HART
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In This Issue

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U.S. Air Force Says DoD's Disparaging CTL Report Shows 'Misunderstanding'

The U.S. Air Force says a recent report put out by the U.S. Department of Defense's (DoD) energy task force that downplays the importance of establishing a coal-to-liquids (CTL) program, indicates that the DoD task force misunderstands the purpose of the program.

The report, entitled "More Flight – Less Fuel", written by DOD's Defense Science Board Task Force on DOD Energy Strategy, casts doubt as to the wisdom of using the Air Force to stimulate a domestic market for synthetic jet fuel.

"The Task Force has strong concerns about the viability of this technology for a variety of reasons. Capital costs and production costs are high, putting investments at long term risks. "The environment control technologies needed to allow the plants to operate over the long term have only been demonstrated at limited scale and their costs are highly uncertain. Water demand also is very high using current production technology, and many coal reserves are in arid regions. The process produces large amounts of contaminated wastewater that must be treated," the report said.

It also cited a 2007 report from the National Academy of Sciences, which raised questions about the estimates of coal reserves. Additionally the task force has a concern regarding the money spent on the program, particularly the $35 million test program which consisted of running Air Force test flights on a blend of 50:50 Fischer Tropsch (FT) fuel and regular jet fuel which showed the blend performs well.

"This result is not unexpected since South African Airways have been flying a 50/50 mix of synthetic and commercial fuel for about 8 years," the task force said.

It concluded these large expenditures could be used for more productive contributions to DoD's most pressing energy challenges, "rather than demonstrating synthetic fuel technologies that do not appear to have a viable market future or contribute to reducing battlespace fuel demand," the report said.

Contacted by *Gasification News*, Vicky Stein, spokesperson in the office of Assistant Secretary William Harrison, said that while the Air Force puts together a formal response to the DoD report, the report itself indicates that the task force fundamentally misunderstands the long range aims of the Air Force synthetic fuels program.

Additionally, Stein said that more B1 Bomber F-T blended fuel tests are scheduled for March 19 or 20. The fuel will be subjected to tests in the after-burner and at supersonic speed. She said the results are expected to be "unremarkable," as the 50% synthetic fuel is expected to burn without any problems.

– Suzanne McElligott

U.S. EPA's Coal Group Recommends $1 Billion/Year CCS Fund

The U.S. Environmental Protection Agency's (EPA) Clean Air Act Advisory Committee (CAAAC) lists 13 recommendations from its Advanced Coal Technology Work Group (ACT Work Group) in the final report on potential barriers and opportunities to create incentives under the Clean Air Act to the development and deployment of advanced coal technologies.

Among the recommendations: Congress should create a governmental CCS Early Deployment Fund that would generate $1 billion a year annually for five to ten years to cover the additional costs of CCS for at least 5-10 full-scale early commercial demonstrations of various techniques.

The money needed for this could be raised through a few options, one being a temporary electricity charge. "Raising $1 billion from fossil-based electricity, for example, would result in an increase of approximately 0.6% in electricity charges," the work group said.

Here's a synopsis of all of the recommendations:

- **National Policies**: National mandatory greenhouse gas reduction legislation can provide a carbon price signal that would encourage the deployment of large-scale carbon dioxide capture and sequestration (CCS) systems. It is critical, the work group says, that any national policy should include provisions that prioritize and encourage early deployment of advanced coal technologies – particularly CCS.

- **A Toolkit of Incentives**: Government agencies should use a variety of regulatory, financial and other incentives – including cost recovery, tax exemptions and credits, loan guarantees, accelerated depreciation, and long-term purchase contracts – to accelerate early commercial projects that utilize advanced coal technologies.

- **Early Development Fund**: Congress should immediately create a CCS Early Deployment Fund, whether through comprehensive climate change legislation or separate legislation, to fund the additional costs and risk of CCS to developers.

- **State Actions**: State legislatures should take action to enable public utility commissions and other appropriate state agencies to take steps to encourage the early commercial deployment of advanced coal technologies that enable the transition to CCS.

- **Improving the Efficiency of Existing Coal Plants**: EPA should immediately evaluate ways to reduce CO_2 emissions at existing coal-fired power plants. Additionally, EPA and other agencies should support increased efficiency at existing power plants.

- **Technology Advancing Agreements**: Stakeholders involved in the development of coal-based facilities should consider entering into Technology Advancing Agreements to accelerate deployment of advanced coal technologies during periods of regulatory uncertainty.

- **EPA's Underground Injection Control (UIC)/Sequestration Policies**: EPA should designate a new well class for geologic sequestration of CO_2 in its upcoming UIC rulemaking.

- **EPA Public Outreach**: EPA should immediately develop a public outreach effort to explain carbon capture and sequestration. At a minimum, efforts should cover: why CCS is needed; risks

and benefits of using CCS; the security of CO_2 storage at properly selected and managed sites and the need for demonstration and commercial deployment.

- **EPA Accounting Protocol**: EPA should develop an accounting protocol to quantify the CO_2 emissions from capture, transport, injection and storage of CO_2 in geologic formations.

- **EPA Training Programs for Sequestration Projects**: EPA should sponsor education and training programs for regulators and other officials involved with the permitting and monitoring of CCS projects.

- **Carbon Dioxide Specifications**: A standards setting body, such as ASTM or something similar, should establish specifications for CO_2 quality, taking into consideration a variety of sources, transportation alternatives; and end uses.

- **Existing Authorities under the Clean Air Act**: EPA should take advantage of existing opportunities under the Clean Air Act, and current regulations, to promote the near-term deployment of advanced coal technologies that reduce the overall environmental footprint of coal-based facilities.

- **Pipeline Study**: The appropriate federal agencies should promptly conduct a study examining CO_2 pipeline infrastructure issues in the context of developing a large-scale national CCS program.

--Suzanne McElligott

U.S. House Bill Promotes CTL Fuels, Clean Coal Technology

U.S. Rep. Mike Ross (D-Ark.) introduced bipartisan legislation designed to spur production of a range of domestic alternative fuels, including coal-to-liquid (CTL) fuels, and enable the development and use of advanced clean coal technologies.

The "American-Made Energy Act of 2008" (H.R.5437) was introduced by Ross and Rep. Devin Nunes (R-Calif.) on Feb. 14. Click here for a fact sheet on "The American Made Energy Act of 2008. Click here to read the bill.

The bill calls for $1.5 billion in new CTL and clean coal technology tax credits. For CTL fuels, the bill provides $500 million in tax credits for CTL facilities that can capture and store at least 65% of carbon dioxide emissions.

These credits would be awarded through an application process managed by U.S. Treasury Department, with applicants demonstrating the highest percentage of carbon dioxide capture receiving the highest priority.

