

July 2009

Carbon Trading: Opportunities, Challenges, and Distributional Effects in the United States

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Carbon dioxide is the most significant greenhouse gas in terms of human emissions. Increased carbon dioxide levels are thought to exacerbate global climate change which can affect sea levels, changes in ocean currents, and the earth's warming and cooling. Among other things, these changes can affect the well-being of plant and animal life, the quality of food production, and the general health of the population.

The relationship between human actions and climate change continues to be debated, but the fact remains that carbon dioxide levels are continuing to rise. Atmospheric concentrations of carbon dioxide have increased by over 30 percent over the past 200 years. Scientists are becoming less confident in quantifying forecasts of climate change, but recent NOAA studies suggest that the impacts of carbon dioxide concentrations are irreversible for up to 1,000 years after emissions levels begin to decline.

POLICY PERSPECTIVE

Policymakers continue to debate how to equitably manage human influence on CO₂ emissions. As of 2008, all of the 11 climate change bills (except one carbon tax proposal) that have been considered by the U.S. Congress suggest introducing a *cap and trade* system. Cap and trade programs are administrative approaches used to manage pollution emissions by providing economic incentives for achieving reductions in the pollutants through multiple methods.

Some climate change bills focus on the restriction of emissions in certain sectors including the automotive industry, the air transportation industry, and agriculture. The proposed measures to balance carbon output are different for each bill. Some limit carbon reductions to the U.S. while others allow international reductions (similar to what was arranged under the Kyoto

Protocol). Sometimes agriculture and forestry are treated separately because of the difficulty in quantifying and monitoring carbon reductions.

There is still resistance to introducing cap restrictions within the U.S. Congress in regards to questions about why the U.S. should do something if other large developing nations do not. Differences between the bills reflect the main interests of the states or their sponsors. For instance, South Carolina is invested in nuclear energy whereas West Virginia is focused on coal. Oregon is invested in hydropower while Florida is focused on natural gas.

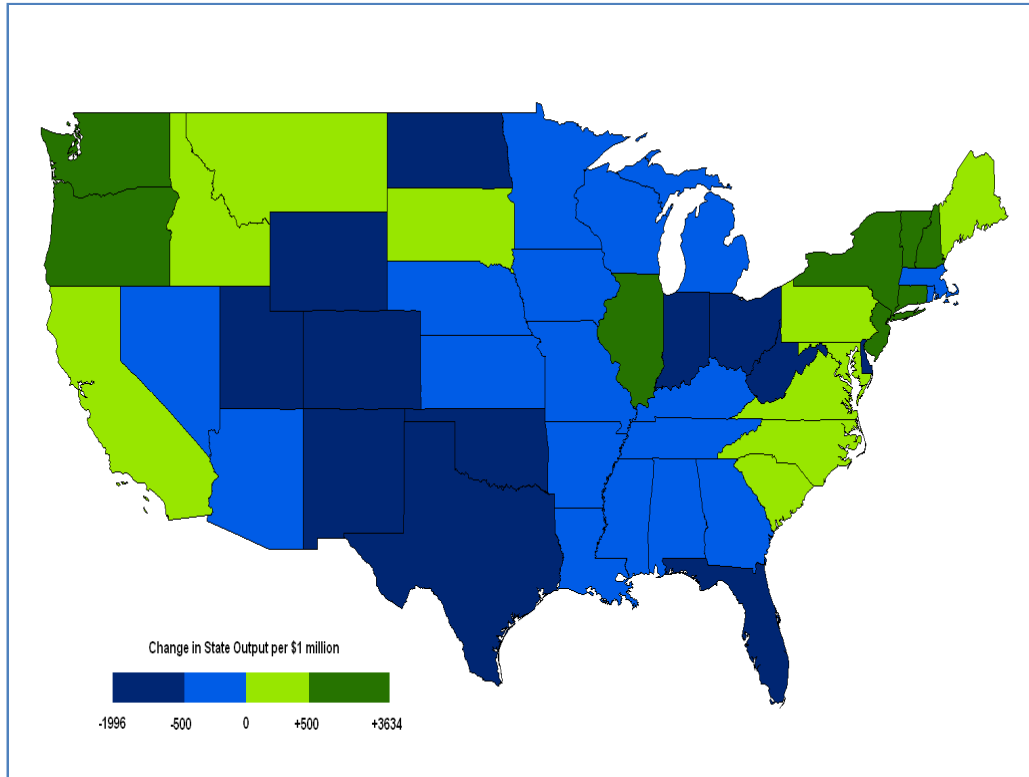
TAXING & TRADING CARBON

The two main policy plans for reducing carbon output include taxing plans and carbon trading programs. A carbon tax is a tax on energy production when the production generates carbon as a byproduct. A carbon trading program allows energy producers to buy or sell the rights to generate carbon while limiting the overall amount of carbon produced. From a basic standpoint, a carbon tax generates revenue for government because the tax sets the price for carbon output but allows the emissions levels to vary. Carbon trading permits fix the emission target (cap) and allow the price to vary. The setting of the tax rate or the cap is a policy choice that is politically influenced, but should be directly informed by sound science.

CAP & TRADE PROGRAM OR CARBON TAX: SOUTH CAROLINA BENEFIT OR HINDRANCE?

In order to explore this question, Dr. Tom Tanner, Dr. Robert Carey and I gathered energy source data for the 50 states from 1990 to 2006 from the Energy Information Administration. The sources were separated into two categories: carbon producing (coal, oil, natural gas) and non-carbon producing (hydro, nuclear, and other renewable). Secondly, electric power generation production and demand figures were estimated and projected for the next 50 years with the use of REDYN (regional dynamic economic input/output model). Then, carbon energy and non-carbon energy production percentages were calculated for the 50 states in 2001 and 2006.

To understand the economic impacts, the percentages were converted into dollar estimates and the accompanying employment, wage, and economic winning and losing states across the country. The map below details this analysis. The green states indicate economic benefits from a cap on carbon set at 2006 levels. The economy of the blue states is negatively affected by the cap.



CONCLUDING COMMENTS

Like other hydro, nuclear, and renewable energy producing states, in this assessment, South Carolina benefits economically from a carbon cap. Almost 52 percent of South Carolina energy is produced through nuclear power. If a cap and trade program came into existence, then South Carolina could possibly be a net energy exporter to other states in the Southeast. Less than one percent of South Carolina's energy production is "renewable." To increase the state's capacity, significant energy resources could be tapped from solar power (photovoltaics), biofuels (switchgrass), and other technologies in order to reduce the amount of carbon generated from energy production.

Questions still remain relative to the optimum program structure and the economic impact and policy options that would factor into a carbon trading program and/or a carbon tax program. In addition, accompanying impacts specific to South Carolinians should be considered.

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