

Carbon Capture and Storage

One way to reduce carbon dioxide emissions from coal-fired electric generation plants

By Jennifer Taylor

Supplying America's growing electricity requirements will continue to include the use of coal as a fuel source, mainly because coal is plentiful and it has reliably powered the nation's "base load" generation plants. However, the environmental concern about "greenhouse gas" carbon dioxide emissions from coal-fired plants has guided electric utilities, including cooperatives, towards the development of technology that potentially can negate the effects of these emissions.

A 2007 study released by the Electric Power Research Institute (EPRI), a non-profit utility-sponsored organization whose members include electric co-ops, finds that U.S. electric utilities can help the nation cut carbon dioxide emissions to 1990 levels by 2030 by taking aggressive steps in seven principal areas. The most significant reductions, EPRI notes, will come from Carbon Capture and Storage (CCS) technologies.

CCS involves isolating carbon dioxide from other power plant emissions. The collected gas is then compressed, pumped down into spent oil and natural gas wells, saline reservoirs, or inaccessible coal seams, and in theory entombed forever. According to a recent Massachusetts Institute of Technology report, Carbon Capture and Storage is "the critical enabling technology to reduce carbon dioxide emissions significantly."

Implementing the technology is not cheap. EPRI points out that building advanced, more efficient coal-fired plants with carbon capture and storage technology will raise capital construction costs by around 40 percent, while the cost for retrofitting existing plants, if possible at all, could run 60 to 80 percent of a new facility.

Storing carbon dioxide also remains problematic. "Storing carbon dioxide in a variety of geological formations is something we do not understand," says Clark Gellings, vice president of technology at EPRI. "We have to do more research to determine whether it's even feasible and then address all of the other issues—the policy and regulatory concerns—that go along with it." North Carolina may or may not be an appropriate place geologically to use this technology; however, the state's co-ops believe researching the option is important for America's future power supply.

To date, no coal-fired power plants are equipped with

CCS technology. And just three plants worldwide remove carbon dioxide from natural gas production and store it underground. Out of these three, the Great Plains Synfuels Plant, operated by Basin Electric

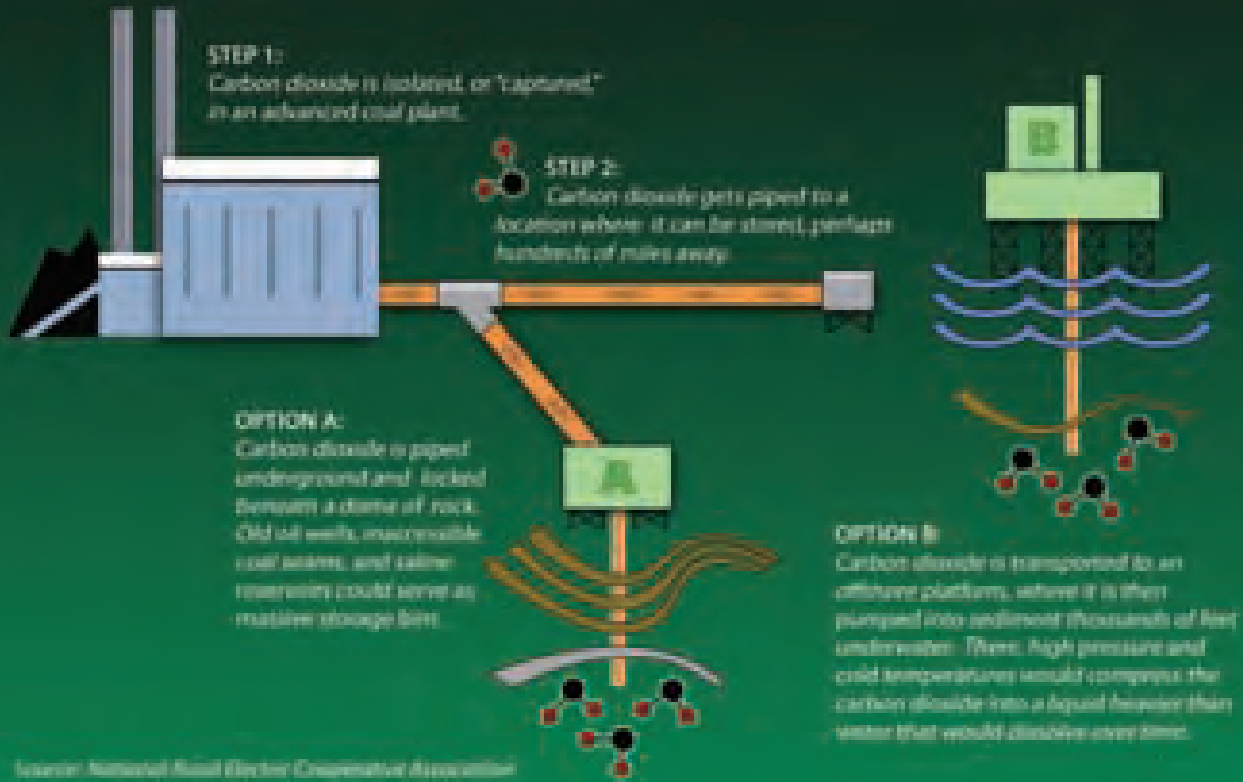
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Power Cooperative—a Bismarck, N.D.-based generation and transmission (G&T) co-op, supplying wholesale power to 126 member co-ops in nine states—starts the process with coal, which is turned into a synthetic natural gas. Every day, the Great Plains Synfuels Plant sends 8,700 tons of captured, compressed carbon dioxide via a 205-mile-long pipeline buried four feet underground to depleted oil fields in Canada where the gas helps bring more oil to the surface. Over the years, more than 10 million tons of carbon dioxide have been captured and shipped in this manner.

