

WVU experts meet with Chinese coal-to-liquids leaders

Officials from China's leading research and corporate energy organizations met Tuesday (Jan. 13) with West Virginia University faculty and U.S. Department of Energy leaders to discuss advances in converting coal to transportation fuels while capturing and storing carbon dioxide emissions.



Elliot Kennel (left), research professor in the Department of Chemical Engineering, describes for Wu Xiuzhang (right) the process developed at WVU to convert coal directly to liquids at low temperature and pressure. Coal liquefaction typically requires high temperature and pressure, which translates into higher cost. Wu, the deputy chief engineer of the Shenhua Group of China, and his colleagues met with experts at WVU under a U.S. Department of Energy agreement between the organizations to share information and expertise.

The meeting was organized by the U.S. China Energy Center, a program of the National Research Center for Coal and Energy at WVU. The Shenhua Group in China is developing the world's first commercial direct coal liquefaction plant in northwestern China at a cost of about \$1.5 billion. The plant will eventually transform millions of tons of coal into thousands of barrels of liquid fuel per day. With support from the U.S. Department of Energy, WVU and Shenhua Group have been evaluating the economic and environmental impacts of the direct coal liquefaction technology.

While commercial coal-to-liquids processes exist, these are known as indirect coal liquefaction and require breaking coal down into molecules of carbon monoxide and hydrogen, which are building blocks that are then processed into diesel fuel. Direct coal liquefaction processes attempt to bypass the breakdown of the coal into such small molecules to make liquid fuels directly.

WVU Vice President for Research and Economic Development and President of the WVU Research Corp. Curt Peterson called the collaboration "an important component in gathering information that can lead to better and more responsible use of one of America's most abundant natural resources."

Jerald Fletcher, director of the U.S. China Energy Center at WVU, and research assistant professor Qingyun Sun of the Natural Resource Analysis Center at WVU will be assessing the economic and environmental impacts of the plant and analyzing the technology transition. Information gained by the researchers will be shared with those in the U.S. to help promote the transfer clean coal technologies.

"Converting coal to transportation fuels in an environmentally safe way requires knowledge from many different kinds of experts," Fletcher said. "Faculty from the departments of Chemical Engineering, Geology and Geography, Mechanical and Aerospace Engineering, and Resource Management have been part of an agreement to discuss various aspects of coal to liquids with our guests."

WVU has been working with the U.S. Department of Energy and the China National Development and Reform Commission under an agreement known as the Protocol on Cooperation in the Field of Fossil Energy Technology Development and Utilization since 2002.

“Even with oil at about \$40 per barrel, we need to consider the long-term ability to provide a sufficient source of liquid fuels on a global scale, including alternative means such as coal to liquids,” said Lowell Miller, director of the Department of Energy’s Office of Sequestration, Hydrogen and Clean Coal Fuels.

“Under our agreement, we’re helping the Chinese acquire environmental expertise on carbon dioxide capture and storage to address climate concerns,” Miller said. “The Chinese are helping us gain economic and environmental data and operating experience previously unknown to us in regard to building and running a novel coal-to-liquids plant. This information could be very helpful to the U.S. as we would plan to build a similar facility here.”

Wu Xiuzhang, deputy chief engineer for the Shenhua Group, led the delegation from China.

“Cooperation between the U.S. and China – and especially with West Virginia University – is very valuable and has been very successful so far,” Xiuzhang said.

WVU experts said the Shenhua Direct Coal Liquefaction plant will likely be well suited to a large-scale international-class carbon capture and storage project. Fletcher and his colleagues, WVU professor Tim Carr and Julio Friedman of Lawrence Livermore National Laboratory, noted that the Ordos basin in China – where the plant is under construction – has the geological resources necessary to support a sequestration project.

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