

The Department of Energy FutureGen Initiative

The latest iteration of the Department of Energy's FutureGen project is a federal initiative to finance and retrofit a former power plant into a "clean coal" facility in Meredosia, Illinois. For almost a decade, the massive project has been politically controversial, and increasing costs led the Bush Administration to cancel the project in 2008. Yet project proponents, headed by Illinois lawmakers, quickly revived plans for the mega-facility. Although project costs continue to soar and clean coal technology remains elusive, taxpayer subsidies continue to flow to FutureGen. On August 5, 2010, the Department of Energy (DOE) announced the awarding of \$1 billion in federal stimulus money as part of the American Recovery and Reinvestment Act.



DOE's Proposed Plant to be retrofitted for
FutureGen 2.0

Project Background

Originally proposed by the Bush Administration in 2003, FutureGen was a large-scale, multibillion dollar initiative of the DOE to build and operate the world's first coal-fueled, zero emissions power plant.¹ The mega-plant was intended to produce hydrogen and electricity from coal, while capturing and storing carbon dioxide (CO₂) emissions underground, a process known as carbon capture and sequestration (CCS).²

Although potential sites for the plant were considered in Texas, Ohio, and West Virginia, the DOE ultimately chose Mattoon, Illinois as its final location. The choice was made in part because of the passage of an \$80 million tax incentive package by the Illinois State Legislature in July 2007, which was designed to draw the multibillion dollar project to Illinois.³ The plant, which had an original cost estimate of \$1 billion, was to be funded by the Department of Energy and the private FutureGen Industrial Alliance, a group composed of eight members, including CONSOL Energy Inc., Peabody Energy, Rio Tinto, and Alpha Natural Resources.⁴ However, as market prices continued to escalate through 2007, the DOE withdrew its support in early 2008 and the project was cancelled.

FutureGen, Revised

Both the DOE and FutureGen Alliance ascribed FutureGen's cancellation to price inflation for materials such as stainless steel and concrete, as well as for labor and other components of plant construction.⁵ The original cost estimate of \$1 billion had increased to \$1.3 billion from

2003-2007,¹ before any physical construction of the plant had even begun.⁶ With inflation through 2017, the expected completion date of the project, FutureGen's total cost was now \$1.8 billion.⁷ These rising cost projections caused the DOE to release a restructured proposal in 2008,⁸ suggesting that the federal government pay for only the carbon capture portion of the facility.⁹

The Department of Energy's new plan was designed to support several smaller commercial clean coal plants that were already being pursued across the nation.¹⁰ However, pressure to continue the project in Mattoon¹¹ led to a June 2009 announcement by Energy Secretary Chu supporting the construction of a large-scale "clean coal" plant in Mattoon.¹²

A March 2009 Government Accountability Office (GAO) report suggests the decision to revive the large-scale FutureGen project may have been misguided.¹³ According to the report, a large-scale FutureGen program would not be cost-effective and the DOE should consider other options, including developing existing technology that is more quickly and cost-effectively implemented at existing coal plants.¹⁴ Moreover, according to the Environmental Protection Agency (EPA), carbon capture and sequestration technology may not be up and running until 2020. Even with government subsidies available, the cost and capacity of the technology continues to remain uncertain. Despite the GAO's report on investing in alternatives and continually increasing costs, the DOE decided to move forward with FutureGen.

FutureGen 2.0

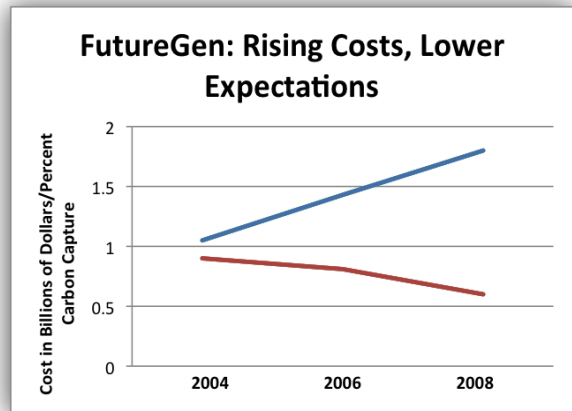
On August 5, 2010, the DOE announced that it would no longer finance the construction of a new plant in Mattoon, IL. Instead, it would award \$1 billion¹⁵ to retrofit a 64-year-old oil-burning plant in Meredosia, Illinois¹⁶ and also build a training center for the new development.¹⁷ The redesigned plan called for the use of "advanced oxy-combustion" technology and pumping the emissions consisting of pure carbon dioxide through a 150 mile underground pipeline back to Mattoon for storage. The underground pipeline would span over 400 acres of Coles County farmland.¹⁸

