

THE FY 2009 FOSSIL ENERGY RESEARCH AND DEVELOPMENT BUDGET

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To the Committee on Appropriations, Subcommittee on Energy and Water Development
U.S. House of Representatives
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CURC submits this testimony in support of increasing the DOE's fossil energy budget by the following amount: \$29 million for the Coal R&D program (for a total of \$411.7 million) for specific R&D activities as noted below; and an additional \$200 million for the CCPI program (for a total of \$285 million). CURC supports the Administration's request to fund FutureGen at \$156 million, but does not support the DOE proposal to restructure the FutureGen program. Rather, CURC recommends that the Committee consider providing multi-year funding through an additional \$1 billion advance appropriation for a new, near-term program to support installation of currently available or emerging carbon capture and storage (CCS) technology on power generation or industrial facilities using coal.

Introduction

Coal will continue to play a pivotal role in meeting U.S. energy needs. Its abundance and use in the United States helps to insure our national energy security and economic vitality. With the advent of a greenhouse gas regulatory program in this country, it is vitally important that affordable and reliable carbon capture and storage (CCS) technologies be available to minimize the economic impacts upon the American consumer while continuing to allow the nation to reap the economic and energy security benefits associated with using our most abundant domestic fossil fuel resource. Technology also will play a crucial role worldwide as the demand for energy from coal grows rapidly.

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 that industry can rely upon. That means Congress should again consider funding programs for multiple years through advance appropriations. Our membership has defined such a multi-year program and the Congress is urged to adopt such a strategy.

For CCS to be technically and economically capable of contributing to longer-term climate change solutions, initial commercial deployment of currently available technology is needed now. In addition – and most important with respect to this Subcommittee's jurisdiction – a well-funded and focused research, development and demonstration program directed at developing the next generation of CCS technologies is needed.

CURC Near- and Long-Term Program

CURC has developed a two-part program. The first program is focused upon near-term technology applications. This program identifies technologies available now, i.e. technologies that do not require additional development work, but need to have proven operational experience

to be accepted in the marketplace. This near-term effort is needed to accelerate progress in the development of commercially deployable CCS technologies. It will provide “learn-by-doing” knowledge regarding the integration of carbon capture systems with power plants, as well as much needed experience with underground storage of large quantities of CO₂. The CURC near-term program identifies a suite of incentives designed to improve power plant efficiency, to encourage the construction of advanced coal based power plants, and to support early technology deployment projects to capture and store (or use) CO₂. While this program calls for the use of federal tax incentives to fully energize American industry to deploy the first stages of CCS technology, the Subcommittee is urged to examine the CURC near-term program and to support initial funding not by re-directing FutureGen funding, but by appropriating additional funds to initiate this near-term program.

The second program, developed with the Electric Power Research Institute (EPRI) in consultation with the Department of Energy (the CURC-EPRI Technology Roadmap) defines a research, development and demonstration program that focuses upon the rapid development of cost-effective CCS technologies. The Roadmap identifies a set of technology options for the electric power sector that once successfully developed, will insure low cost electricity to the American consumer while capturing and permanently storing most of the CO₂ emissions from coal use (details about the CURC-EPRI Roadmap can be found on the CURC website at www.coal.org). The CURC-EPRI roadmap defines the steps necessary to develop much more efficient power plant platforms and affordable, safe, reliable CO₂ capture and storage systems. The goal of the roadmap is to have, by 2025, new combustion and gasification based power plants operating with CCS with an efficiency between 39% to 46% at a cost equal to or lower than alternative sources of electric power. Our analysis suggests that the combined Federal and industry investment necessary to achieve these goals is approximately \$17.0 billion between now and 2025. This amount reflects both the federal and industry investment (traditionally, the maximum Federal cost-share is 80% for R&D projects and 50% for demonstration projects).

Recommendations

Using the CURC-EPRI roadmap as a tool to guide our nation’s coal research and development (R&D) efforts, CURC has examined the President’s FY 2009 budget request for coal and submits the following recommendations which are keyed to the roadmap.

