Pittsburgh, Pittsburgh, Pennsylvania

### **Cofiring Biomass with Lignite Coal**

Principal Investigator:

Mr. Darren D. Schmidt, (701) 777-5120

dschmidt@eerc.und.nodak.edu

Grantee: Energy and Environmental Research Center (EERC), Grand Forks, North Dakota

### **Gasification-Based Biomass Cofiring Project**

Principal Investigator:

Ms. Patricia J. Hus, (219) 647-5263  
pjhus@nipsco.com

Grantee: Northern Indiana Public Service Co., Merrillville, Indiana

### **Gasification-Based Biomass Cofiring Project**

Principal Investigator:

Dr. Babul Patel, (415) 768-1200  
bpatel@nexant.com

Grantee: Nexant, LLC, San Francisco, California

### **Cofiring Biomass with Lignite Coal**

This demonstration will fire wood waste with lignite coal at the North Dakota Penitentiary in Bismarck. The data from the testing will serve as a potential model for the 5,800 district energy systems in the U.S. and will reduce the 5,000 tons of residue from wood burning the city currently landfills each year.

### **Gasification-Based Biomass Cofiring Project**

Northern Indiana Public Service Co., will evaluate the feasibility of using wood waste, switchgrass, corn stover, non-recyclable paper and other related products to produce synthesis gas, or "syngas," and to the syngas in a generating station which ordinarily fires natural gas.

### **Gasification-Based Biomass Co-Firing Project in Henderson, KY**

Nexant, LLC, will study the use of poultry litter in a biomass gasification cofiring demonstration at the Reid Plant in Henderson, KY. This project will determine the optimum sizes at which gasifiers can be integrated, while maintaining boiler operation.

### **Calla Energy Biomass Gasification Cofiring Project**

This project involves developing and demonstrating an advanced version of the Institute of Gas' RENU GAS™ biomass gasification technology to gasify biomass-based fuels at a plant being built in Estill County, KY. The gas will be used to produce steam and electricity for a 600-acre industrial park.

### **Urban Wood/Coal Cofiring in the National Institute of Occupational Safety and Health (NIOSH) Boiler Plant and Urban Wood/Coal Cofiring in the Bellefield Boiler Plant (two projects)**

The University of Pittsburgh has conducted testing of wood/coal cofiring at stoker boiler plants in Pittsburgh. This research involves conducting similar cofiring demonstrations at the University's Bellefield Boiler Plant and at the NIOSH stoker boiler at the Bruceton Research Center. Tub ground, clean pallet wood will be blended at different ratios of wood/coal and tested in each boiler. Issues such as feeding, emissions, and economics will be investigated.

### **Feasibility Analysis for Installing a CFB Boiler for Cofiring Multiple Biofuels and Other Wastes with Coal**

Pennsylvania State University will analyze the installment of a state-of-the-art circulating fluidized bed boiler and ceramic emission control device, and will develop a test program to evaluate cofiring multiple biofuels and coal-based feedstocks.

### **Cofiring Coal: Feedlot and Litter Biomass Fuels in a Pulverized Fuel and Fixed-Bed Burners**

Texas A&M University will investigate cattle feedlot and chicken litter biomass cofiring with coal to determine the optimum operating parameters and maximum combustion efficiency that can be achieved with the least emissions.

### **Cofiring Biomass at the University of North Dakota**

This project involves assessing local biomass resources available to the University and designing an economical feed system for the University's boiler system. The research will demonstrate the potential advantages and performance of cofiring biomass and coal to other university district heating systems

### **Fuel-Lean Biomass Reburning in Coal-Fired Boilers**

Iowa State University will examine the feasibility of adapting a commercially successful emissions reduction technology to herbaceous biomass when fired with coal.

### **Calla Energy Biomass Gasification Cofiring Project**

Principal Investigator:  
Mr. Francis Lau, (847) 768-0592  
lau@igt.org

Grantees: Institute of Gas Technology, Des Plaines, Ill. and Calla Energy Partners, Lexington, Kentucky

### **Urban Wood/Coal Cofiring in the Bellefield Boiler Plant**

Principal Investigator:  
Dr. James T. Cobb, (412) 624-7443  
cobb@engrng.pitt.edu

Grantee: University of Pittsburgh, Pittsburgh, Pennsylvania

### **Feasibility Analysis for Installing a CFB Boiler for Cofiring Multiple Biofuels and other Wastes with Coal**

Principal Investigator:  
Mr. Bruce Miller, (814) 865-3093  
bgm3@psu.edu

Grantee: Pennsylvania State University

### **Cofiring Coal: Feedlot and Litter Biomass Fuels in a Pulverized Fuel and Fixed Bed Burners**

Principal Investigator:  
Dr. Kalyan Annamalai, (409) 845-2562  
Kannamalai@mengr.tamu.edu

Grantee: Texas A&M University

### **Cofiring Biomass at the University of North Dakota**

Principal Investigator:  
Mr. Darren Schmidt, (701) 777-5120  
dschmidt@eerc.und.nodak.edu

Grantee: University of North Dakota

### **Fuel-Lean Biomass Reburning in Coal-Fired Boilers**

Principal Investigator:  
Dr. Robert C. Brown, (515) 294-7934  
rcbrown@iastate.edu

Grantee: Iowa State University

# BIOMASS COFIRING PROGRAM



*Biomass Delivery Using a Self-unloading Truck  
(Wood Waste from Carpentry Industry)*



*Mixing Coal and Biomass (Wood Waste)*



*Transport Feed Conveyor Sending Biomass and Coal to Main Feed System*