In addition, the bill extends the alternative fuel credit for CTL fuels through Sept. 20, 2020, and authorizes the study and development of expanding the strategic petroleum reserve to include transportation fuel produced from coal.

The bill also authorizes the Department of Defense (DoD) to enter into purchase agreements for bio-based or CTL fuels and extends DoD contracting authority to 25 years. The bill also develops a commercial futures market for CTL fuels by auctioning off long-term commodity contracts for fuels produced primarily from coal.

The remaining tax credits would be allocated with $500 million available for advanced coal-based electricity projects, plus another $500 million in credits to support coal gasification projects.

--Suzanne McElligott

How to Steer Attention to Underground Coal Gasification

London – For underground coal gasification, known as UCG, to gain traction with investors and the public, the industry needs a focused public relations plan as well as intensified lobbying.

So explained Carl Hughes of Deloitte in a presentation to the Underground Coal Gasification Partnership annual meeting here last month.

"There needs to be a stronger connection between the scientists – the technology developers – and the investor community. Successful operational UCG models (like Linc Energy in Queensland, Australia, and Canada's Ergo Exergy) need to be communicated and commercially marketed," he said.

"Broad community acceptance of UCG is essential if it is to attract sufficient regulatory and financial support. Public consultations, provision of targeted education and engagement with key community stakeholders will be essential," he added.

Hughes also said that in many countries, UCG is competing with other low carbon technologies for a limited pool of government finance (i.e., R&D tax credits, climate change levies and grants). In the absence of any firm financing from governments, lobbying will be needed to boost the case for UCG and allow it to compete with low-carbon technologies.

Additionally, there is a strong need for fiscal incentives such as tax breaks, production credits, subsidies and upfront financial support to underwrite some of the costs (both development and infrastructure) if the potential of this technology is to be realized.

Hughes listed investors' pros and cons of financing UCG projects. While UCG is a relatively safe, low-cost, low-emissions energy source with a wide range of end uses (power, fuel, chemicals, hydrogen), its negatives are a challenge.

The lack of UCG projects in the Western world leads to uncertain economic projections. Additionally, UCG's high level of output volatility further complicates financial forecasts.

Hughes said syngas has lower energy content than pipeline gas and the quality is highly variable.

Additionally, underground coal operations tend to be riskier, more expensive and less reliable than open-cut activity, as gasification underground cannot be controlled as well as above ground gasification processes, he said. UCG operations can also have a negative impact on underground aquifers as well as ground subsidence.

Another challenge to potential UCG financiers lies in the fact that trials are expensive and time consuming. "A working UCG plant is not something you can model in a lab," he said.

Other potential stumbling blocks for UCG financing are shared with a number of other technologies, such as sensitivity to energy and carbon pricing, transportation costs to get product to market, grid connection costs for remote sites and planning constraints. -- *Suzanne McElligott*

West Hawk to Market Power Ecalene Fuels' Syngas-to-Liquids Technology

Denver-based coal and energy company West Hawk agreed to exclusively market and license Power Ecalene Fuels' (PEF) coal/biomass syngas-to-liquids conversion system.

West Hawk describes PEF's technology as an efficient system that converts the syngas to liquids to include jet fuel, ethanol and high quality alcohols.

It plans to market and license PEF's technology in the U.S. in Colorado, West Virginia, Wyoming, Arkansas, and Oklahoma. In Canada, it plans to market and license it in British Columbia, Alberta, Northwest Territories, and Nunavut.

Additionally, West Hawk says it expects to license the PEF technology in Asia with its initial focus in China in the Shanxi Province and the Xinjiang Autonomous Region, followed by Taiwan and

Inner Mongolia. The company also said it intends to supply this technology to two plants in China, owned by Lu'An, when final demonstration tests have been completed (*GN 10/3/07*).

Currently, PEF says it is in the process of building a demonstration plant in the U.S., and West Hawk says it is planning to make an equity investment in the plant in order to have a showcase facility. *Financial Deal Tracker* reported that West Hawk agreed to buy 10% of the project in late-February.

"West Hawk expects a revenue stream will result from the sale and licensing of each syngas-to-liquids unit, while other revenue sources will originate from the sales of products from West Hawk's coal properties and gasification facilities.

-- Suzanne McElligott

Gasifier-Processed Coal Drops Mercury Emissions 82%

Evergreen Energy recently completed a month-long test burn which indicated that Ohio coal blended with its patented K-Fuel resulted in an 82% drop in mercury emissions.

K-Fuel is raw, low-grade coal processed with steam and pressure through a Sasol/Lurgi Mark IV gasifier and associated equipment adapted for the K-Fuel process.

The test was conducted at a western Pennsylvania power plant using 75% Ohio bituminous coal and 25% K-Fuel coal supplied by Buckeye Industrial Mining of Lisbon, Ohio, a subsidiary of Evergreen. Evergreen said the test was conducted under third party supervision.

The stack mercury emissions from the test blend was compared to the mercury content of the raw coal normally burned at the plant.

The resulting nearly 82% reduction in mercury emissions provides a new avenue for plant operators to comply with strict new mercury emissions standards across the U.S., Evergreen said.

A reduced need for activated carbon for mercury capture would generate sizable cost savings. Activated carbon injection is a currently accepted method for removing mercury from the flue gases of coal-fueled power plants, but the process is expensive and it reduces the value of the plant's fly ash, which is sold for use in the construction materials industry, Evergreen said.

Fuel and stack-based test results also were encouraging for industrial boiler operators who must comply with new federal emissions regulations known as MACT (maximum available control technology) that were slated to take effect last fall but have been delayed by court appeals.

A blend of K-Fuels and local coals met MACT standards in tests conducted by the University of Notre Dame and the City of Painesville, Ohio.

--Suzanne McElligott

DN: UCG Can Be a Prominent Clean Coal Technology in India

London – India has large coal reserves of more than 250 billion tons. Past studies conducted in the 1980s indicated that roughly 30% of Indian reserves are deep and have the potential for underground coal gasification (UCG), despite the high-ash coal and lignite.

After a lapse of 20 years, some of the largest state-run companies in India are taking in interest in UCG.

India's state-run exploration firm Oil and Natural Gas Corp. (ONGC) India Ltd., started UCG projects with technical support from Russia's Skochinsky Institute of Mining, Anil Khadse from the Department of Chemical Engineering at the Indian Institute of Technology told attendees of the Underground Coal Gasification Partnership conference in London last month.

In addition, other major companies such as privately owned Reliance Ltd., and state-run gas utility GAIL (India) Ltd. are also planning for UCG pilot studies, he said.