1. Clean Coal Power Initiative (CCPI). The \$85 million proposed for CCPI is not adequate to support pre-commercial and commercial-scale demonstrations of integrated coal conversion, CO₂ capture, and sequestration technologies for combustion and gasification-based coal power systems. DOE issued a draft Funding Opportunity Announcement (FOA) for the CCPI program in late 2007 with the expectation of making awards in late 2008. However, a final solicitation has yet been released. DOE indicates only \$250 million may be available for awards and this total includes an FY 2009 appropriation for the CCPI program. This level of funding is not sufficient to mirror the magnitude of effort required to address greenhouse gas mitigation. There is a serious concern that the level of available funding will be inadequate to induce viable projects to come forward. CURC recommends that the Subcommittee increase funding for this vital program by an additional \$200 million above the amounts requested. This is the federal government’s key technology demonstration

program to address CO₂ capture and storage. Inadequate funding of this program is not acceptable.

In addition, the DOE should be directed to clearly include in its solicitation eligibility for large pilot and pre-commercial scale projects that will demonstrate carbon capture and storage as an integrated part of a combustion or gasification based electric generating unit. Several technologies are ready to be demonstrated at the large pilot and/or pre-commercial scale. These smaller scale demonstrations will be less costly than full scale systems, but will still provide critical engineering data and operational experience that can thereafter be scaled to commercial size. CURC recommends that DOE solicit applications for the demonstration of pre-commercial scale activities through the CCPI program.

Finally, and most important, we urge the Subcommittee to direct the DOE to immediately issue the CCPI solicitation. In its original draft solicitation the Department indicated that the request for proposals would be issued first in December of 2007, with awards to be made no later than April of 2008. We believe there are many potential projects awaiting the DOE solicitation. Further delays simply postpone the demonstration of technologies that industry might use in the nation's efforts to mitigate greenhouse gases.

2. FutureGen. The Administration seeks to use previously appropriated funds to support a proposed restructured FutureGen program in FY 2009. CURC supports the use of these funds for the original FutureGen project, and opposes the proposed action by DOE to terminate support of the current FutureGen project. FutureGen is intended to begin operation, including CCS operations, in 2012 and to serve as a living laboratory to test components for the gasification technologies being developed in the R&D program. We believe this project is a critical component not only in the further development of IGCC related technologies, but also to our understanding in the capture and permanent storage of CO₂. If DOE discontinues support of FutureGen, as much as five years of development of a fully integrated IGCC with carbon capture will be lost, not to mention the work already done on CO₂ storage and site characterization. These actions could greatly delay the commercialization of IGCC-CCS technology.
3. Initiate a New Industry-Government CCS Program. CURC supports the Department's initiative to undertake a separate solicitation in which the DOE would provide funding for the incremental costs associated with installing CCS on commercial-scale facilities. This program, however, cannot be limited to CCS applications on IGCC facilities only. CURC has recommended to the DOE, and we take this opportunity to recommend to the Congress as well, that combustion-based projects, including both advanced pulverized coal with carbon capture and oxycombustion technologies, be included in this new initiative. Because the manner in which combustion and gasification based systems will be able to capture CO₂ from a generating unit differ greatly, we have recommended establishing parallel programs to reflect differing qualification criteria. The purpose of this recommendation is only for ease of administration. The amount of funding proposed for this new program, \$1.3 billion (in as-spent dollars), over a 14 year period (the scope and duration of the proposed program) is not adequate to support "multiple" CCS deployment projects as DOE suggests. CURC has recommended the establishment of a 15 year and \$30 billion (a combined industry and

government investment) program to rapidly deploy CCS technology, as identified above as CURC's "near-term" program. Federal appropriations are needed to initiate this program and the Subcommittee is encouraged to make available advance appropriations of \$1.0 billion to begin this important government and industry program.