The project, now labeled "FutureGen 2.0," is expected to transport and store more than 1.3 million tons of carbon dioxide annually.¹⁹ The majority of the \$1 billion investment will be spent 150 miles west of Mattoon for the retrofit of the plant in Meredosia, IL. Overall, the total cost of the project remains uncertain, according to champion of the project Senator Dick Durbin (D-IL), but the storage facility and transmission network will cost \$1.2 billion.²⁰

The plant to be repowered belongs to Ameren Corporation, a St. Louis based company, and has not produced any power since 2009. Described as implementing "advanced oxy-combustion technology," the retrofitted plant is designed to be the first commercial scale production of its kind. Instead of using normal air, which is comprised of mainly nitrogen, a French energy company named Air Liquide will supply pure oxygen to use in the coal combustion process in

¹ Constant 2004 dollars, without accounting for inflation.

order to increase flame temperatures and create a more complete combustion. However, the large amount of energy required for oxy-combustion has always been a significant drawback to the technology.²¹ It would require the use of up to 200 megawatts of energy, a large increase compared to the next largest oxy-combustion plan which uses only 10 megawatts.²²



Significant changes have also been made to the percentage of carbon emissions that FutureGen 2.0 is expected to capture. Originally, the Bush administration suggested that the plant would capture 90% of emissions (see graph). This number was lowered to 81% in 2008.²³ Today, the DOE expects FutureGen 2.0 to capture 80%²⁴ of emissions at completion, with the goal to increase carbon capture to 90% after three years.²⁵

FutureGen 2.0, Revised... Again

In August, 2010, Coles County officials rejected an offer to work with the DOE on its revised plan to pipe exhaust gasses to Mattoon for underground storage while retrofitting the existing Ameren plant in Meredosia. As a result, the DOE scrambled to solicit other Illinois communities for storage approval.²⁶ Citing revised changes to the project, Coles County officials said the “\$1.2 billion project does not provide for the highest and best use of a Mattoon site that top scientists, researchers, and engineers have determined to be the best location in the nation for a clean coal facility and on-site carbon capture and sequestration research.”²⁷ On February 28, 2011, after much debate, Morgan County was selected as the site for the carbon sequestration project.²⁸ The county beat out five other counties in the running.²⁹

On September 28, 2010, Ameren announced a \$553 million cooperative agreement with the DOE.³⁰ Together, with partners Babcock & Wilcox Co. and Air Liquide, Ameren will retrofit the Meredosia facility and build the newly directed Morgan County pipeline in three phases. The first two phases will cover structural design, engineering layout, and commercial viability of the project, while the third phase includes the pipeline construction and renovation of the Meredosia plant.

To finance the estimated \$1.4 billion project, \$1 billion is being provided by the Recovery Act of 2009, \$250 million is being provided by FutureGen Industrial Alliance, and \$150 million is being provided by Ameren and partners (Babcock & Wilcox and Air Liquide).³¹

The project entered its second phase on October 1, 2011 according to Ameren and is expected to be completed in 2015.^{32,33} Hurdles remain before construction can commence, but lawmakers in Illinois have already pushed legislation through to jumpstart construction of the pipeline. Illinois State Senate Bill 1821, which was signed into law on August 23rd, 2011, allows

for the construction and operation of the pipeline pending a certificate of approval from the Illinois Commerce Commission.³⁴

Furthermore, FutureGen has purchased “underground storage rights” from approximately two dozen residents in Morgan County, IL. Depending on the results of the DOE study, these residents would receive an estimated \$325,000 per year in royalties.³⁵

Recent News

Once again, a major setback has struck the FutureGen project. On October 3rd, 2011, the Chicago Tribune revealed that Ameren is pulling out of the FutureGen project and shutting down two of their power plants, including the one in Meredosia, IL.^{36,37} In the same statement, Ameren stated it believed it would not affect the viability of the FutureGen 2.0 project, though no specific company has showed signs of taking on the project. Currently, Ameren and FutureGen Alliance are in talks to transfer the \$730 million allotted for the retrofit of the Meredosia power plant.³⁸

On October 13th, 2011, FutureGen Alliance announced the retrofit of the oxy-combustion coal fueled power plant is on schedule and test drilling has commenced in Morgan County, IL. Drillers have completed approximately 375 ft of the total 5,000 ft test well.³⁹ The CEO of FutureGen Alliance, Kenneth Humphrey, said the test well will dictate whether the geology of the expanded 1,000 acre area plot in Morgan County will be stable enough to store the expected total of 39 million metric tons of carbon to be captured.⁴⁰ Data from this test well will be shared with the DOE who will conduct an independent study of their own. Results from this environmental study are expected to be announced in fall of 2012.