However, further feasibility studies are required for UCG in India and modeling studies should be done for: reactor modeling, cavity growth modeling, and subsidence modeling, Khadse said.

While the government-run companies are looking at making a serious study of UCG possibilities, the government is at work trying to cut paper work.

Government policies need to be amended in order to facilitate the growth of the industry. At the moment, the Ministry of Coal is working on overhauling the process by which coal blocks would be allocated for UCG.

This involves amending the Coal Mines (Nationalization) Act of 1976 as the rules do not currently permit UCG as an end use.

India's Draft Coal Vision 2025 envisages the development of UCG, and Khadse expects to see the policies standing in the way of UCG start to be stripped away in the near future.

--Suzanne McElligott

Briefs

GE Signs 32nd Gasification Contract in China

GE Energy signed a deal on a coal-to-chemical production plant in China, raising its total gasification contracts in the country to 32, the company said.

The latest GE Energy deal was signed with the Guizhou Jinchi Chemical Co. in China's Guizhou province.

Guizhou Jinchi will use GE's gasification technology to produce syngas, which the company uses to produce chemicals at the Tongzi County project site.

Of the 32 projects in China that have licensed GE gasification technology since the mid-1970s, 23 are reportedly in commercial operation, GE said. More than 90% of the gasification equipment for these projects was manufactured locally in China.

Rentech to Terminate CIT Credit Line

Rentech Inc. said in a Feb. 22 letter to shareholders that it intends to terminate its CIT Group/Business Credit line of credit given to it for its Rentech Energy Midwest Corp. (REMC) fertilizer producing subsidiary in East Dubuque, Ill.

The CIT line of credit imposes what Rentech describes as restrictive covenants on the company that limits Rentech's liquidity, Rentech said in a statement.

According to a 2006 Security and Exchange filing, CIT had provided a maximum of $30 million in operating capital. However, in its letter to shareholders, Rentech said the cashflows at REMC and other potential sources of cash provide sufficient liquidity through the next fiscal year.

Rentech also said it does not expect any significant equity raises for the next 12-18 months, which is when it expects to raise the equity portion of the capital requirements for its Natchez project.

VSE Wins FT Testing Subcontract from Air Force

Integrated Concepts and Research Corp. (ICRC), a wholly owned subsidiary of VSE Corp., announced it recently won an award of a U.S. Air Force subcontract supporting the Advanced Power Technology Office to research, demonstrate and sustain the incorporation of Fischer-Tropsch (F-T) fuel in diesel engines.

Under a two-year subcontract agreement with Concurrent Technologies Corp., ICRC will provide technical support to facilitate the testing of F-T fuel blended with conventional petroleum-derived JP-8. This 50/50 blend will be evaluated in base storage facilities, Air Force ground support equipment and Air Force ground vehicles. Potential ICRC revenues under the subcontract are estimated to be $1.38 million.

SAIC to Support Clean Coal Technologies in China Projects

Science Applications International Corp. subsidiary The Benham Companies agreed to support Clean Coal Technologies (CCTI) in its bid to commercialize its coal processing technology in China.

CCTI's proprietary technology pre-processes coal for removal of up to 90% of pollutants and excess moisture prior to use as a clean-burning fuel in coal-fired power plants.

With the support of the U.S. Department of Commerce, CCTI plans to build modular front-ends to power plants in China that will transform coal with high levels of impurities and contaminants into an efficient, clean-burning energy resource.

Syntroleum, Tysons Foods Venture Picks FEED Contractor

CDI Corp. said Dynamic Fuels LLC, a 50/50 joint venture between Syntroleum Corp. and Tysons Foods, selected it to provide a front-end engineering and design study on a $150 million synthetic fuels plant to be built in Geismar, La.

The new facility is to produce 75 million gallons a year of diesel or jet fuel by converting animal fats, vegetable oils and used greases supplied by Tyson Foods, Inc. using Syntroleum's Bio-Synfining technology.

Senators Object to Some Bush Energy Budget Requests

U.S. Senators Jeff Bingaman (D-N.M.) and Pete Domenici (R-N.M.), respectively chairman and ranking member of the Senate Energy and Natural Resources Committee, took issue with several of President George Bush's budget requests for fiscal year 2009 in a letter to the Senate Budget Committee.

While generally applauding Bush's request for $25 billion for the Department of Energy, an increase of $1.13 billion or 4.7% over the department's current appropriation, the Senators objected to cuts in oil and gas research, which would make coal the only fossil fuel studied by the department.

SES Starts Syngas Sales in China

Synthesis Energy Systems said its 95%-owned joint venture project with China's Shandong Hai Hua Coal & Chemical Company commenced syngas sales on February 19, 2008.

The company noted that the plant is now operating in a pure oxygen-blown mode using locally sourced, high-ash coal as feedstock to produce syngas, which is in turn being used by Hai Hua as a feedstock for methanol production.

Blue Source Acquires Canada's Baseline Emissions Management

Salt Lake City-based Blue Source LLC acquired Baseline Emissions Management, Inc., an emission offset marketing and consulting group operating in Canada's provincial carbon trading markets.

"Baseline’s industry position in Canada is a great compliment to Blue Source’s U.S. position and brings valuable experience in emission offset marketing and offset protocol development," Blue Source said in a statement.

Australia's Linc Begins UCG to GTL Commissioning Phase

Australian underground coal gasification (UCG) company Linc Energy started commissioning its 5 b/d demonstration gas-to-liquids plant at its UCG site at Chinchilla in Queensland, Australia in late-February, it said.

Linc said the commissioning is expected to last about 10 weeks with "numerous ongoing piping and cabling runs.”

MRCSP Starts CO_2 Injection Test in Michigan

The U.S. Department of Energy's (DOE) Midwest Regional Carbon Sequestration Partnership (MRCSP) started injecting 10,000 tons of carbon dioxide into a 3,000-foot deep saline formation early last month. The test injection is to be completed by the end of March.

The carbon dioxide is captured from a DTE Energy natural gas processing plant and transported about eight miles via pipeline to the injection site at Gaylord, Mich.

After injection is complete, scientists will conduct tests to determine how the carbon dioxide responds to being contained within the targeted geologic formations. The results of those tests are expected to be available later in 2008.

The MRCSP, one of seven DOE-sponsored regional partnerships, is led by Battelle, a non-profit company involved with technology development and commercialization.

Partners involved in the Michigan Basin test, in addition to Battelle, DTE Energy and the site operator, Core Energy LLC, include the Michigan Geological Repository for Research and Education at Western Michigan University, and the Michigan Department of Environmental Quality (MDEQ), Office of Geological Survey.

