

The Department of Energy's FutureGen Program

Testimony submitted by The Coal Utilization Research Council House Committee on Science and Technology Subcommittee on Energy and Environment

**April 15, 2008 at 10:00 am
2318 Rayburn House Office Building**

Introduction:

This written statement is submitted in conjunction with testimony that will be provided to the Subcommittee on Energy and Environment of the House of Representatives Committee on Science and Technology by the Coal Utilization Research Council (CURC).

The Coal Utilization Research Council is a not-for-profit organization comprised of major coal producers, investor owned and well as public utilities that use coal as a fuel to generate electricity, entities that use coal to produce other useful chemicals and fuels, the major U.S. manufacturers of boilers, gasifiers and oxygen production machinery and equipment, several states and leading universities involved in coal research and development, as well as the Edison Electric Institute (EEI), the National Rural Electric Cooperative Association (NRECA), the America Public Power Association (APPA), the National Mining Association, the United Mine Workers of America, EPRI and others. A complete list of CURC's membership is attached for the Committee's information.

CURC is organized for the specific purpose of promoting the research, development, demonstration and deployment of technology that will enable the long term use of our nation's abundant coal supplies in a cost-effective and environmentally acceptable manner. As the Congress prepares to debate the enactment of greenhouse gas legislation and the regulation of GHG emissions, including principally carbon dioxide CO₂, it is vitally important that technology play a key role. Indeed, with the use of technology the capture and use or long-term storage of carbon dioxide is possible. Equally true, unless carbon capture and storage (CCS) technology is successfully demonstrated and deployed on coal and other CO₂ emitting facilities it is unlikely we will succeed in containing our contribution to the warming of the globe.

The Subcommittee has asked that we address three questions with regard to the Department of Energy's decision to terminate the current FutureGen project and to restructure the program. Those questions are:

- (1) What is the value and role of FutureGen towards the development and deployment of carbon capture and storage technologies?
- (2) What is the value and role of the restructured program as a compliment to other federal R&D efforts related to CCS technology development?
- (3) How will the restructured program compliment the on-going Clean Coal Power Initiative (CCPI) and the regional Carbon Sequestration Partnership Program?

Summary of the CURC Written Statement:

- (1) As a totally integrated, ground up commercial-scale demonstration project of IGCC with fully integrated carbon capture and storage this project should not be terminated. The U.S. will lose valuable time and experience (as much as three to five years) in the development and deployment of CCS technology and application if the FutureGen project is abandoned.
- (2) The DOE initiative to encourage IGCC projects to install and operate CCS onto planned IGCC projects would be beneficial and CURC supports such a program but not at the expense of the FutureGen project. Moreover, the DOE proposal needs to be funded at a realistic level (the \$1.3 billion to be committed over a 14 year is totally inadequate) and such a program cannot be limited to IGCC projects only.
- (3) The CCPI program is a separate demonstration program intended to support new technology that is not currently available in the marketplace. The proposed restructured FutureGen program would be focused, presumably, upon a different set of commercially-available technologies to capture and sequester CO₂. However, IGCC and other coal combustion projects that are equipped with CO₂ capture technology could become an important source of CO₂ for the on-going regional Carbon Sequestration Partnerships.

Value and Role of FutureGen to Develop and Deploy CCS:

FutureGen was initiated by the Administration in 2003 and this first-of-a-kind demonstration project has been described as America's showcase for cutting-edge technologies to advance the nation's climate change initiatives predicated upon the development and use of technology.

FutureGen is unique because the entire project has been conceived and is being executed as an integrated whole – from advanced coal gasification to electricity production to capture and long term storage of the CO₂. A primary value of FutureGen is this integration. Of equal importance is the demonstration of technology capable of capturing up to ninety percent of the CO₂ emitted through the coal conversion process and then the compression, transport and long-term storage of at least one million tons annually of that captured CO₂ into a deep saline formation. Tomorrow's coal utilization projects will learn from this project – the planning, design, construction and operation of an integrated system, including the IGCC powerplant, the integrated CO₂ capture system, and the identification, characterization, field preparation attendant to the CO₂ storage site and then the location and drilling of wells, followed by the injection, monitoring and verification processes for storing CO₂. This has never been done before; FutureGen would be the world's first.