4. Coal R&D Program. The Department of Energy is to be commended for its proposed FY 2009 R&D budget, which is substantially higher than in years past. However, the entire DOE coal R&D program is now, in its entirety, a critical component of our nation's greenhouse gas mitigation program and as such requires a much higher level of funding and a multi-year commitment from the Federal government in order to come close to achieving the challenging schedules that have been put forward by policymakers for CO₂ reductions. We urge that such a commitment for an accelerated funding approach be consistent with the technology goals of the CURC-EPRI roadmap. CURC believes that additional R&D funding in the amount of \$29.0 million, without earmarks, is required for focused development activities in particular R&D programs to accomplish the goals of the CURC-EPRI roadmap, as follows:
 - a. Innovations for Existing Plants (IEP). CURC agrees with the DOE proposal to restructure the IEP program to support development of CCS technologies including post combustion technologies to capture CO₂ from existing sources. Such a program should focus on post-combustion capture, oxyfuel combustion, separation and compression of CO₂ from coal fired utility boilers, efficiency improvements, and concepts to reduce water consumption. In addition, CURC recommends funding be provided to support development of technologies to control criteria and hazardous air pollutants. The recent decision by the D.C. Circuit Court of Appeals created new uncertainties about the types of mercury and other hazardous air pollutant control technologies that will be required to meet an unknown future regulation. CURC recommends DOE continue development and testing of different control technologies across a span of different coal types to address the technological uncertainties created by the court decision.
 - b. Carbon Sequestration. CURC supports the President's proposed funding level of \$149 million in FY 2009 to support large scale injection tests of carbon dioxide in geologic formations. CURC recommends that this program also continue and expand its focus on the development of novel approaches for pre- and post-combustion CO₂ capture technology development.
 - c. Advanced Turbines. CURC recommends that this program, funded at \$28 million in the Request, be funded at \$55 million in FY 2009. The additional resources are needed to insure that the development of the hydrogen turbine remains on track, given it is an essential component of advanced high efficiency IGCC facilities that will capture CO₂. The funding increase should also support the development of oxyfuel combustion turbines. In both instances, improved turbines are critical to increase plant efficiencies and to reduce CO₂ emissions.
 - d. Advanced Research. CURC recommends an additional \$2.0 million (for a total \$26.6 million) for this program in FY 2009. This increase would be required to support DOE's ultra supercritical materials research activities. This program, which has been under funded for the past two years, is focused on developing high temperature materials that will enable boiler systems and turbines to become more efficient, resulting in the

reduction of CO₂ emissions from combustion processes in power plants. CURC also recommends that DOE redirect a portion of the funding for this program to support oxycoal combustion science, CO₂ compression science and low temperature materials research, which are critical to develop integrated CO₂ capture technology systems.

- e. IGCC. CURC supports the President's request to fund this program at \$69 million in FY 2009, but does not support the request to provide \$2.5 million from this program's budget to fund the Asia Pacific Partnership. CURC recommends that this money be utilized instead in areas where the current IGCC program is lacking focus, specifically on improving feed pressurization, instrumentation and controls, and solid filters.
 - f. Coal to Liquids. CURC supports the President's program for development of hydrogen from coal, but recommends additional work be conducted to improve and develop alternative syngas processes, develop catalysts and process technologies to reduce the amount of hydrogen needed and advance polygeneration systems.
5. University Based Research. CURC recommends that DOE initiate an academic or university based program to develop coal chemistry research programs to rebuild the declining workforce for coal technologies in the future and to support new university coal research projects for advanced research, gasification and combustion based technologies. University based programs to support students training to become engineers or craftsmen are needed for the development and construction and operation of advanced power systems in the future.

Conclusion

Recognizing the fact that we are operating within a severely constrained budget, and Congress is developing legislation that will require significant reductions of CO₂ emissions over the next several decades, CURC believes that funds provided for the DOE Clean Coal Program should focus almost exclusively upon those technology development programs that will enable deployment of CCS technologies as quickly as possible (between now and 2025). The issue of carbon mitigation is so predominant that we must focus limited resources upon developing and widely deploying CCS technologies to address the issue of CO₂ mitigation.