Syntroleum to Seek Hearing from Nasdaq Panel

Tulsa-based Syntroleum Corp. said earlier this month that it intends to seek a hearing in front of the Listing Qualifications Panel of Nasdaq to prevent its possible delisting from the exchange.

On Jan. 31, Syntroleum announced it had been notified by Nasdaq that its market value fell below the minimum of $50 million for listed securities. Syntroleum expects a hearing to be scheduled before mid-April and the company's securities will remain listed pending the issuance of the panel's decision following the hearing.

In the event the panel determines not to grant the company's request for continued listing on Nasdaq, Syntroleum said it would request that its securities be transferred to the Nasdaq Capital Market. The company said it believes that it currently satisfies all applicable requirements for listing on the Nasdaq Capital Market.

Minn. Senate Hopeful Al Franken's Not Impressed with Mesaba IGCC Plant

While U.S. Senate hopeful and former *Saturday Night Live* television show writer Al Franken reportedly supports clean coal technology and carbon capture and sequestration initiatives, he is not supporting Excelsior Energy's bid to build an integrated gasification combined cycle plant in Minnesota.

Franken is looking to unseat Sen. Norm Coleman in November, but first needs to win the Democratic nomination in that state.

He is reportedly unsure that the plant is the best project for the money and has concerns about how the CO_2 might be sequestered, *The Bemidji Pioneer* newspaper reported on Feb. 17.

Franken reportedly said the U.S. needs to strike international agreements providing the ability to sell U.S. clean coal technology overseas as well as international cap and trade programs.

Gas to Liquids News

Sasol Chevron, Australia Discuss Potential GTL Pilot Plant: Minister

Australia's Resources and Energy Minister Martin Ferguson said his department was discussing the possibility of establishing a gas-to-liquids (GTL) pilot project in Australia with Sasol Chevron, the GTL joint venture between U.S.-based Chevron and South Africa's Sasol.

The *West Australian* newspaper said the discussions have boosted hopes that a $10 billion-plus processing plant might eventually be built in Western Australia.

Ferguson made the remarks to delegates at the 3rd Annual Coal-to-Liquids and Gas-to-Liquids conference in Brisbane on Feb. 26.

"My department is working closely with Monash Energy – a joint venture between Shell and Anglo – on a potential CTL project in the Latrobe Valley in Victoria – and with the Sasol Chevron joint venture on Australian GTL prospects," he said in a speech prepared for the conference.

He also mentioned Central Petroleum's interest in a potential GTL plant in the Northern Territory.

Regarding Western Australia, he said one of the advantages of Australia's North-West Shelf was that the CO_2 emitted at the facilities could be sequestered below the seabed.

"I would like to see by 2015 our nation serious about gas to liquids, basically creating a new synthetic transport fuel which is potentially more environmentally sound, based on CO_2 sequestration," Ferguson said.

"WA [Western Australia] is potentially central to a debate about alternative transport fuels in Australia involving gas-to-liquids and that's why we are intimately involved at a department level in discussions with companies operating in this area."

Ferguson's department had made no financial commitment to any Sasol Chevron proposal and would not consider doing so until the "fiscal and policy settings" for the industry had been devised.

Ferguson also reportedly said he also wanted to encourage coal-to-liquids technology, as Australia has up to a 600 years supply of coal (*see story this issue*.) He said pilot plants would be built in Victoria's Latrobe Valley and in Gladstone, Queensland.

To advance all these projects, Ferguson said his department is due to release a legislative framework for carbon capture and storage before the end of the year. *--Suzanne McElligott*

Shell's Pearl GTL Plant to Start in 2010: Qatari Energy Minister

The first train of Shell's mammoth 140,000 b/d gas-to-liquids (GTL) plant will start in 2010, Qatari Oil Minister Abdullah al-Attiyah reportedly said on March 4 in Vienna.

Attiyah said he had spoken to Shell Chief Executive Jeroen van der Veer the previous day, both *Dow Jones* and *Reuters* reported.

The *Dow Jones* story quoted al-Attiya as saying: "Pearl will be operational in 2010. I am not worrying about the delay of the project and I am not worrying abut the cost."

The project was originally forecast to cost $5 billion but inflation in the construction sector pushed more recent estimates as high as $18 billion.

Dow Jones reported December that the project could conceivably cost more than $18 billion (*See Gasification News, Dec. 12, 2008*.) and would not meet its original start up date set for 2009.

--Suzanne McElligott

Coal to Liquids News

Australia's Altona Completes CTL Pre-feasibility Study

Australian based energy company Altona Resources said it completed the key technical field components of the pre-feasibility study for the development of an integrated coal-to-liquids (CTL) plant and co-generation power facility at its Arckaringa project in South Australia.

"The drilling campaign focused on the Wintinna Coal Deposit and was completed on schedule on 11th February, 2008. Sufficient total drilling meterage and sampling was achieved from 20 boreholes to meet the programme's key objectives, including the definition of approximately 700 million tonnes of coal that can be classified as Measured or Indicated according to the current JORC Code for reporting resources," Altona said.

The “JORC Code” is a reference to the Joint Ore Reserves Committee, which is sponsored by the Australian mining industry. It puts out the standard code for reporting mineral resources and ore reserves in the country.

Altona anticipates that it will take two months to evaluate and report on the results of the study and bring the pre- feasibility stage to a close.

After establishing the project will remain on the books, the company plans to start the final feasibility stage of what it calls a "Bankable Feasibility Study (BFS)".

While it evaluates the details of the pre-feasibility report, Altona said the study did show the Arckaringa site has many positive attributes, such as:

Proven coal resources;
Conventional open cut coal mining;
Coal resources of a quality suitable for CTL technology;
Expandable plant design;
Excellent infrastructure with immediate access to railway and ports;
Strong demand for electricity in South Australia;
Existing export and domestic markets for diesel and jet fuels;
Strong government support in a politically stable country;
Environmental issues identified;
Competitive project economics.

The company said a decision to move on a final feasibility is likely to elevate Arckaringa to "Major Project" status in South Australia, under which the state government would establish a process to streamline evaluation and approvals.

Based on advice from key advisers, including Jacobs Consultancy and Hatch Engineering, Altona anticipates that the final feasibility and government approvals stage will take approximately 24 months.

The construction of two modules comprising the "base case" 10 million barrel per year CTL plant and associated power facility could come on stream over a period of between 36 and 54 months, the company said.

--Suzanne McElligott

Fuel Frontiers Starts CTL Engineering Study Prior to Acquisition

Fuel Frontiers, a subsidiary of Washington, D.C.-based Nuclear Solutions, said it launched a coal-to-liquids (CTL) engineering program with the Shaw Stone & Webster division of Baton Rouge, La., based- Shaw Group.

