

COBURNING BIOMASS AND COAL IN THE FUTURE

**Created by Teachers
Engineers, and Scientists**



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OBJECTIVES

- * The students will describe the flow of energy from energy source to the consumer.
- * The students will consider the viability of other sources of energy production.
- * The students will consider the economic sensibility of energy production.
- * The students, in mixed groups, will address the following problems concerning one form of future energy production: Coburning Coal and Biomass.
 - 1) What are some sources of biomass?
 - 2) How do we efficiently ship source of biomass to power plant?
 - 3) How do we prepare the biomass for burning?
 - 4) What are some possible problems with the burning of biomass?
 - 5) What are the possible losses and efficiencies of burning biomass?

BACKGROUND

As the United States continues to require more energy production in order to meet its ever increasing demands, the need for new energy and greater efficiency of already existing power plants and consumers is attracting more public attention.

One option being looked at by the Federal Energy Technology Center in Pittsburgh is the cofiring of Biomass, once living material that has stored energy inside, in coal fired electrical power plants. By mixing various inexpensive materials such as paper or wood with coal, power plants can expect to burn less coal thus reducing operating costs by burning less coal.

Before this option can be employed, there are several major problems that must be overcome. In most coal burning power plants, the coal must be pulverized into a powder form. This pulverized coal, when burned produces a constant and uniform heat when compared to the older method of stoking burners. If biomass is to be burned in a preexisting coal-fired power plant, the biomass must be dried and pulverized into a powder form. The biomass must also be shipped from the point of origin to the processing plant or the power plant. All of the preceding involve using energy to get energy. The net rate of efficiency has yet to be determined and is what this lesson plan is based on.

PROCEDURE

Have students list all sources of energy. Sources should include: petroleum, solar, coal, nuclear, wind, tides, geothermal, etc.

Have students trace energy from original source of energy to power plant and to light bulb. See example below.

Where are possible energy losses that would result in reduction of energy efficiency? Examples should include loss of heat via smoke stack, energy used in the transport of coal, friction of electricity as it passes over power lines.

Have students discuss the economics of energy production. Topics should include:

- * How can we reduce the price of electricity?
- * What are the costs of coal both in terms of purchasing of and the environmental effects of.
- * What are some other materials that can be burned instead of or mixed with coal?
The list should include paper, wood chips, plant materials, pallets, plastics, etc..

Have students get into groups of five and have each group address one of the following problems:

- 1) What are some sources of biomass?
- 2) How do we efficiently ship source of biomass to power plant?
- 3) How do we prepare the biomass for burning?
- 4) What are some possible problems with the burning of biomass?
- 5) What are the possible losses and efficiencies of burning biomass?

