

**BRIEF ANALYSIS**

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## Economic and Public Health Benefits of Coal-Based Energy

by Eugene M. Trisko

Coal is critical to electricity production in many countries and the United States is no exception. It is a low-cost source of reliable, baseload power — continuously produced power necessary to keep electricity flowing. It is also a secure energy source, since the United States contains more than a quarter of the world's recoverable coal reserves, equaling a 250-year supply at current rates of consumption. Coal-fired power plants generate 52 percent of the electricity in the United States.

Some environmentalists have indicted coal-fired electric power generation as a major source of air pollution and contributor to human-caused greenhouse gas emissions. Modern coal-fired power plants produce 90 percent less of major air pollutants than previous generations, and because of their increased efficiency, they emit less carbon dioxide (CO<sub>2</sub>) into the atmosphere per kilowatt produced. Nevertheless, some proposed air quality standards and domestic and international proposals to reduce greenhouse gas emissions would force utilities to shift electricity production from coal to other sources of generation. For example, the Energy Information Administration (EIA) of the U.S. Department of Energy estimated the climate change plan proposed by Sen. John McCain (R-Ariz.) and Sen. Joseph Lieberman (D-Conn.) in 2004 would reduce coal use by 59 percent to 78 percent.

Two recent studies supported by the Center for Energy and Economic Development (CEED) show the signifi-

cant benefits delivered by coal-fired power plants and the substantial harm that could result if environmental policies force a reduction in the use of coal.

**Economic Benefits of Coal.** Researchers at Pennsylvania State University estimated the economic benefits of coal and the potential impact of replacing coal with more expensive energy sources such as natural gas and a 10 percent mix of renewables. They netted out the positive offsetting impacts of investments in replacement fuels and electric generating capacity. By 2015:

- The annual benefit of coal use at currently projected levels is estimated at more than \$1 trillion in gross domestic product (GDP), \$360 billion in additional household income and nearly 7 million jobs.

- In contrast, a 33 percent reduction in coal-fired electric power generation would reduce GDP by \$166 billion, household income by \$64 billion and employment by 1.2 million below what it otherwise would be. [See the figure.]

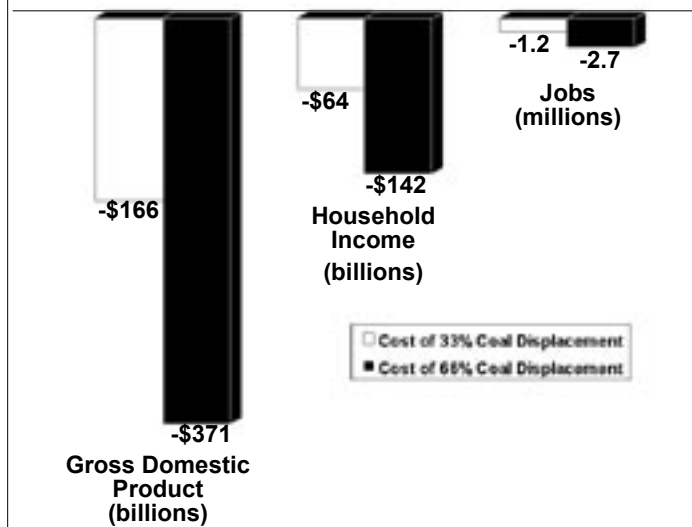
- A 66 percent reduction in coal-fired electric power generation would reduce GDP by \$371 billion, household income by \$142 billion and employment by 2.7 million.

The negative impact of displacing coal would be felt nationally, regionally and in nearly every state, even after considering the

positive impacts of replacement energy sources.

**Health Hazards of Eliminating Coal.** The impact of eliminating coal wouldn't be limited to the economy; indirectly, it would also negatively affect health. Harvey Brenner of Johns Hopkins University conducted the first major research on the impacts of unemployment on public health for the Joint Economic Committee of Congress in 1979 and 1984. In his 1984 study, Brenner found that

### Annual Losses from Reducing Coal Use



Note: Average of low and high energy price scenarios in 2015.