Arizona Electric Power Cooperative, a G&T based in Benson, Ariz., that supplies wholesale power to six distribution co-ops in the Southwest, will participate with three other Grand Canyon State utilities in a carbon dioxide storage pilot project, one of seven U.S. Department

Capturing and Storing Carbon

In a process called carbon capture and sequestration, carbon dioxide can be separated from coal power plant emissions and stored underground. When the technology becomes available on a commercial scale, the result could be huge reductions in the amount of carbon dioxide that is released into the atmosphere.




of Energy (DOE) large-scale carbon storage initiatives.

While North Carolina's electric cooperatives do not own coal-fired facilities, the cooperatives support an increase for funding research and development of clean coal technology as a means toward ensuring the future power needs of the state's rapidly growing population. Additionally, some of the power that is provided to North Carolina electric cooperatives from other utilities is generated from coal-fueled generation and it is likely to continue in the future.

The Cooperative Research Network (CRN), an arm of Arlington, Va.-based National Rural Electric Cooperative Association (NRECA), which represents the interests of electric co-ops nationally, has joined a DOE sequestration project near Gaylord, Mich., where 10,000 tons of carbon dioxide derived from a natural gas processing plant will be

captured and stored in underground saline formations. The Michigan site features most elements of a complete sequestration system, including a compression plant, an 8-mile-long supercritical pipeline, and injection and monitoring wells.

If electric utilities are to implement CCS on a commercial scale by

2020, major projects with coal-fired plants need to begin soon. This year, co-ops nationwide have been calling on Congress to invest in new and emerging technologies required for reducing carbon dioxide emissions. 

Jennifer Taylor writes on consumer and cooperative affairs for the National Rural Electric Cooperative Association.

Ask the Question

With growing demand for electricity and pressure mounting in Congress to address climate change, consumers can get involved by asking elected officials to support technological development. Leaders of your electric cooperative believe that to develop the technology needed to keep the lights on and rates affordable, the federal government must exercise committed leadership and provide funding.

Consumers are urged to ask their Congressional representatives the tough question:

"What are you doing to fully fund the research and development required to make emissions-free electric plants an affordable reality?"

To direct the question to your representatives, go to the Web site for "Our Energy, Our Future: A Dialogue With America." Visit www.ourenergy.coop to contact your elected officials and make your voice heard.