Fuel Frontiers said the engineering program would provide the technical basis for a 400 ton per day CTL plant to be built in Muhlenberg County, Ky.

Fuel Frontiers said in a statement that it plans to use a plasma gasification system designed by Westinghouse Plasma for the Kentucky plant, coupled to a Fischer-Tropsch syngas-to-liquids diesel fuel production system to be designed and constructed by Shaw.

The project announcement comes just days after the board of Nuclear Solutions said it supported a $110 million bid for Fuel Frontiers from Woodstock, Ill.-based Inter-Americas.

The investment firm made the unsolicited offer in late-February.

Inter-Americas said it plans to integrate Fuel Frontiers' plasma conversion technology with the thermal technologies of Clovis, Calif.-based Full Circle Energy, one of Inter-Americas' portfolio companies.

Inter-Americas said the merger should be completed within 30 days.

U.S. EIA Sees BTL Overtaking CTL; Doubts on Cellulosic Biofuels

U.S. Energy Information Agency's (EIA) just-revised 2008 Annual Energy Outlook (AEO) now sees biomass-to-liquids (BTL) fuel overtaking coal-to-liquids (CTL) fuel, thanks to the U.S. energy bill signed by President George Bush last December.

In March 4 testimony before the U.S. Senate Energy & Natural Resources Committee, EIA administrator Guy Caruso said the newly-revised AEO forecast sees coal use for CTL as "lower than in previous *AEO*s as a result of EISA2007 [the U.S. energy bill].

"Investment dollars that would have previously gone into CTL capacity now flow to biomass-to-liquids (BTL) capacity. However, there is a great deal of uncertainty about this projection," he cautioned.

Crucial to all the assumptions in AEO is the world crude oil price. As is typical of EIA forecasts, the agency remains very conservative about future crude prices, seeing light-sweet crude declining from around $100/barrel today to $57 per barrel in 2016, in constant 2006 dollars, or to $68 per barrel in nominal dollars.

That's under the "reference" or base case. An alternative "high price" case sees crude hitting nearly $120/barrel by 2030 (in constant 2006 dollars), he said.

Rationale for the assumed crude price decline: Expanded investment in oil exploration and development.

"After 2016, real prices begin to rise, as demand continues to grow and higher cost supplies are brought to market," Caruso said. " In 2030, the average real price of crude oil is $70 per barrel in 2006 dollars, or about $113 per barrel in nominal dollars."

Total U.S. consumption of liquid fuels likewise is expected to grow only modestly, by 0.4% annually, he said. That takes U.S. liquid fuels consumption from 20.7 million barrels/day at end-2006, to 22.8 Mmb/d in 2030.

"Improvements in the efficiency of vehicles, planes, and ships are more than offset by growth in travel," he said, thus undercutting the presumed benefits of a 40% increase in vehicle corporate average fuel economy (CAFÉ) mandated in the 2007 energy bill.

Key reason for doubt on vehicle fuel-efficiency gains: U.S. EPA CAFÉ ratings generally overstate real-world fuel economy "by a significant margin," he said.

While the 2007 energy bill's "renewable fuel standard" (RFS) mandates 36 billion gallons of renewables in the gasoline or diesel pools by 2022, EIA doubts that mandated cellulosic-based renewables will rise to the challenge.

"The current state of the industry and our present view of projected rates of technology development and market penetration of cellulosic biofuel technologies suggest that available quantities of cellulosic biofuels prior to 2022 will be insufficient to meet the new RFS targets for cellulosic biofuels, triggering both waivers and a modification of applicable volumes," Caruso said.

"The modification of volumes reduces the overall target in 2022 from 36 billion gallons to 32.5 billion gallons. The modified cellulosic biofuel requirement is projected to be met by a combination of domestic cellulosic ethanol, imported cellulosic ethanol, and biomass-to-liquids diesel, but the specific mix is again highly uncertain."

As for ethanol, its U.S. use grows from 5.6 billion gallons in 2006 to 24.3 billion gallons in 2030, he said.

"Biodiesel use reaches 1.3 billion gallons in 2030 (about 1.6% of total diesel consumption by volume)," he said. "Consumption of diesel liquids produced from biomass (BTL) grows to 4.2 billion gallons in 2030, 4.9% of total diesel consumption by volume."

Coal's share of U.S. electricity generation "remains between 48% and 49% through 2018, before increasing to 54% in 2030. Net additions to coal-fired generating capacity in the *AEO2008* reference case total 103 gigawatts from 2006 to 2030, including 4 gigawatts at CTL plants and 30 gigawatts at integrated gasification combined-cycle (IGCC) plants."

However, carbon capture doesn't figure into EIA's coal-electric projection – another very conservative EIA assumption, given the current political winds in Washington.

"Given the assumed continuation of current energy and environmental policies in the reference case, carbon capture and sequestration (CCS) technology does not come into use during the projection period," Caruso said. -- *Jack Peckham*

Australia Commits A$500 Million to Clean Coal Fund

The Australian federal government is allocating A$500 million (U.S.$470 million) to develop clean coal technologies, with a emphasis on coal-to-liquids (CTL) technologies, Australia's Resources and Energy Minister Martin Ferguson told delegates at the 3rd Annual Coal-to-Liquids and Gas-to-Liquids conference in Brisbane on Feb. 26.

"We are committing $500 million [Australian dollars] to a National Clean Coal Fund to develop and demonstrate clean coal technologies," he said.

The fund is to provide:

- A$75 million for a national clean coal research program, including A$25 million for CSIRO (Commonwealth Scientific and Industrial Research Organisation);
- A$50 million for a national carbon mapping and infrastructure plan;
- A$50 million for a coal gasification research facility in Queensland; and
- A$100 million for two post-combustion capture demonstration plants in New South Wales and Victoria.
- A$225 million to support the demonstration of priority clean coal technologies, including CTL projects.

Ferguson said the Australian government wants to encourage coal-to-liquids (CTL) technology. The country has up to a 600-year supply of coal. He said pilot plants would be built in Victoria's Latrobe Valley and in Gladstone, Queensland.

To advance all these projects, Ferguson also said his department is due to release a legislative framework for carbon capture and storage before the end of the year. *--Suzanne McElligott*

Carbon Storage

CCS Trust Fund Could Accelerate Deployment: Pew Center

Large CO_2 emitting facilities in the U.S. probably should be made to pay into a trust fund, managed by a quasi-governmental entity, that would fund carbon capture and sequestration (CCS) demonstration projects around the country, the Pew Center on Global Climate Change said in a recent report.

