Coal News and Trends

May 2009

Upcoming Web-Based Seminars:

- **Clean Coal Technology Webinars**
  The International Trade Administration will host a series of web-based seminars throughout 2009 highlighting opportunities for U.S. clean coal technology, mining, and coal-fired power generation companies in overseas markets. The seminars will provide country-specific market overviews for U.S. companies interested in establishing or expanding exports in the clean energy sector. The series will be led by U.S. & Foreign Commercial Service energy/trade specialists in the targeted market. The dates and times for the upcoming webinars are as follows:

  o *Opportunities for U.S. Companies in the Coal, Mining, and Power Generation Sectors of Vietnam, June 10, 2009*

  To register for this event or for additional information please refer to: http://www.buyusa.gov/pittsburgh/coalwebinars2009.html, or contact Shannon.Fraser@mail.doc.gov, 202-482-3609, or Steve.Murray@mail.doc.gov, 412-644-2819.

Coal Industry Trade Leads:

- **Coal-Fired Power Plant in Kenya, Kenya Electricity Generating Company**

  The Kenya Electricity Generating Company (KenGen) completed a feasibility study for the construction of a 300 MW coal-fired power plant in the Mombassa region. The study advances the implementation of a coal fired power plant to be comprised of two units of 150 MW each and estimated to cost U.S. $700 million. KenGen recently put forward a notice for Expression of Interest for a joint venture partner who will take on 60 percent equity, with KenGen owning the remaining 40 percent. Information on the EOI is available at:
  http://www.kengen.co.ke/Tenders.aspx?TenderId=0
  U.S. companies interested in this project are encouraged to contact Mary Masyuko, Commercial Specialist at the U.S. Embassy in Nairobi, at Mary.Masyuko@mail.doc.gov.

Upcoming Industry Events:

- **British Columbia Mining Opportunity Event, Vancouver, May 5-6, 2009**

  Canada presents U.S. manufacturers of mining equipment and technology with some of the best export prospects in the world. Canada's mining industry continues to persevere during this changing global environment. U.S. small and medium-sized firms with equipment, services or technology for this sector will not want to miss this opportunity to participate in this event. This event will provide participants with an efficient and cost-effective opportunity to gain valuable market exposure, establish business contacts, promote their products, services and technologies, and advance their business objectives with the full support of the U.S. Commercial Service in Vancouver, Canada.

Participants will benefit from an export seminar on the B.C. mining market and a "Doing Business in Canada" presentation; a schedule of one-on-one appointments with pre-screened potential business partners; a networking reception hosted by the U.S. Consul General with key contacts from the British Columbia business community in attendance; and logistical support, including special U.S. Commercial Service hotel rates in Canada. The participation fee for small companies with less than 500 employees is US$1,600, and for large companies with more than 500 employees the participation cost is US$3,650. Please note that registration is limited to 8 qualified U.S. firms and is available on a first come, first served basis. To view the market research reports, "Canada: Mining Equipment Industry" and "Mining Industry in Canada Snapshot," please refer to: http://www.buyusa.gov/canada/en/bcminingopportunities2009.html Please contact Judy Simonite, Commercial Service Trade Specialist in Vancouver, at Judy.Simonite@mail.doc.gov, or 604-642-6678 for additional information on this event.

- **ITA Export Seminar at the Electric Power Conference, Chicago, May 11-15, 2009**

The International Trade Administration will hold a complimentary Export Seminar on 'Advancing U.S. Exports of Power Technologies and Equipment' on May 11 from 1:00-5:00pm in Room 13 of the Stephens Convention Center in Chicago. The session will highlight:

- An Overview of World Markets for U.S. Power Technologies and Equipment
- U.S. Exporting Programs and Breaking into International Markets
- Financing and Ensuring Payment for Energy Projects
- Intellectual Property Rights and Exporting
- U.S. Company Export Experiences in Overseas markets
- Electric Power Country Market Overview: Algeria

To register for the Exporting Seminar, please mark box PC14 on the registration form and fax/email the document to the listed contact information. Registration information is available at: http://www.electricpowerexpo.com/pdf/EP09_Registration.pdf

For additional information on the ITA Program of Events at the Electric Power Conference, please contact Shannon Fraser at (202) 482-3609 or Shannon.Fraser@mail.doc.gov. For additional information on the Electric Power Conference, please refer to: http://www.electricpowerexpo.com/index.asp, or contact Carrie Shapiro at 832-242-1969.

Policy Analysis:

New Oxygen-Production Technology Proving Successful

Ceramic Membrane Enables Efficient, Cost-Effective Co-Production of Power and Oxygen

http://fossil.energy.gov/news/techlines/2009/09025-Oxygen_Production_Technology_Prove.html

Washington, D.C. – The Office of Fossil Energy's National Energy Technology Laboratory (NETL) has partnered with Air Products and Chemicals Inc. of Allentown, Penn. to develop the Ion Transport Membrane (ITM) Oxygen, a revolutionary new oxygen-production technology that requires less energy and offers lower capital costs than conventional technologies. ITM Oxygen will enhance the performance of integrated gasification combined cycle (IGCC) power plants, as well as other gasification-based processes. The technology will also enhance the economics of oxy-fired combustion technologies, making it an attractive option for the capture of carbon dioxide from existing coal-fired power plants.