And finally, this project represents the association of industries, both domestic and international, as well as the commitment of the U.S. and foreign governments, to cooperatively plan and develop this project. Not only has the FutureGen Industrial Alliance committed up to \$400 million the Alliance also incorporated into the project the DOE's goal that FutureGen serve as a "living laboratory" to lead in the advancement of technology by becoming a testing platform for future advanced coal power plant technology deployment. With international participation, it would appear that FutureGen could also serve as a principal means by which countries, like China, would be able to view first-hand how to construct, operate and use technology to capture and store CO₂ from coal use.

Finally, if DOE is allowed to terminate this partnership it would appear that we could lose as much as five years. How? FutureGen has actively developed this project over the last five

years; the planning of a fully integrated IGCC with CO₂ capture will be lost, not to mention the work already done on CO₂ site evaluations storage and selection. We most certainly will also lose the benefits of working together. The importance of this industry alliance, its commitment to the project and its reliance upon the government as a partner should not be underestimated. Withdrawing support at this stage in the project's development sends a mixed message to the market place and to Congress regarding the DOE's commitment to technology development and to the government's reliability as a partner, especially for large-scale projects that require multi-year commitments.

Assessment of Restructured Program:

The CURC has submitted comments to the DOE in response to the Department's Request for Information (RFI) soliciting industry interest in the proposed terms and conditions of a restructured FutureGen program. That submittal is attached to this testimony and it is requested that CURC's information be made a part of the hearing record. The CURC opposes the Department's plan to terminate support of the currently structured FutureGen project for the specific reasons detailed above. However, we do support the initiation of a separate program whereby the government would assist industry by providing financial support to cover the incremental costs of the installation and operation of CCS. The following is a summary of the RFI comments submitted by the CURC:

- (1) The amount of funding, \$1.3 billion (in as-spent dollars), over a 14 year period (the scope and duration of the proposed FutureGen restructured program) does not appear to be adequate to support "multiple" CCS projects;
- (2) The program should not be limited to the installation and operation of CCS on IGCC projects; rather, a separate but parallel program for combustion-based projects, including both post combustion capture and oxycombustion projects of, at least comparable size, should be established;
- (3) The requirement to capture 90% of CO₂ and store at least one million tons per year of CO₂ into deep saline structures is overly restrictive; industry needs to obtain baseline data, demonstrated reliability and widespread confidence in CCS systems and these goals can be achieved more cost-effectively by requiring less aggressive percentages of capture;¹ and
- (4) The lack of a regulatory structure to address the transport and storage (during the life of the project as well as longer term) of captured CO₂ along with a resolution to long term liability issues for selected power generation projects must be addressed, otherwise industry involvement is not likely to occur.

CURC has proposed the adoption of a near-term CO₂ reduction program that contemplates, in part, supporting the same goal as the Secretary now proposes through the proposed alternative FutureGen program. Encouraging the early application of CCS technology to commercial-scale

¹ The 90% capture requirement of total CO₂ emissions is more appropriately applied to the FutureGen project where technology demonstration is a principal goal rather than the type of commercial-scale projects contemplated by this proposed program. Furthermore, even after detailed characterization of a sequestration site, there is no certainty that it will be suitable for long term sequestration. Certainty only comes after injection of significant amounts of CO₂ and thus confirmation of predictions about the storage site. Projects need design flexibility to recover non-CCS operation if initial sequestration fails; thus, it is strongly encouraged that the program specifically recognize the possibility that long term sequestration may not be possible and specific allowance should be made for this contingency by insuring that a selected project sponsor will not be penalized and forfeit the DOE's financial support if long term storage proves unsuccessful.

power generation facilities, both gasification and advanced combustion-based, is a critical component of CURC's near-term program. But, the CURC program appears to be more realistic as it relates to costs of CO₂ capture equipment and the total amount of support required of government to encourage power plant owners to install and then capture CO₂ and store up to one million tons annually into deep saline formations. The CURC near-term program is described, in detail, in a briefing paper that the CURC issued last November, 2007. A copy of that paper can be obtained at our website at: www.coal.org.

The near-term program details a multi-year industry effort focused upon the adoption of technologies that are currently available in the marketplace. The DOE proposed restructured FutureGen program appears to be intended towards the same goal. The CURC program would support CO₂ reductions that could be accomplished now by the application of technologies currently available. We believe that adoption of such a near term program might result in the prevention or capture of at least 140 million tons of CO₂ annually. The estimated cost of the CURC near term program is \$38 billion in industry and government cost sharing to achieve these early results between now and 2025.