The report, entitled "*A Trust Fund Approach to Accelerating Deployment of CCS: Options and Considerations*," was written by Naomi Pena, of the Pew Center, and Edward Rubin of Carnegie Mellon University's Environmental Engineering and Science department.

The paper makes a case that carbon emitting industries, such as the power industry, should set up a something like a quasi-independent, fee-based CCS trust fund.

The report envisions the trust fund being supported by a fee on coal-fueled power plants and other emitters, to provide monies that would be dedicated to commercial-scale CCS demonstrations. Once industry agrees to pay the fees, then fees would become mandatory.

In the scenario provided in the report, the monies are to be disbursed by a quasi-governmental corporation as suggested by last year's report entitled *The Future of Coal* by the Massachusetts Institute of Technology (MIT).

MIT argued that the quasi-governmental model of management would combine the advantage of government-style "deep pockets," along with the cost/benefit expertise of the private sector.

In the Pew Center model, the funds would be spent on demonstrations of a variety of CCS technologies (both combustion-based and gasification-based power plants), in both new-build and retrofit situations, across a variety of U.S. coal types used in different regions of the country at different elevations, and with CO_2 sequestered in different types of geological formations.

A companion paper put out by the Pew Center last year, "*A Program to Accelerate the Deployment of CO2 Capture and Storage (CCS): Rationale, Objectives, and Costs* ," estimates the total cost of such a CCS demonstration program at around $10 billion to $30 billion over a 10-15 year period, for programs at scales of ten projects and thirty projects, respectively.

The new Pew Center report said the advantages of a CCS trust fund, as described above, would:

"Raise the required amounts of money from non-governmental sources,
Ensure that those who pay into the fund also benefit from the program,
Ensure multi-year financial self-sufficiency of a CCS deployment program,
Ensure that demonstrations are conducted for a range of power generation facilities, CCS technologies, coal types, and geographical regions, and
Get started rapidly and maintain a well-defined revenue stream."

The paper also said the CCS trust fund could:

> "Support needed demonstration of integrated CCS at commercial-scale coal-based power plants to establish its costs and viability – the likely pre-conditions for any future policy requiring the use of CCS;
> More quickly and directly achieve significant cost reductions in CCS technologies than approaches that depend solely on sufficiently stringent CO_2 emission limits;
> Bring substantial national economic as well as environmental benefits by reducing the future costs of achieving significant CO_2 emission reductions from coal-based electric power plants; and
> Foster energy security goals by enabling domestic coal to provide electricity as well as (potentially) transportation fuels (e.g., in the form of electricity or hydrogen) in a carbon-constrained environment."

--Suzanne McElligott

Tenaska Proposes First SCPC Plant to Capture Carbon Dioxide

Omaha, Neb.-based power plant developer Tenaska, Inc. said it plans to build a $3 billion, super critical pulverized coal (SCPC) plant in Sweetwater, Texas that will capture 90% of its carbon dioxide emissions and pipeline the CO_2 for enhanced oil recovery to producers in the Permian Basin.

Tenaska filed an air permit application with the Texas Commission on Environmental Quality (TCEQ) for its net 600-MW Tenaska Trailblazer Energy Center project last month.

The company said it chose SCPC technology over integrated gasification combined cycle (IGCC) technology because it wants to use Powder River Basin (PRB) coal, which is a high moisture, lower Btu coal that works better with SCPC than with gasification. Additionally, it said SCPC technology is better when working at Sweetwater's low elevations.

But while saying it plans to capture 90% of the carbon, it has not decided upon a carbon capture technology.

"We believe that an amine absorption system will work when scaled to our needs; we also are investigating other appropriate technologies that may be available that meet our needs," the company said.

"Regardless of the capture system chosen, the project will capture CO_2 from the plant's flue gases, remove moisture from the CO_2, compress it and deliver it under pressure via a pipeline to the oil fields in the Permian Basin. There, it will be used for enhanced oil recovery efforts, which result in the CO_2 being stored in deep underground rock formations," Tenaska added.

"The final decision to proceed with the project will be made in 2009 based on a number of factors, including the availability of local, state and federal incentives; final project cost estimates; and projected market prices for electricity and CO_2," Tenaska said. Construction could begin in late 2009 and be completed in 2014.

The volume of CO_2 expected to be sold to oil producers could be used to recover more than $1 billion/year of oil.

Tenaska is also managing partner of an IGCC project in Illinois. The Taylorville Energy Center (TEC) is a proposed $2 billion, 630-MW being developed by Christian County Generation, LLC, a joint venture of Tenaska, Inc., and MDL Holding Co., of Louisville.

That project jumped a major hurdle earlier last month when it was granted an air permit. The plan calls for the plant to be CO2 capture-ready only. Environmental groups have protested the plan because no capture or sequestration plan has been put forward by the company. The start up date for TEC is currently scheduled for sometime around 2012. *--Suzanne McElligott*

Australia's Loy Yang Power to Study Retrofitting HTC Capture System

Loy Yang Power, which operates a 2,200 MW brown coal fired power station in Australia's Latrobe Valley in Victoria, agreed to undertake a site specific feasibility study on retrofitting an HTC Purenergy carbon capture system.

The carbon capture technology is to be supplied by Australia's EESTech. EESTech owns the exclusive Asia-Pacific rights to the HTC Purenergy CO_2 Capture System which extracts CO_2 from the flue gas stream of coal and gas fired power stations.

The HTC carbon capture system is a pre-engineered, modular system, which HTC says can be retrofitted onto existing power plants.

The HTC carbon capture system is to be integrated with EESTech's hybrid coal gas turbine, which utilizes waste coal, methane or biomass, to produce energy.

"Identifying and developing viable new technologies will be critical to the sustainable utilisation of the Latrobe Valley's abundant brown coal resource. Pre-drying and post-carbon capture and storage technologies are seen as prospective pathways to achieving low or near-zero emissions from brown coal," said Ian Nethercote, Loy Yang chief. --*Suzanne McElligott*

EU Ambassador to U.S. Calls for Further Carbon Sequestration Push

The proposed reform of the European Union's CO_2 cap & trade system would make it financially worthwhile for companies to adopt sequestration technology that would eliminate CO_2 emissions from coal burning.

So said Ambassador John Bruton, Head of the EU Commission Delegation to the United States, after a visit to possible sequestration sites in Wyoming late last month.

The European Union is financing substantial research into cost effective techniques for carbon sequestration. Bruton said it was "urgent" that companies find a way to make it financially worthwhile to sequester carbon emissions.

The proposed reform of the European Union's cap & trade system could do just that. "It could bridge the financial gap," Bruton said.

