

THE GASIFICATION PROCESS

Advocates say a coal gasification plant operates more efficiently and consumes less fuel per kilowatt hour than a conventional coal-fired plant. The process is cleaner because coal is converted into a synthetic gas, which is easier to clean.

1 Water and coal are mixed into a slurry.

2 The slurry and oxygen are sprayed into the pressurized gasifier.

3 The mixture is partially ignited and turned into a synthetic gas called syngas.

Oxygen

Water

Coal

Feeder tubes

Gasifier

4 Syngas is pumped out to be cleaned.

5 The waste, a glassy residue, can be used for paving roads.

A THE CLEANUP

The cleanup process removes more than 90 percent of traditional pollutants from the raw synthetic gas.

Particulate removal
Gas cleanup/
sulfur disposal

Shift reactor
Creates a higher proportion
of hydrogen

Synthetic gas
conversion

Fuel and
chemical
loading

B USEFUL BYPRODUCTS

Sulfur, hydrogen and other byproducts can be removed and used to make marketable chemicals such as methanol, ammonia and fertilizers.

C MAKING POWER

The cleaned gas fires a combustion turbine that turns the rotors in a generator, producing electricity.

Generator

Generator

F POWER TO THE PEOPLE

The generators connect to the power grid, taking energy to homes and businesses. One megawatt typically serves about 1,000 homes. When in operation, the proposed Cinergy plant is expected to produce approximately 600 megawatts.

E COMPLETING THE CYCLE

Some residual steam is sent back to the gasifier to continue the process.

Steam
return

D USING THE HEAT

In a combined cycle process, the heat given off by the combustion turbine is captured and converted to steam. It powers a steam turbine, which drives another electric generator, increasing the electric output by about a third.