Meanwhile, concerns over the vicinity of the sequestration site to residential homes and local farmland, as well as general unknowns about the reliability of the technology, have been expressed by many local landowners.^{41, 42} “We don’t want to be part of an experiment,” says Mark Bergschneider, a Morgan County resident with land near a possible sequestration site. Furthermore, unknown changes in property values and compensation—if contamination occurred—are major concerns. This local opposition has already driven Coles County, the original sequestration site, to refuse development plans in their county.⁴³

Concerns for Taxpayers

The total expected cost of FutureGen has varied greatly over the past eight years while the realities of clean coal technology continue to lower expectations for the final project. The cost of FutureGen is now expected to top \$1.65 billion by project completion and total costs behind the entire project remain unknown.⁴⁴ The \$1.65 billion includes over \$1 billion for the retrofit of the Meredosia plant (pending purchase from Ameren) and \$550 million to construct the pipeline.⁴⁵

Over the last three decades, clean coal initiatives have largely proven to be unsuccessful and carbon capture and sequestration technologies remain uncertain and costly.^{46,47} FutureGen is no exception, with unknown total project costs and unproven technical reliability.⁴⁸

Despite revising and restructuring, the federal government is still being asked to shoulder the majority of FutureGen's costs with \$1 billion coming out of the federal stimulus.⁴⁹ Pursuing a large-scale, high-risk, multibillion dollar initiative that requires significant government subsidies is not a fiscally sound investment for the taxpayer. If FutureGen is to move forward, the well-established financial partners involved with FutureGen should bear the majority of project costs, not American taxpayers.

November 2011

For more information, please visit www.taxpayer.net
Or contact Autumn Hanna at (202) 546-8500 or autumn@taxpayer.net

¹ U.S. Department of Energy-Fossil Fuel Techline, "FutureGen Project Launched," December 5, 2005.

http://www.fossil.energy.gov/news/techlines/2005/tl_futuregen_signing.html

² U.S. Department of Energy, "FutureGen Factsheet," November, 2011.

http://fossil.energy.gov/programs/powersystems/futuregen/futuregen_revised_0108.pdf

³ *St. Louis Post-Dispatch*, "FutureGen Timeline," January 2010. http://www.stltoday.com/business/futuregen-timeline/article_46d53baa-2a17-5c0b-9768-3cff20876ba0.html

⁴ FutureGen Alliance, "Alliance Members," November, 2011. <http://www.futuregenalliance.org/the-alliance/members/>

⁵ Matthew L Wald, "High Costs Cited as U.S. Shuts Down Coal Projects," *New York Times*, January 31, 2008.

<http://www.nytimes.com/2008/01/31/business/31coal.html>

⁶ Government Accountability Office, "DOE's Decision to Restructure FutureGen Should be Based on a Comprehensive Analysis of Costs, Benefits and Risks," February 2009. <http://www.gao.gov/new.items/d09248.pdf>

⁷ Government Accountability Office, "DOE's Decision to Restructure FutureGen Should be Based on a Comprehensive Analysis of Costs, Benefits and Risks," February 2009. <http://www.gao.gov/new.items/d09248.pdf>

⁸ U.S. Department of Energy, "DOE Seeks to Invest nearly \$1.3 Billion to Commercialize CCS Technology," June 24, 2008.

http://fossil.energy.gov/news/techlines/2008/08023-FutureGen_FOA_Released.html

⁹ U.S. Department of Energy, "DOE Announces Restructured FutureGen Approach to Demonstrate Carbon Capture and Storage Technology at Multiple Clean Coal Plants," Press release January 30, 2009. http://www.fossil.energy.gov/news/techlines/2008/08003-DOE_Announces_Restructured_FutureG.html

¹⁰ U.S. Department of Energy, "Financial Assistance Funding Opportunity Announcement, 'Restructured FutureGen'," June 24, 2008.

http://fossil.energy.gov/programs/powersystems/futuregen/Restructured_FutureGen_Final_FOA__6-24-0.pdf

¹¹ Mark Hemingway, "What's in the Stimulus: An Earmark as big as the Ritz," *National Review Online*, February 5, 2009.