If carbon capture and storage technology makes the avoided cost of CO_2 lower than the carbon price, then the trading scheme could provide a financial tool to make up the difference between the cheap but heavily polluting conventional coal-fired methods, and the more expensive but non-polluting carbon sequestration method, Bruton added.

"Instituting cap-and-trade systems with a price on carbon will be crucial to making carbon capture and storage a commercially viable option for us all," he said. --*Suzanne McElligott*

Integrated Gasification Combined Cycle News

Dubai Plans $6 Billion IGCC Plant

A senior official of the Dubai Electricity and Water Authority (DEWA) said that the company expects to buy power from a "foreign consortium" which plans to build a $6 billion, 2,000-MW integrated gasification combined cycle (IGCC) plant in Dubai, the local *Khaleej Times* reported.

Saeed Mohammad Al Tayer, managing director and CEO of DEWA, reportedly made the statement on Feb. 24 following the signing of a memorandum of understanding with the foreign consortium that is next expected to produce a feasibility study on the project.

The consortium is made up of China's Sino Global International, an engineering contracting firm in New York, Canadian firm Samena Power & Energy Ltd. and Dubai-based Skyline Services Group, a shareholder of energy development firm Sino Eastern.

According to the *Khaleej Times* news report, Al Tayer said DEWA would likely guarantee the purchase of power and a water supply from the plant, and at this time expects the right to purchase a 51% share of the plant.

A *Middle East Business Intelligence* report said the only feedstock being considered now is coal.

--Suzanne McElligott

China to Build Six IGCC Plants by 2010, GreenGen Construction to Start Soon

China is set to build six integrated gasification combined cycle (IGCC) plants by 2010 and construction on the first plant in Tianjin is to start this year, an official from the Chinese Academy of Sciences (CAS) reportedly said at a power conference in Beijing

According to a report from *China Business Newswire*, Xiao Yunhan, deputy director general of CAS' Bureau of High-Tech Research and Development, said China intends to build six demonstration IGCC plants, including the 250-MW "GreenGen" plant in the northeastern coastal city of Tianjin, located near Beijing.

Xiao reportedly said the other five projects will be built in Shaanxi Province, Shanxi Province, Hangzhou City of Jiangsu Province and in Guangdong Province, which will have two projects.

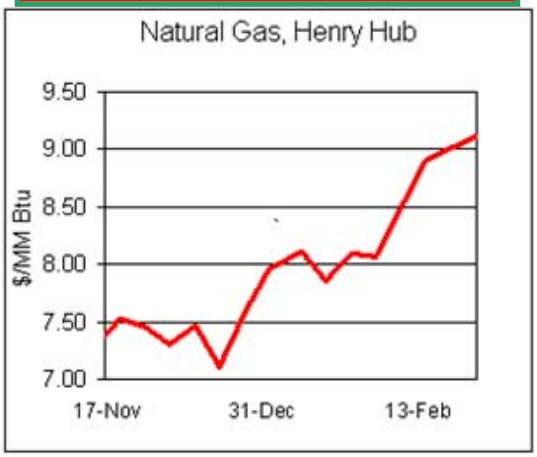
The first 250-MW construction phase of the GreenGen plant is to be completed by the end of 2009, and as previously reported, the long range plans for GreenGen eventually would expand capacity to 650 MW.

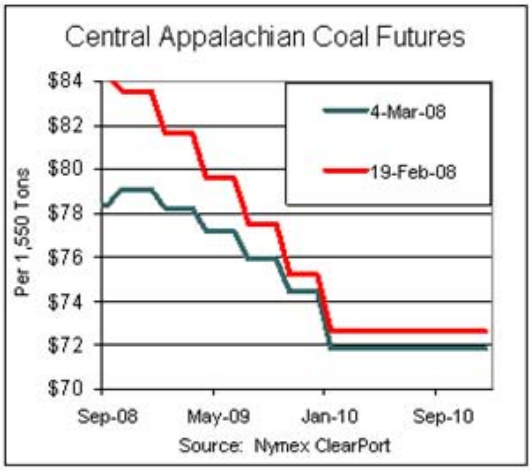
In the second phase, between 2010 and 2012, the GreenGen is to improve its IGCC and polygeneration technologies, expand the coal gasification capacity of gasifiers to 3,500 tons per day and begin development of technologies including hydrogenation, separation of hydrogen and carbon dioxide, and fuel cell-based power generation, the newswire report said.

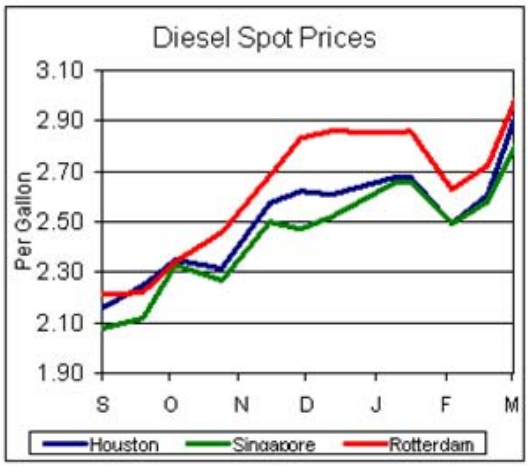
In the third phase, between 2013 and 2015, an additional two 400-MW IGCC units are to be constructed. Plans for Phase III also include a hydrogenation facility, hydrogen-based power generation facilities and carbon capture and sequestration (CCS) facilities.

U.S.-based Peabody Energy, the largest privately owned coal producer in the world, is a 6% equity holder in GreenGen. Additional GreenGen stake holders include: China Guodian Corp., the China Power Investment Corp., the

Market Snapshot







Shenhua Group, the China National Coal Group and China's State Development and Investment Corp.

The *China Business Newswire* report said China will own the intellectual property rights to the Tianjin GreenGen plant.

Xiao also reportedly said that the two projects to be developed in Shaanxi and Shanxi will be combined with coal-to-liquids (CTL) facilities,. *--Suzanne McElligott*

In Other Sectors

Price, Climate Change, Security of Supply to Drive Clean Energy Growth: Yergin

High energy prices, climate change and energy security are "converging as the new engine driving the development of clean energy," said Daniel Yergin, chairman of Cambridge Energy Research Associates (CERA), in a speech to National Governors Association last month.

"There is a major shift in public opinion towards clean energy, which is being bolstered by the growing conviction that new carbon policies will reshape the competitive landscape of the global energy business," Yergin said.

Citing CERA's new study, "Crossing the Divide: the Future of Clean Energy," Yergin said that renewable power and biofuels could be supplying as much as 16% of the global electric and transportation needs by 2030.

