

Week of August 7, 2006

Snapshot from the Field

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Illinois, Texas Sweep Short List for FutureGen's \$1-Billion 'Clean-Coal' Project



The Plant's Pollution-Cutting Technology Could Change the Global Energy Picture.

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Coal-fired operations account for almost 40 percent of worldwide CO² emissions.

CREDIT: New York Climate Rescue

FutureGen, a US\$1-billion "clean-coal" prototype, is bound for either Illinois or Texas, the finalist states for the one-of-a-kind project. FutureGen's commercial-scale power plant will be the first coal-fired operation ever designed to produce electricity and hydrogen with virtually no harmful pollution.

Illinois and Texas swept the project short list, each landing two of the four locations. The U.S. Dept. of Energy (DOE) announced the four finalists in Washington, D.C., on July 25th. Illinois' short-list sites are in the cities of Mattoon and Tuscola, while the Lone Star State's locations are in

Odessa and near the city of Jewett.

Wherever the plant is located, the outcome of the FutureGen operation could have a substantial impact on global energy independence, as well as on the coal and power industries.

"This project makes coal, one of the most abundant fossil energies in the world, available in the future in the face of growing concern over greenhouse gas emissions and climate change," Jeff Jarrett, DOE assistant secretary of fossil energy, said at the FutureGen short-list announcement.

The U.S. has enough coal to last a projected 250 years, if not longer. Coal-fired plants now produce more than half of America's electricity. But coal usage faces mounting opposition because of substantial pollution. Coal-fired operations account for more than one-third of U.S. carbon dioxide emissions.

Worldwide, coal creates almost 40 percent of CO² emissions.

Pollution is the central problem that FutureGen is tackling. Unlike traditional operations, the plant won't burn coal. Instead, it will pressurize it, producing a gas from which pollutants can be easily separated. The enriched hydrogen gas that remains will then power a turbine functioning much like a jet engine. Significantly, the CO² emissions produced in pressurization won't be released into the air. They'll be captured inside the plant and then "sequestered" – injected thousands of feet below the surface of the ground.

FutureGen's initial goal is to capture at least 90 percent of the plant's CO² emissions, alliance officials say. Advanced technologies, however, could enable nearly 100 percent capture.



The FutureGen plant (shown above in a U.S. Energy Dept. rendering) will produce 275 megawatts, enough to power 150,000 single-family homes.

The Power Company Connection

FutureGen's clean-burning technology has generated keen interest, particularly among power companies and coal suppliers. Some of the biggest players, in fact, are already involved in the project.

Since 2005, the DOE has been partnering with the FutureGen Industrial Alliance, formed in response to the federal government's clean-coal program. The non-profit consortium includes U.S.-based companies **American Electric Power**; **CONSOL Energy**; **Foundation Coal**; **Kennecott Energy** (part of England's **Rio Tinto Ltd.**); **Peabody Energy**; and **Southern Company**; plus London-based **Anglo American**; Melbourne, Australia-based **BHP Billiton**; and Beijing-based **China Huaneng Group**. Collectively, those companies serve customers in Asia, Australia, Canada, the People's Republic of China, Europe, South Africa, South America and the United States.

The FutureGen Alliance has committed more than \$250 million to the project. The Indian and South Korean governments have each pledged \$10 million as well. The U.S. government will bankroll the balance of the venture, an investment currently projected at about \$750 million.

The final FutureGen location will be tapped in late 2007. Plant engineering will proceed in tandem with site selection. The facility is scheduled to go online by 2012, producing 275 megawatts, enough to power approximately 150,000 single-family homes.

"Wherever the plant is ultimately located," FutureGen Alliance CEO Mike Mudd said at the Washington press conference, "it is designed to use a diversity of coals benefiting all users and producers of coal, both in the U.S. and throughout the world."

FutureGen's initial schedule called for the plant to operate for at least five years after it opened. DOE officials, however, now say that the facility will continue to function as a technological testing site for decades after that.

