Coal and Hydrogen

Perhaps nothing captures the technological hopes of the 21st century better than the vision of a hydrogen economy. The energy in our abundant coal resources can be converted into hydrogen for hydrogen-powered fuel cells to run cars, trucks, planes, homes and businesses.

Hydrogen is a chemical element that carries energy and can be stored as a liquid or a gas. It is colorless, odorless and non-toxic. When it burns in air, that reaction produces only water.

Yet in the hydrogen economy, there are no reserves to tap into; we have to create the energy in real-time. The U.S. federal government has committed more than $1 billion to develop technologies for hydrogen that will allow its growing use. The fuel of choice in producing the hydrogen we'll need is coal, which America has in abundance, more than any other country on earth.

The way the energy in coal is converted into hydrogen is through a process called gasification, which is already in use around the world turning coal into electricity, natural gas and transportation fuels. Now it can be used to produce hydrogen and is the premise of a U.S. Department of Energy initiative known as FutureGen.

FutureGen is an alliance of private companies that will partner with the U.S. government to build a 275 megawatt prototype center. Peabody Energy, the world's largest coal company, has staked out a leadership role in the development of this project, committing a portion of its 9.5 billion tons of reserves to power the facility

The plant will gasify the coal through a process that will convert the coal's carbon to synthesis gas made up of hydrogen and carbon monoxide. The synthetic gas then will react with steam to produce additional hydrogen and a concentrated stream of carbon dioxide. The hydrogen will be used as a clean fuel for electricity generation or in fuel cells for industry and transportation. The carbon dioxide will be permanently and harmlessly sequestered in geological formations under the earth. The plant itself will operate with near-zero emissions.

[I think we should take this next bit out: You're talking about a 500 megawatt plant and we haven't even broken ground on a 275 megawatt experimental plant. Let's not get too far ahead of ourselves]

Peabody Energy has more than 9.5 billion tons of reserves, enough to replace all the oil used in the U.S. transportation industry for more than six years. If just 1 percent of the syngas from a 500-megawatt gasification plant is used to produce hydrogen, it would create enough hydrogen to produce the fuel needs of 10,000

vehicles (for what time period?). It's also the equivalent of four gasoline stations each with 12 pumps and 350 fill-ups per day. The bigger the plant, the lower the cost.

A hydrogen economy, once a fanciful notion, is now technologically within our grasp. Coal will be at the center of this 21st century development because it is truly a 21st century fuel and a key to unlocking the energy future for America and the world.