Source: Adam Z. Rose and Dan Wei (Pennsylvania State University), "The Economic Impacts of Coal Utilization and Displacement in the Continental United States, 2015," Center for Energy and Economic Development, Inc., July 2006.

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every 1 percent increase in unemployment resulted in a 2 percent increase in premature deaths.

In 2005, Brenner updated his 1984 study and developed estimates of the impacts of potential reduced coal use on public health. Brenner's research connects the dots between the economic benefits of coal use and the public health consequences of reduced coal utilization. His finding: the loss of jobs causes increased premature mortality.

Brenner's econometric model, drawing on more than 50 years of U.S. health and economic data, firmly links changes in U.S. mortality to changes in economic variables such as GDP per capita, the unemployment rate and the interaction between GDP and employment. Brenner's analysis shows that the upward trend in real per capita income is the most important single factor explaining decreased U.S. mortality rates since the 1960s. Conversely, any reduction in GDP per capita, say, as a result of an increase in unemployment, increases the mortality rate.

Brenner applied his model to the findings of two studies that estimated the adverse economic impacts of reduced coal use — a 2001 Penn State study and an analysis of the impacts of the Kyoto Protocol by DRI, a noted economic forecasting and consulting organization. Brenner adjusted the results of these studies to approximate the income and unemployment effects of a hypothetical complete elimination of coal.

Brenner reports "the estimated additional mortality in the year 2010, based on four different variations of the model, ranges from an additional 170,507 to 368,915 deaths for the displacement of 100% of coal-based generation. The author's moderately conservative estimate is based on an annual change model at 195,308 deaths."

Applying his analysis to specific climate change policies affecting coal-fired generation, Brenner says: "Given an estimated potential displacement of 78% of U.S. coal generation based on EIA's study of proposed climate change initiatives, the indicated premature mortality from reduced income and increased unemployment would exceed 150,000 deaths annually, absent direct and effective mitigation programs."

**Policy Implications.** To put the health risks from a mandatory switch from coal in context, Brenner's estimate of potential premature deaths from national climate change legislation is many times greater than U.S. Environmental Protection Agency's estimates of the benefit in reduced premature mortality from new national ambient air quality standards. The EPA estimates implementation of the new 8-hour ozone standard would reduce premature mortality by 1,000 to 3,000 lives annually, and the new standard for fine particulates (soot) would reduce premature mortality by 15,000 lives annually. On the one hand, the government is pursuing regulatory action to protect lives, while legislative proposals to reduce coal use could harm many more people.

Together, the Penn State and Brenner studies offer profound evidence that policy initiatives such as climate legislation must be evaluated from two perspectives: in addition to direct economic impacts on output, income and employment, policymakers need to consider the potential indirect public health consequences of policies that restrict energy supply choices.

This prescription applies not just to national legislation, but to state and regional climate initiatives such as those in California and the Northeast. All of these programs should be carefully assessed to determine their potential adverse public health consequences related to higher energy prices, increased unemployment and reduced household incomes.

**Conclusion.** Shifting from coal-fired electric power generation to other forms of energy would have a small effect on CO<sub>2</sub> emissions and an even smaller impact on climate change, but it would impose costs on the economy and thereby the health of Americans. The benefits of coal, and the cost of eliminating it, should be weighed against benefits from the incremental reduction in air pollution and CO<sub>2</sub> emissions. Adding up the benefits and subtracting the costs, the ledger for coal remains in the black.

*Eugene M. Trisko is an attorney. This article is based on his presentation at the American Legislative Exchange Council's 2006 Annual Meeting in San Francisco, July 20, 2006.*

*Note: Nothing written here should be construed as necessarily reflecting the views of the National Center for Policy Analysis or as an attempt to aid or hinder the passage of any legislation.*

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