Since NETL and Air Products teamed up in 1998 to develop the membrane material and process, they have made steady progress toward its commercialization. The technology is now being validated in a 5 tons-per-day prototype facility and producing high purity oxygen at record production flux under

commercially relevant conditions. The tests are confirming earlier predictive studies as to expected economic benefits of ITM Oxygen, and the technology is being scaled up to 150 tons per day. The 12-year project has also created 160 new jobs.

Researchers view ITM Oxygen as a transformative technology with potential to increase the cost effectiveness of next-generation plants. Other oxygen-intensive industries—such as steel, glass, non-ferrous metallurgy, refineries, and pulp and paper—could also realize cost, environmental, and productivity benefits as a result of the technology.

The ITM Oxygen technology is a radically different approach to producing low-cost, high-temperature, high-quality tonnage oxygen. Existing technology is energy intensive and requires air to be cooled to approximately -280 degrees Fahrenheit, the temperature at which air becomes a liquid and oxygen can be separated. In contrast, the electrochemical properties of the ITM Oxygen make it possible to selectively separate oxygen from a stream of air at high temperature and pressure.

In the ITM Oxygen process, oxygen in high-temperature, high-pressure air is ionized at the surface of the ceramic membrane and transported through the membrane via a pressure gradient. The oxygen ions recombine as pure oxygen on the permeate or low-pressure side and leave a stream of hot, compressed, oxygen-depleted air on the feed or non-permeate side. The energy of the hot non-permeate stream is recovered through conversion to electrical energy and steam. The overall process enables cost-effective co-production of power and high purity oxygen that is synergistic with modern power production applications.

As part of the on-going project, a subscale engineering prototype facility was designed and built to test multiple membrane modules under commercially relevant operating conditions. The prototype facility, which was designed to produce up to 5 tons of oxygen per day, was successfully commissioned and is now fulfilling test requirements using an array of commercial-scale ITM modules operating simultaneously.

Twelve test runs over a range of driving forces have been completed to date. During more than 9,000 hours of operation, commercial flux targets have been achieved or surpassed and product purity has exceeded 99 percent. Additional tests, involving the cycling of the membranes through a range of pressures and temperatures, are now underway to assess the robustness of the membranes under startup and shutdown conditions and potential process upsets.

Testing in the prototype facility is providing engineering data to support the design of a 150 tons/day test facility that will co-produce oxygen and power. The larger facility is expected to begin commissioning in late 2010.

First U.S. Large-Scale CO2 Storage Project Advances

One Million Metric Tons of Carbon to be Injected at Illinois Site

http://fossil.energy.gov/news/techlines/2009/09022-Large-Scale_CCS_Advances.html

Washington, D.C. – Drilling nears completion for the first large-scale carbon dioxide (CO2) injection well in the United States for CO2 sequestration. This project will be used to demonstrate that CO2 emitted from industrial sources can be stored in deep geologic formations to mitigate large quantities of greenhouse gas emissions.

The Archer Daniels Midland Company (ADM) hosted an event April 6 for a CO2 injection test at their Decatur, Ill. ethanol facility. The injection well is being drilled into the Mount Simon Sandstone to a depth more than a mile beneath the surface. This is the first drilling into the sandstone geology since oil and gas exploratory drilling was conducted between 15 and 40 years ago. No wells within 50 miles have been drilled all the way to the bottom of the sandstone, which the storage well will do.

The project is funded by the Department of Energy (DOE) and the Illinois Department of Commerce and Economic Opportunity.

"This test represents an exciting step forward in the Department's collaborative efforts to develop America's carbon sequestration capabilities," said Dr. Victor K. Der, Acting Assistant Secretary for Fossil Energy. "In Decatur, we're moving from theory to application."

A collaboration between ADM and the Midwest Geological Sequestration Consortium (MGSC), the injection test is part of the development phase of the Regional Carbon Sequestration Partnerships program managed by the National Energy Laboratory (NETL) for the Department of Energy's Office of Fossil Energy (FE).

The project will obtain core samples of the Mount Simon Sandstone during drilling that will be used in analysis to help determine the best section for injection. The sandstone formation is approximately 2,000 feet thick in the test area.

From 2010 to 2013, up to one million metric tons of captured CO2 from ADM's ethanol production facility in Decatur will be injected more than a mile beneath the surface into a deep saline formation. The amount of injected CO2 will roughly equal the annual emissions of 220,000 automobiles.

Following injection, the site will be monitored to ensure safe and permanent storage of the CO2. Results of the project will provide important information on the future of carbon sequestration as a viable option for CO2 storage.

The geology at the ADM site can be compared to a stack of rugs. Each rug represents a different geologic layer, such as sandstone, shale, dolomite, anhydrites, etc., that all have different characteristics. The layers have been deposited over millions of years.

The Office of Fossil Energy launched the Regional Carbon Sequestration Partnership initiative in 2003 to determine the best approaches for capturing and permanently storing gases that can contribute to global climate change. MGSC is one of seven regional partnerships created by the DOE to advance carbon sequestration technologies nationwide. Drilling operations to construct the injection well were started in February 2009.

MGSC is led by the Illinois State Geological Survey, the Indiana Geological Survey, and the Kentucky Geological Survey, in cooperation with government and other energy industry partners. This project is expected to create nearly 250 full-time jobs which will be supported throughout the project's life of more than ten years.