

PEW CENTER COAL INITIATIVE

One of the most significant challenges in addressing global climate change is reducing greenhouse gas (GHG) emissions resulting from the use of coal. Coal use, primarily for the generation of electricity, now accounts for roughly 20 percent of global GHG emissions. Rising energy demand will continue to drive up coal consumption, particularly in countries with large reserves such as the United States, China, and India. By 2030, GHG emissions from coal-fired power plants in these three countries alone may be equivalent to one-fourth of total global energy-related emissions today. To avoid—or minimize—dangerous human interference with the climate system and at the same time ensure adequate, affordable energy supplies, it is critical that these and other countries adopt policies and technologies that enable continued use of coal while dramatically reducing its GHG emissions profile.

To help address this challenge, the Pew Center is undertaking a major initiative to identify policy options for reducing coal-related GHG emissions. This initiative will produce a series of papers examining:

- Technology pathways for future coal use, both for power generation and other potential end uses, that will assist in reducing emissions, particularly by enabling the introduction of carbon capture-and-storage (CCS) technologies; and
- Policy options at the national, state, and international levels to drive the deployment of advanced generation technologies and, ultimately, widespread capture and sequestration of coal-related GHG emissions.

These papers will be undertaken in collaboration with leading experts and with advice and input from a Consultative Group of experts, policymakers, and stakeholders.

Coal's role must be understood in a broader context, and this project is one of a number of recent and ongoing initiatives by the Pew Center to address a range of sectors and activities generating greenhouse gas emissions. The Center recently released an Agenda for Climate Action recommending an integrated national climate change strategy for the United States that combines technology development with policies promoting scientific research, an economy-wide emissions market, adaptation, and emission reductions in key sectors. The recent report of the Center's Climate Dialogue at Pocantico identifies policy options to engage major economies in a comprehensive international climate effort post-2012. Ongoing work includes a detailed analysis of domestic and international policy options to reduce emissions from transportation.

The Pew Center's Coal Initiative aims to develop approaches for addressing coal that integrate well with solutions for other sectors and energy sources. For example, in developing policies and programs that promote capture and storage (CCS) of carbon dioxide from coal, we will draw on experience that includes enhanced oil recovery and other CCS-related efforts. In addressing policies for addressing the conversion of coal to other forms of energy, we will consider how these fit within broader policy for the power sector, transportation fuels, etc.

This initiative is meant to complement prior efforts and ongoing collaborations such as the Massachusetts Institute of Technology's coal study, the Western Governors' Association's Clean and Diversified Energy Initiative, and the World Resources Institute's project focused on sequestration.

ADDRESSING COAL IN THE UNITED STATES

Coal will play an increasing role in meeting U.S. energy needs in coming decades. Steep natural gas prices and energy security concerns have led to renewed interest in the use of domestic coal resources for electricity generation, with an estimated 130 new coal-fired plants now on the drawing boards. GHG emissions from coal-fired electricity, now 27 percent of total U.S. emissions, are projected to grow by a third by 2025.¹ There also is growing interest in use of coal for producing transportation fuels and for other potential end uses.

Technology Pathways – Adding carbon capture to coal combustion adds cost. For this reason, it is expected that initial paths forward will be ones that produce revenues that reduce the cost-disparity. Such paths might include co-production of high-value products (hydrogen, transportation fuels, and chemical feedstocks, among others) and sales of the waste carbon dioxide (i.e., for EOR), etc. Understanding these technology paths is critical to developing sound policy options to expand CCS beyond initial applications. Work undertaken by the Western Governors Association developed timelines and technology pathways for CCS in the western states. This initiative will build on this work by identifying pathways more suitable to the Midwest and the East Coast, particularly a comparable path for disposal of CO₂ in saline reservoirs. The policy implications of alternative pathways would also be identified.

Policy options – The initiative will identify a range of policy options at the federal and state levels to promote the deployment of CCS and to ensure its safety and environmental integrity.

- **Deploying CCS.** Separation and capture of waste CO₂ from coal-fired generation is yet to be demonstrated commercially, and the long-term storage of waste CO₂ in geologic formations is untried in the United States. This results in uncertainty regarding technological feasibility and cost.
 - *Federal policies* – This paper will provide an in-depth analysis of policy options to reduce technological and cost uncertainties and provide a path for achieving CCS deployment of CCS as rapidly as feasible. Several of these options are already under development through exploratory work completed over the past year. Options under consideration include standards placed upon electricity generators or retailers, as well as tradable emissions caps or fee-based incentive systems. Options will be evaluated for technological, economic, and political feasibility; effectiveness in reducing emissions; cost-effectiveness; flexibility; and other criteria including those deemed critical by the Consultative Group.
 - *State policies* -- In conjunction with the national policy and technology pathway work already underway, we would work with states regionally and individually to develop tailored solutions. We will work with the Western Governors Association, the upper Midwest states involved in the Powering the Plains Initiative, and the lower Midwest

¹ 2006 EIA projection (provisional)

states that are moving ahead on climate and clean energy. We will also work with individual states as particular opportunities arise. We will also develop and analyze California's options to regulate and/or incentivize imports of low-carbon electricity. While California is the main target of such research, the report will build on the Pew Center's work with other western states and discuss the broader applicability of such policies. The final scope of work for the white paper will be defined in cooperation with the Consultative Group (see below).

ADDRESSING COAL INTERNATIONALLY

The international component of the coal initiative will have two primary focuses:

- Potential technology pathways and policy options for reducing coal-related GHG emissions in China and India; and
- Options for an international agreement to reduce coal-related GHG emissions from the power sector globally.

China and India – Apart from the United States, China and India are the countries with the largest shares of global coal consumption. Both have substantial coal reserves and their consumption is projected to increase rapidly in coming decades as they add new coal-fired generation capacity to meet rising electricity demand. As a result, their coal-related emissions are projected to double by 2030. For each country, the initiative will examine:

- ***Technology Status and Paths Forward.*** These papers will review current and projected coal use; likely technology pathways and their emissions implications; and options for advanced combustion technologies, use of coal for transportation fuels, and carbon capture-and-storage.
- ***Policy Options.*** These papers will consider options for national policies to reduce coal-related GHG emissions that might be undertaken unilaterally, as a basis for emissions crediting under the Clean Development Mechanism, and/or as a basis for commitments as the international climate framework evolves.

Sectoral Approaches – This paper will explore approaches to structuring an international agreement among governments and/or the private sector to reduce coal-related GHG emissions globally. Possibilities include intensity-based sectoral targets or standards phasing in advanced combustion or carbon capture-and-storage technologies.

CONSULTATIVE GROUP

To inform all aspects of this work, the Pew Center is forming a Consultative Group of experts, policymakers, and stakeholders from both the United States and abroad. Members will advise on the overall scope of work, provide ongoing input in their areas of expertise, review draft papers, and help ensure that this initiative complements related efforts by other institutions. The group will meet twice, at the outset and toward the end of the initiative, and will remain engaged throughout by email, conference call, etc.