



NATURAL RESOURCES DEFENSE COUNCIL

**Statement of**  
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**Before the**  
**Committee on Energy and Natural Resource**  
**United States Senate**

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## **Introduction**

Thank you for the opportunity to share my views regarding MIT's "Future of Coal" report.<sup>1</sup> My name is Daniel A. Lashof, and I am the science director of the Climate Center at the Natural Resources Defense Council (NRDC). I was a coauthor (with David Hawkins and Robert Williams) of a September 2006 Scientific American article titled "What to do about Coal." David Hawkins of NRDC served on the advisory committee for the MIT study and NRDC has prepared a brief response to the MIT report, which is attached to my testimony and available online.<sup>2</sup>

NRDC is a national, nonprofit organization of scientists, lawyers and environmental specialists dedicated to protecting public health and the environment. Founded in 1970, NRDC has more than 1.2 million members and online activists nationwide, served from offices in New York, Washington, Los Angeles and San Francisco.

## **Capturing and Sequestering Carbon is Possible Today**

MIT's report on the Future of Coal correctly recognizes the imperative for prompt action on global warming and the critical role that use of carbon dioxide (CO<sub>2</sub>) capture and geologic storage (CCS) must play in reconciling protection of the climate with expected global dependence on coal. Yet the report's examination of policies to promote immediate deployment of CCS systems is incomplete and it fails to address the most urgent problem facing U.S.

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<sup>1</sup> <http://mit.edu/coal/>

<sup>2</sup> [www.nrdc.org/globalWarming/coal/contents.asp](http://www.nrdc.org/globalWarming/coal/contents.asp)

policymakers: what CO<sub>2</sub> performance requirements should be applied to proposed new coal power plants?

While the facts set forth in the report provide ample justification for a recommendation to require all proposed new coal plants to capture CO<sub>2</sub> for geologic disposal, the report is silent on this question.

Rather than recommending performance requirements to capture and store CO<sub>2</sub> from all new coal plants, the report proposes an incomplete policy response that would likely fail to prevent the construction of new high-emitting coal plants and result in much larger taxpayer costs and higher abatement costs when climate protection policies are adopted. The report recommends that government grants be made to energy companies to fund use of CO<sub>2</sub> capture at a few new coal plants, that government fund several large-scale geologic injection projects, and that Congress not “grandfather” new proposed power plants from future CO<sub>2</sub> control legislation. While each of these recommendations is a useful complement to a direct requirement for new coal plants to use CCS, by themselves they are inadequate.

Some industry proponents of old-technology coal plants that will not capture CO<sub>2</sub> have claimed that the MIT study suggests that CCS systems are not ready for use at proposed new coal plants. In contrast, the report itself states that there is no reason for Congress to delay adoption of a carbon emission control policy and finds that construction of new supercritical pulverized coal plants without CCS “will raise the cost of future CO<sub>2</sub> control.” One reason is that retrofits of plants built without CCS are not likely. The MIT report finds that: “[...], retrofitting an existing coal-fired plant originally designed to operate without carbon capture will require major technical modification, regardless of whether the technology is SCPC or IGCC.”

(Executive Summary, p. xiv) Yet the report fails to recommend (or even discuss) the most obvious direct policy measure—a requirement that new coal plants employ CCS.

### **Is CCS Ready for New Coal Plants to Use Today?**

While the Findings and Recommendations chapter of the MIT report states there is no reason for Congress to delay adoption of a carbon emission control policy and finds that construction of new supercritical pulverized coal plants without CCS “will raise the cost of future CO<sub>2</sub> control,” the report’s Executive Summary discusses the choice of whether to apply CCS from the point of view of private sector developers, concluding that it is difficult to choose between Integrated Gasification Combined Cycle (IGCC) technology and supercritical pulverized coal (SCPC) technology.

The critical flaw in this discussion, which I expect will be widely quoted by conventional coal plant developers, is that it implies that the only rational approach to new coal plant investments is to permit private developers to choose between two different types of coal plants, both of which release their CO<sub>2</sub> rather than capturing it. However, the premise of significantly delayed requirements to control CO<sub>2</sub> emissions that underlies this discussion is inconsistent with other findings in the report that CCS is ready for application today and that there is no reason for Congress to delay adoption of limits on CO<sub>2</sub> emissions.

Is it technically feasible for new coal power plants to capture and sequester their carbon? The MIT study itself supports an affirmative answer. The study finds that commercial capture systems exist:

“Of the possible approaches to separation [with pulverized coal plants], chemical absorption with amines, such as monoethanolamine (MEA) or hindered amines, is the commercial process of choice.” (page 24)

“In applying CO<sub>2</sub> capture to IGCC [...] a weakly CO<sub>2</sub>-binding physical solvent, such as the glymes in Selexol, can be used to separate out the CO<sub>2</sub>. Reducing the pressure releases the CO<sub>2</sub> and regenerates the solvent, greatly reducing the energy requirements for CO<sub>2</sub> capture and recovery compared to the MEA system.” (page 34)

The study also finds that “large-scale CO<sub>2</sub> injection projects can be operated safely” (Executive Summary, p. xii). Dr. Julio Friedman of Lawrence Livermore National Laboratory agrees. Testifying before the House Energy and Commerce Committee on March 6, 2007, Dr. Friedman concluded that:

“Opportunities for rapid deployment of [geological carbon sequestration] GCS exist in the US. There is enough technical knowledge to select a safe and effective storage site, plan a large-scale injection, monitor CO<sub>2</sub>, and remediate and mitigate any problems that might arise (e.g., well-bore leakage). This knowledge derives from over 100 years of groundwater resource work, oil and gas exploration and production, studies of geological analogs, natural gas storage site selection and operation, and hazardous waste disposal. A careful operator could begin work today at a commercial scale and confidently select and operate a site for 30 to 50 years.” (pages 6-7)

The MIT study notes that existing projects do not employ the rigorous monitoring that is needed for a fully implemented CCS program and that permitting regulations need to be written. However, if begun now, these requirements can be developed in a few years, shorter than the period required to plan, finance, and build new coal plants now in

preliminary development stages. Such requirements will need to be adopted to carry out the large demonstration injection projects recommended by the report in any case. As the report states, “What is needed is to demonstrate an integrated system of capture, transportation, and storage of CO<sub>2</sub>, at scale. This is a practical goal but requires concerted action to carry out” (Executive Summary, p. xi) Rather than carry out a set of demonstrations unconnected to newly built coal plants, the obvious alternative is to integrate the construction of new coal plants with the initial large-scale injection projects.

### **Conclusion**

The MIT study does not examine in any detail the key issue surrounding new coal plant construction: would it be better to vent CO<sub>2</sub> from new coal plants in the next decade or two rather than capture it. The report notes that if significant new coal capacity without CCS is built the costs of CO<sub>2</sub> control programs would increase for all. Another outcome, not discussed in the report, is that such new coal investments will be cited by their owners as reasons to delay the pace of programs to limit CO<sub>2</sub> emissions. That result would foreclose options to stabilize CO<sub>2</sub> concentrations at adequately protective levels.

While the authors of the MIT report decline to say so directly, the information presented in the report supports a straightforward policy recommendation: Congress should require planned new coal plants in the United States to employ CCS without further delay.