



CHINA EXAMINES COAL CONVERSION
With crude oil prices on the rise, commercial coal liquefaction is receiving attention in many nations, including China.
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WVU Building Energy Bridge With China

W.VA. ANALYSTS WILL EXAMINE COAL-TO-LIQUID INNOVATION USED IN ASIA

By **JULIET A. TERRY**
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Transforming coal into liquid fuel was a hot topic in the United States in the 1970s and 1980s, but the idea never captured lasting interest in the energy sectors.

Now, however, with crude oil prices on the rise, commercial coal liquefaction is getting a second look. A renewed interest of the technology in China could put **West Virginia University** and the Mountain State's coal industry on the international map for innovation.

"We can become a major player in clean coal technology in the world," said Dr. **Qingyun Sun**, a research assistant professor at WVU's **Natural Resource Analysis Center**.

"China is short on oil but rich in coal. So China is going to start coal liquefaction," Sun said.

A coal company called the **Shenhua Group** is spending an estimated \$1.5 billion on its first coal liquefaction production line. The plant is expected to go online in 2008 and will transform about 3 million tons of coal into 850,000 tons, or 20,000 barrels per day, of diesel and gasoline fuels.

With support from the U.S. Department of Energy and the China National Development and Reform Commission, WVU and Shenhua Group will study the economic and environmental effects of direct coal liquefaction (DCL) technology.

WVU already has helped build bridges between American and China coal and energy sectors. Sun, who used to work for the Chinese government, helped a West Virginia company called **Coal Fillers Inc.** negotiate a deal to build a plant in Wu-Xi, China.

"The Department of Energy developed the technology a long time ago, but nobody was using it because oil prices were low. Now, oil prices are much higher," Sun said.

In April 2000, the Department of Energy signed an agreement with the **Ministry of Science**



Photos courtesy of West Virginia University
West Virginia University assistant research professor Qingyun Sun, left, and professor Jerald Fletcher meet with Xiangkun Ren, CEO of the Shenhua Coal Liquefaction Research Center, at the Direct Liquefaction Pilot Plant in Shanghai. At right is the Shenhua coal mine.

and Technology of the People's Republic of China to cooperate in fossil energy technology development and utilization. Two and a half years later, the agreement expanded to bring in the China National Development and Reform Commission to focus on clean fuels. WVU was added to the partnership, called Annex II, and is the only non-Chinese, non-Department of Energy participant.

With the help of a \$400,000 Department of Energy grant, WVU and the Shenhua Group explored possible Annex II tasks, and in March 2005 they agreed on a project — the Shenhua Coal-to-Liquid Fuels Project.

Dr. **Richard Bajura**, director of the WVU National Resource Center for Coal and Energy,

FASTfacts

According to information provided by **West Virginia University**, commercial coal-to-liquids processes exist, but they are known as indirect coal liquefaction, which require breaking down coal into molecules of carbon monoxide and hydrogen. Those building blocks then are processed into diesel fuel. Direct coal liquefaction processes attempt to bypass the breakdown of coal into such small molecules by "snipping" the chemicals in the coal in the right places to make liquid fuels directly.

Dr. **Jerald Fletcher**, chairman of WVU's department of agriculture and resource economics, and Sun have been leading the activities under Annex II. They hope to create a U.S.-China Energy Center at WVU.

The DCL technology may have started in America, Sun said, but the nation is short on experience because it never was used widely, which is where WVU comes in.

"WVU is going to build this expertise. We could become a world leader for this field," he said. "It's definitely going to help West Virginia and the United States."

West Virginia equipment



manufacturers need to learn to make the transition to DCL technology, Sun added, and WVU can help them get started. The university has been part of a five-university consortium for coal liquefaction research and development since 1986. The group, the **Consortium for Fossil Fuel Science**, is one of few active coal-to-liquid programs in America.