The amount of funding proposed for a restructured DOE FutureGen program is \$1.3 billion, over a 14 year period (the scope and duration of the proposed DOE program). The CURC first adopter proposal which practically mirrors the organizational structure and the goals of the DOE restructured FutureGen program would support approximately 9000 megawatts which we believe is a minimum number of units (10 to 15 units) required to launch early experience with CO₂ capture and long term storage from power plants. This portion (the first adopter program) of CURC's proposal would cost approximately \$9.0 billion between now and 2025. We therefore, seriously question the adequacy of the \$1.3 billion over the proposed 14 year period to support "multiple" projects as projected by the DOE.

Potential to Complement other DOE programs, including the Department's R&D and CCPI and Regional Partnership Programs:

CURC wishes to emphasize in as strong a manner as possible the importance of DOE's coal R&D program as a critical component to our nation's greenhouse gas mitigation efforts. To achieve the challenging CO₂ emission reduction schedules that have been discussed in Congress, much more significant levels of funding for coal-related technology development, demonstration and deployment will be required, and a multi-year commitment from the federal government is needed immediately. Long term goals need to be agreed upon by industry and government; advance appropriations to support the RD&D programs need to be made to insure that funding is available; and then government must be a steady and reliable partner. The challenge of global climate change and man's contribution to that change will require enormous financial, technical and political commitments and the current DOE budget provides a very inadequate response to the technology challenges involved. CURC and EPRI have jointly developed a long term RD&D program that specifically addresses the need for targeted programs. This technology Roadmap includes the type of technology that must be supported to achieve specific cost, efficiency and emission reduction goals as well as estimated costs. The costs set forth in the Roadmap, in light of the enormous increase in the costs of basic commodities like steel and copper currently are being revised. A copy of the CURC-EPRI coal technology Roadmap can be obtained by visiting the CURC website at www.coal.org.

FutureGen was intended to be the Department's premier demonstration project that would serve as a continuing "test bed" for moving technology from R&D to demonstration. By terminating the current FutureGen project this function may also be lost. More importantly, the important elements of design integration, 90%+ capture of CO₂, and long term storage of CO₂ is likely to be lost in a restructured program where any industry participants must be focused upon the operation of a commercial, power production facility not the testing of equipment or the capturing of 90% of the CO₂ at this early stage in the development of CCS technology.

Where the FutureGen project is intended to complement the DOE's R&D program by serving as a demonstration project (the last element of RD&D) the proposed restructured program has a different set of goals and objectives. These goals and objectives, in our opinion are exceedingly valuable, as well. Government support of those who will undertake early CCS projects (beyond FutureGen) is encouraged.

Finally, and very important, CURC has recommended to DOE and to the Congress that CCS projects utilizing combustion technology (i.e. flue gas scrubbing or oxygen-fired combustion technology) should be made specifically eligible for the restructured FutureGen program if it is ultimately adopted. We have specifically recommended that there be a separate, parallel program established for CCS projects utilizing combustion technology. Our reason for suggesting a parallel but separate program is two fold: first, the requirements to qualify a CCS technology will be entirely different for pre-combustion and post-combustion CCS systems and, second, rapid implementation of the program is essential to insure that CCS projects precede any enactment and implementation of legislation to regulate CO₂ if Congress decides to take such action. That rapid implementation can be accomplished if DOE does not attempt to write one set of qualification criteria for technologies that are very different.

It is not clear how the goals and objectives of the proposed restructured FutureGen program would complement the on-going Clean Coal Power Initiative (CCPI). That program, which has yet to be continued by the DOE (i.e. the Department announced its intent to release a third solicitation last December but has yet to do so), is focused upon the demonstration of new technology that is not widely used in the marketplace.

Finally, the DOE has specified that projects selected through a restructured program must be able to capture at least 90% of the CO₂ from the unit and store at least one million tons of CO₂ annually. To that end conceivably these power projects could be used as the source for CO₂ for that needed by the regional partnerships to continue large scale CO₂ injection and testing in saline aquifers.

CONCLUSIONS:

The CURC appreciates this opportunity to provide these comments to the Committee on Science and Technology and we will seek to answer any questions that the Committee and its Members have regarding this very important subject matter.