The plant's origins date back to 2003, when President Bush announced the 10-year FutureGen initiative. Spencer Abraham,

then the U.S. Secretary of Energy, called the project "one of the boldest steps our nation has taken toward a pollution-free energy future."



India joined the FutureGen Alliance in March of 2006, and South Korea joined in June. Pictured is President George W. Bush and India's Ministry of Power Secretary R.V. Shahi.



The FutureGen Contenders

The 12 contenders for the FutureGen plant (including Mattoon, Ill., pictured above) are listed below, with asterisks denoting the four sites that made the short list.

Effingham, Ill.	Meigs County, Ohio
Marshall, Ill.	Tuscarawas County, Ohio
Mattoon, Ill. *	Odessa, Texas *
Tuscola, Ill. *	Jewett, Texas *

FutureGen Could Be Catalyst for Cluster

The competition for the FutureGen plant has been intense. Seven states (also including Ohio, Kentucky, West Virginia, North Dakota and Wyoming) submitted site proposals. Many offered big-ticket incentives as well. In all, 12 sites were initially in the running for the plant (see accompanying chart).

The winning area, however, won't see instant gobs of new jobs. The plant will have about 150 full-time employees. But the FutureGen site stands to gain far more. Industry analysts see the plant as the centerpiece in the development a broad-ranging cluster centered on energy-industry innovations.

FutureGen's technologies cover a wide spectrum. The facility will utilize the most advanced developments in electricity generation, emissions control, carbon dioxide capture and storage, and hydrogen production. The plant will essentially function as a large-scale engineering lab, simultaneously integrating and testing those technologies inside a single operation. That demonstration of "real-world" feasibility is an integral step in commercializing

Henderson County, Ky.
Bowman County, N.D.

Point Pleasant, W.Va.
Gillette, Wyo.

clean-coal systems.

Mudd was already talking about making those technologies globally available at the short-list

announcement at the National Press Club.

"FutureGen's suite of innovative technologies will ultimately be available throughout the world, spurring economic development while protecting the environment," he said.

Official: 'Absolutely No Political Influence' in Short-List Selections

Numerous politicians have publicly pursued the FutureGen project, particularly U.S. representatives and senators. But such factors didn't affect the short-list selection, Mudd asserted.

"There was absolutely no political influence that went into the final selection of the sites," he said. "At the end of the day, the selections were based on the technical aspects of the sites ... This was a very scientific and technical process involving the best experts in the world."

FutureGen Alliance Technical Support Manager Ken Humphreys emphasized the same point at a July 19th press briefing in Washington.

"It's not politics, and it's not just the companies or the alliance picking the site," Humphreys said. "It's driven by [the] engineering and the science."

The project is using a set of almost 100 site-selection criteria, which were peer-reviewed and publicly vetted. The [FutureGen RFP](#) divides site scoring standards into three broad categories:

- "Qualifying criteria," the minimum site requirements, which include items like a tract of at least 200 acres (80 hectares) and "access to reliable supplies of industrial water at minimum sustained flow rate."
- "Geologic storage scoring criteria," which gauge each site's "desirable attributes," particularly the geological suitability and stability for underground CO₂ capture.
- "Best value criteria," including land costs and ownership, nearby residences, permitting, the proximate market for hydrogen, and a number of other factors.

The short-list scoring was tightly bunched at the top. "The top five sites," said the official report outlining the decision-making process, "score within 5 percent of each other ... rank[ing] the highest for the power plant siting criteria, geologic storage criteria and combined [scores]."

A site located near the city of Effingham, Ill., had the fourth-highest overall score, but didn't make the short list. As the FutureGen report explained, "This site poses substantial constructability problems, given its relatively small size (270 acres/109 hectares) and the long, narrow configuration of the site."