"We are going through a period of what I call the 'great bubbling,' a high degree of innovation all across the energy spectrum," he said. "To paraphrase a famous phrase about states as the laboratories of democracy, the states today are truly 'laboratories' of energy innovation and initiative for the nation.

"There are a broad range of opportunities and benefits, as well as risks, and pitfalls, as the modern energy industry increasingly moves to adopt clean technologies that will be part of the alternative, low-carbon pathway to the energy future," Yergin said.

"All participants in the global energy business, from traditional firms such as electric power companies and oil and gas companies, to new entrants such as venture capital firms and high tech companies will play a role in shaping this changing energy future. So will government at both the state and federal levels."

Economic weakness explains $100 oil, he added. "A major reason for the current leap to around $100 a barrel is the economy – but now a weak U.S. economy, rather than the strong global economy that has been so important the last few years," he said.

"A slowing U.S. economy, rate cuts by the Federal Reserve and expectations of more, and a weak U.S. dollar – along with the reappearance of inflation around the world – are driving investors into oil and other commodities. Instead of the traditional 'flight to the dollar' during times of uncertainty, we are seeing a 'flight to oil.'"

Meantime, renewable power technologies are poised for substantial growth. Wind will make the largest gains, followed by solar power and biomass. Despite near-term bottlenecks in wind turbine manufacturing, supply shortages in silicon and competitive pressures from escalating component costs, renewables will grow.

Government policy remains a key driver for clean energy advancement. Putting a price on CO_2 emissions, setting mandates and providing subsidies all work to kick-start clean energy technologies by meeting the economic competitiveness and cost advantages of conventional technologies.

The challenge in the years ahead is to provide subsidies in a way that ensures that these technologies get off the drawing board and are able to wean themselves from support – allowing for a phase-out rather than an increase in subsidies – as they become commercially viable on their own.

Mandates must be set at achievable levels and with care so as not to create unexpected pressures from higher prices.

A full range of clean energy technologies along with demand side responses will be needed to address the challenge of redirecting global greenhouse gas emissions trends. While many clean energy technologies are commercially available, more work is needed to develop and demonstrate a broader set of technologies including advanced coal systems.

Nuclear and hydroelectric generation will account for most of the clean energy impact for the next decade, and almost half the gross clean power additions by 2030.

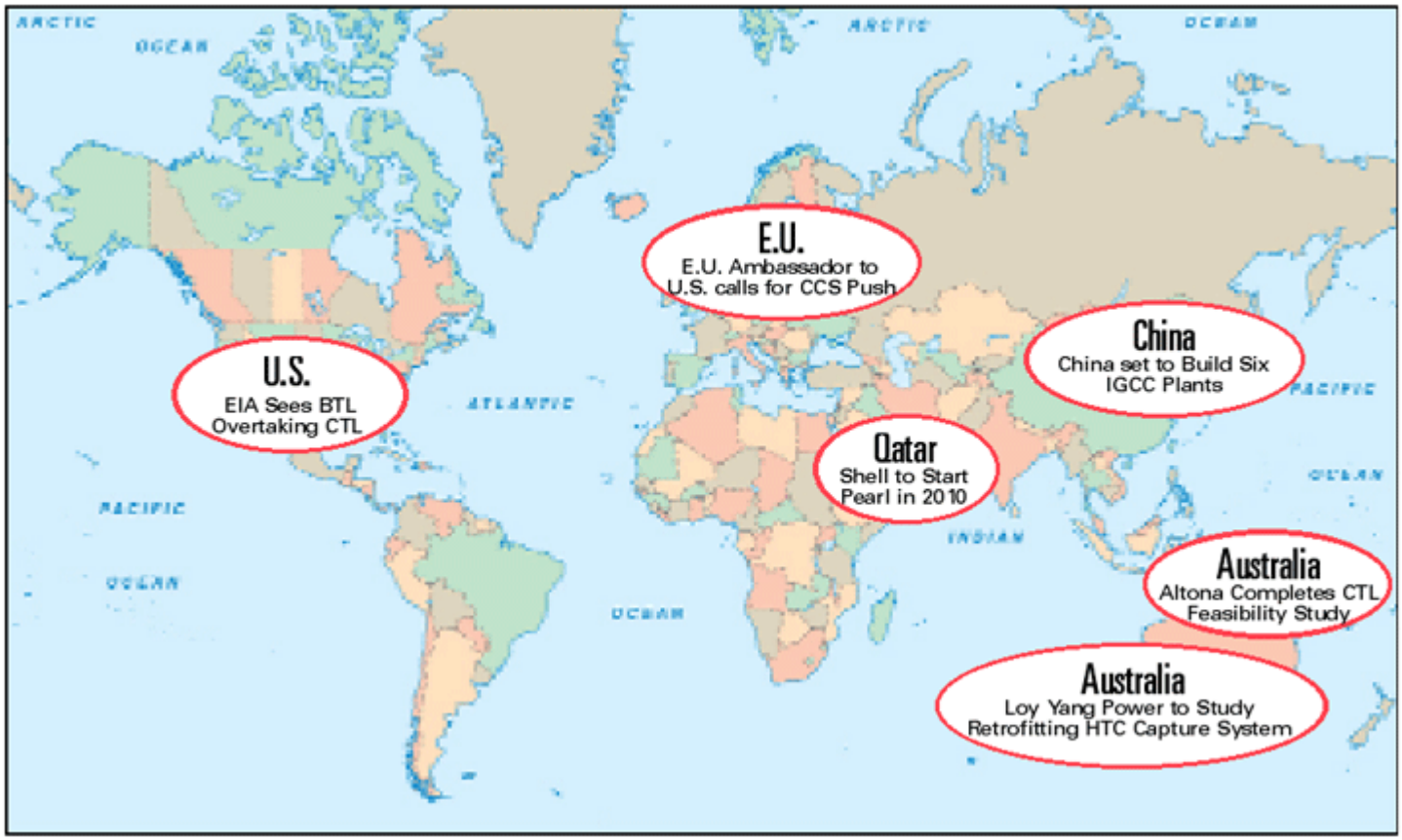
The coal resource base and utilization in the United States and China will create a powerful drive to develop “clean coal” technologies.

Rapid economic growth may push Asian energy needs from 30% of current global demand to 40% by 2030; combined with its manufacturing cost-competitiveness, this could make Asia a nexus for clean energy technology research, development and equipment production, he said.

Economic growth affects energy demand and carbon emissions as well as the political and financial support for research and development of new clean energy technologies.

The U.S., Europe and China – the “Big 3” energy users -- will have a major impact on development of “clean energy,” along with certain other countries, particularly Japan, India and Brazil.

Global Hotspots In This Issue



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