<http://www.nationalreview.com/corner/176859/whats-stimulus-earmark-big-ritz/mark-hemingway>

¹² U.S. Department of Energy, "Secretary Chu Announces Agreement on FutureGen Project in Mattoon, IL," June 12, 2009.

http://www.fe.doe.gov/news/techlines/2009/09037-DOE_Announces_FutureGen_Agreement.html

¹³ Government Accountability Office, "DOE's Decision to Restructure FutureGen Should be Based on a Comprehensive Analysis of Costs, Benefits and Risks," February 2009. <http://www.gao.gov/new.items/d09248.pdf>

¹⁴ Government Accountability Office, "DOE Should Prepare a Comprehensive Analysis of the Relative Costs, Benefits, and Risks of a Range of Options for FutureGen," Testimony before the Subcommittee on Energy, Environment, Committee on Science and Technology, House of Representatives. March 11, 2009. <http://www.gao.gov/new.items/d09465t.pdf>

See also, Government Accountability Office, "DOE's Decision to Restructure FutureGen Should be Based on a Comprehensive Analysis of Costs, Benefits and Risks," February 2009. <http://www.gao.gov/new.items/d09248.pdf>

¹⁵ Siobhan Hughes and Stephen Power, "Clean-Coal Project Advances with \$1 billion in Funding," *Wall Street Journal*, August 6, 2010.

http://online.wsj.com/article/SB10001424052748704657504575411784292302468.html?mod=googlenews_wsj#articleTabs%3Darticle

¹⁶ Tom Kacich, "Change in Mattoon's FutureGen role has area politicians steamed," *News-Gazette*, August 6, 2010. <http://www.news-gazette.com/news/environment/2010-08-06/change-mattoons-futuregen-role-has-area-politicians-steamed.html>

¹⁷ *Ibid.*

¹⁸ *Ibid.*

¹⁹ Matthew L. Wald, "US Changes Plan on Capturing Coal Emissions," *New York Times*, August 5, 2010.

<http://www.nytimes.com/2010/08/06/business/energy-environment/06coal.html?src=busln>