Short List Bypassed Biggest Subsidies

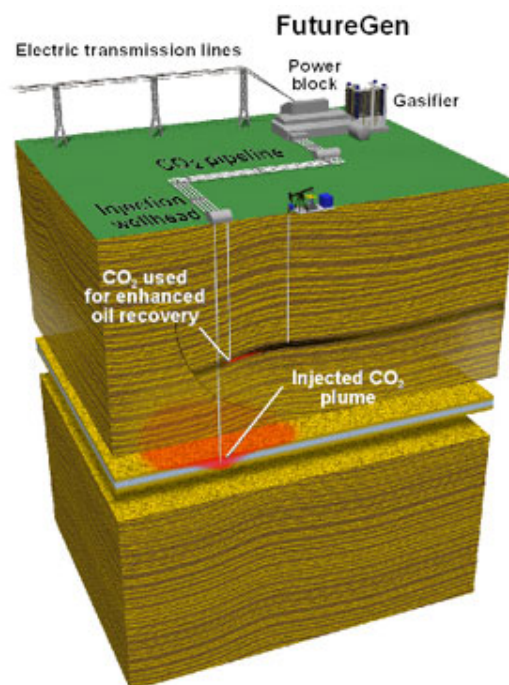
Many observers anticipated that incentives would affect FutureGen's "best value" equation. But state financial subsidies are not mentioned in the short-list report. It remains to be seen whether subsidies will play a tie-breaking role in final site selection.

FutureGen officials passed over the most hefty incentive bids in selecting the short list. Ohio offered \$164 million in subsidies, and Kentucky submitted a \$90-million bid.

Even so, the two finalist states didn't skimp on support. Illinois



"At the end of the day, the selections were based on the technical aspects of the sites," FutureGen Alliance CEO Mike Mudd (pictured) said in announcing the project's short list.



As this FutureGenTexas rendering illustrates, stable geology is essential in project's underground storage of CO₂ emissions.

FutureGen's four finalist locations (see map) don't include the sites that offered the highest incentives.

is offering an \$80-million subsidy package, including grants and low-interest loans.

Ostensibly, Texas' incentive bid is a comparatively modest \$20 million. Longhorn State lawmakers, however, passed a new law in May that specifically indemnifies the FutureGen Alliance against CO₂ liability. Texas is the only state that made such an offer. The Texas Railroad Commission would own all of the CO₂ that the FutureGen plant injects into the ground. The state would assume responsibly for the stored gas, including any liabilities that arise.

Texas' indemnification was the only incentive mentioned in the FutureGen short-list report. That pithy reference was included in the "Rationale" section explaining the short-list picks. The report's entire comment said only, "Texas has agreed to assume title to and liability for the CO₂ produced."

Flies in the FutureGen Ointment?

FutureGen has more than a few critics.

Some say that clean coal is an oxymoron, and characterize FutureGen as a continuation of what they see as the Bush administration's inadequate response on environmental issues. The national Sierra Club, for example, said of FutureGen, "When you have an addiction, you don't say, 'I'll try to kick the habit in 10 or 20 years.' "

Some opponents also contend that CO₂ sequestration is an unproven technology. Other critics point out the increased environmental damage that would come from mining more coal.

There are also cost issues with current clean-coal technology. That technology is now as much as one-third more expensive than conventional systems. On the other hand, the operation may test new technology that has the potential to almost double the generation efficiencies of traditional coal-burning plants, FutureGen officials say.

As for the eight contending sites that missed the short list, all is not necessarily lost.

"The siting criteria for the FutureGen plant were far more stringent than criteria that would be used to site future near-zero-emission coal-fueled power plants," said the project's short-list report. "Offered sites that are not appropriate for the proposed FutureGen facility may be excellent sites for future near-zero-emission coal-fueled power plants."

Site Finalists for FutureGen Energy Plant



FutureGen opponents contend that clean-coal technology could mean more mining, causing greater environmental damage like that seen in this Montana mining site.

Photo Credit: Northern Plains Research Council

