

MIT provides blueprint for future use of coal

March 14 2007

Leading academics from an interdisciplinary MIT panel issued a report today that examines how the world can continue to use coal, an abundant and inexpensive fuel, in a way that mitigates, instead of worsens, the global warming crisis. The study, "The Future of Coal--Options for a Carbon Constrained World," advocates that the United States assume global leadership on this issue through adoption of significant policy actions.

Led by co-chairs John Deutch, Institute Professor, Department of Chemistry, and Ernest J. Moniz, Cecil and Ida Green Professor of Physics and Engineering Systems, the report states that carbon capture and sequestration (CCS) is the critical enabling technology to help reduce carbon dioxide emissions significantly while also allowing coal to meet the world's pressing energy needs.

According to Deutch, "As the world's leading energy user and greenhouse gas emitter, the U.S. must take the lead in showing the world CCS can work. Demonstration of technical, economic and institutional features of CCS at commercial scale coal combustion and conversion plants will give policymakers and the public confidence that a practical carbon mitigation control option exists, will reduce cost of CCS should carbon emission controls be adopted and will maintain the low-cost coal option in an environmentally acceptable manner."

Moniz added, "There are many opportunities for enhancing the performance of coal plants in a carbon-constrained world--higher efficiency generation, perhaps through new materials; novel approaches

to gasification, CO₂ capture and oxygen separation; and advanced system concepts, perhaps guided by a new generation of simulation tools. An aggressive R&D effort in the near term will yield significant dividends down the road and should be undertaken immediately to help meet this urgent scientific challenge."

Key findings in this study include:

-- Coal is a low-cost, per BTU, mainstay of both the developed and developing world, and its use is projected to increase. Because of coal's high carbon content, increasing use will exacerbate the problem of climate change unless coal plants are deployed with very high efficiency and large-scale CCS is implemented.

-- CCS is the critical enabling technology because it allows significant reduction in carbon dioxide emissions while allowing coal to meet future energy needs.

-- A significant charge on carbon emissions is needed in the relatively near term to increase the economic attractiveness of new technologies that avoid carbon emissions and specifically lead to large-scale CCS in the coming decades. We need large-scale demonstration projects of the technical, economic and environmental performance of an integrated CCS system. We should proceed with carbon sequestration projects as soon as possible. Several integrated large-scale demonstrations with appropriate measurement, monitoring and verification are needed in the United States over the next decade with government support. This is important for establishing public confidence for the very large-scale sequestration program anticipated in the future. The regulatory regime for large-scale commercial sequestration should be developed with a greater sense of urgency, with the Executive Office of the President leading an interagency process.

-- The U.S. government should provide assistance only to coal projects with carbon dioxide capture in order to demonstrate technical, economic and environmental performance.

-- Today, Integrated Gasification Combined Cycle appears to be the economic choice for new coal plants with CCS. However, this could change with further research development and demonstration, so it is not appropriate to pick a single technology winner at this time, especially in light of the variability in coal type, access to sequestration sites and other factors. The government should provide assistance to several "first of their kind" coal utilization demonstration plants, but only with carbon capture.

-- Congress should remove any expectation that construction of new coal plants without carbon dioxide capture will be "grandfathered" and granted emission allowances in the event of future regulation. This is a perverse incentive to build coal plants without carbon dioxide capture today.

-- Emissions will be stabilized only through global adherence to carbon dioxide emission constraints. China and India are unlikely to adopt carbon constraints unless the United States does so and leads the way in the development of CCS technology.

-- Key changes must be made to the current Department of Energy research development and demonstration program to successfully promote CCS technologies. The program must provide for demonstration of CCS at scale; a wider range of technologies should be explored; and modeling and simulation of the comparative performance of integrated technology systems should be greatly enhanced.

The report is available online at web.mit.edu/coal .

Source: MIT

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