-
- ²⁰ Tom Kacich, "Change in Mattoon's FutureGen role has area politicians steamed," *News-Gazette*, August 6, 2010. <http://www.news-gazette.com/news/environment/2010-08-06/change-mattoons-futuregen-role-has-area-politicians-steamed.html>
- ²¹ *Power Plant CSS*, "Oxy Fuel Combustion Method," November 18, 2011. <http://www.powerplantccs.com/ccs/cap/con/of/of.html>
- ²² *Ibid.*
- ²³ Government Accountability Office, "DOE's Decision to Restructure FutureGen Should be Based on a Comprehensive Analysis of Costs, Benefits and Risks," February 2009. <http://www.gao.gov/new.items/d09248.pdf>
- ²⁴ Gary Stern, "FutureGen 2.0," *EnergyBiz*, November 18, 2011. <http://www.energybiz.com/magazine/article/196199/futuregen-20>
- ²⁵ U.S. Department of Energy, "Record of Decision, FutureGen Project," July 14, 2009. http://www.fossil.energy.gov/programs/powersystems/futuregen/futuregen_rod_071409.pdf
- ²⁶ Diana Barr, "ILL. Town Rejects Revised FutureGen Plan," *St. Louis Business Journal*, August 11, 2010. <http://stlouis.bizjournals.com/stlouis/stories/2010/08/09/daily46.html>
- ²⁷ Tom Kacich, "Coles County Says 'no' to FutureGen," *The News Gazette*, August 11, 2010. <http://www.news-gazette.com/news/environment/2010-08-11/coles-county-says-no-futuregen.html>
- ²⁸ FutureGen Alliance, "FutureGen Alliance Selects Morgan County, Ill. as the site for the FutureGen 2.0 carbon storage facility" February 28, 2011. http://www.futuregenalliance.org/pdf/pr_02_28_11.pdf
- ²⁹ Diana S.W. Lee, "Futuregen 'clean coal' project still has hurdles to clear," *Illinois Statehouse News*, April 6, 2011. <http://www.mcdonoughvoice.com/news/x1700899049/FutureGen-clean-coal-project-still-has-hurdles-to-clear>
- ³⁰ Kelsey Volkman, "Ameren: FutureGen 2.0 to bring 900 Jobs to Illinois," *St. Louis Business Journal*, September 28, 2010. <http://stlouis.bizjournals.com/stlouis/stories/2010/09/27/daily22.html>
- ³¹ Gary Stern, "FutureGen 2.0," *EnergyBiz*, November 18, 2011. <http://www.energybiz.com/magazine/article/196199/futuregen-20>
- ³² Ameren Corporation, "Project Timeline," <http://www.ameren.com/Environment/Pages/FutureGenTimeline.aspx>
- ³³ Tom Kacich, "Ameren, feds sign agreement on FutureGen," *The News-Gazette*, September 29, 2010. <http://www.news-gazette.com/news/environment/2010-09-29/ameren-feds-sign-agreement-futuregen.html>
- ³⁴ Bill Status of SB1821, "Carbon Dioxide Transportation and Sequestration Act," <http://www.ilga.gov/legislation/BillStatus.asp?DocTypeID=SB&DocNum=1821&GAID=11&SessionID=84&LegID=57876>
- ³⁵ Tim Landis, "FutureGen Project Progressing," *State Journal Register*, October 13, 2011. <http://www.sj-r.com/top-stories/x940613273/Landowners-worried-as-FutureGen-test-drilling-under-way>
- ³⁶ Julie Wernau, "Ameren to shuttle two coal plants in Illinois," *Chicago Tribune*, October 4, 2011. http://articles.chicagotribune.com/2011-10-04/business/chi-ameren-to-shutter-2-coal-plants-in-illinois-20111004_1_futuregen-ameren-corp-coal-plants
- ³⁷ *Daily Herald*, "Ameren in discussions to sell Illinois power plant to FutureGen," November 29, 2011. <http://www.dailyherald.com/article/20111129/business/111129862/>
- ³⁸ Julie Johnsson and Mark Chadiak, "Ameren said to be in talks to hand over carbon-capture project," *Bloomberg Businessweek*, November 16, 2011. <http://www.businessweek.com/news/2011-11-16/ameren-said-to-be-in-talks-to-hand-over-carbon-capture-project.html>
- ³⁹ Tim Landis, "Landowners worry as FutureGen test drillers underway," *State Journal Register*, October 14, 2011. <http://www.sj-r.com/top-stories/x940613273/Landowners-worried-as-FutureGen-test-drilling-under-way>
- ⁴⁰ *Ibid.*
- ⁴¹ Chris Detro, "Landowner opposition scuttles Morgan County FutureGen site," *State Journal Register*, January 5, 2011. <http://www.sj-r.com/top-stories/x1458591834/Landowner-opposition-scuttles-Morgan-County-FutureGen-site>
- ⁴² Tim Landis, "Morgan County still in running as FutureGen storage site," *State Journal Register*, February 9, 2011. <http://www.sj-r.com/top-stories/x1179516585/Morgan-County-still-in-running-as-FutureGen-carbon-storage-site>
- ⁴³ Chris Detro, "Landowner opposition scuttles Morgan County FutureGen site," *State Journal Register*, January 5, 2011. <http://www.sj-r.com/top-stories/x1458591834/Landowner-opposition-scuttles-Morgan-County-FutureGen-site>
- ⁴⁴ Tom Kacich, "Change in Mattoon's FutureGen role has area politicians steamed," *The News-Gazette*, August 6, 2010. <http://www.news-gazette.com/news/environment/2010-08-06/change-mattoons-futuregen-role-has-area-politicians-steamed.html>
- ⁴⁵ FutureGen Alliance, "FutureGen Alliance Negotiating Option to Purchase Part of Meredosia Energy Center for Advanced Coal Power Project," November 28, 2011. <http://www.futuregenalliance.org/wp-content/uploads/2011/11/FG-option-to-purchase-part-of-Meredosia-plant-112811.pdf>
- ⁴⁶ *The Economist*, "Carbon Capture and Storage Trouble in Store," March 5, 2009. http://www.economist.com/displaystory.cfm?STORY_ID=13226661
- ⁴⁷ Government Accountability Office, "DOE's Decision to Restructure FutureGen Should be Based on a Comprehensive Analysis of Costs, Benefits and Risks," February 2009. <http://www.gao.gov/new.items/d09248.pdf>
- ⁴⁸ U.S. Department of Energy, "Record of Decision, FutureGen Project," July 14, 2009. http://www.fossil.energy.gov/programs/powersystems/futuregen/futuregen_rod_071409.pdf
- ⁴⁹ Tom Kacich, "Ameren, feds sign agreement on FutureGen," *The News-Gazette*, September 29, 2010. <http://www.news-gazette.com/news/environment/2010-09-29/ameren-feds-sign-agreement-futuregen.html>