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Surprise Side Effect Of Shale Gas Boom: A Plunge In U.S. Greenhouse Gas Emissions

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This guest article is by Julie M. Carey, an energy economist with Navigant Economics

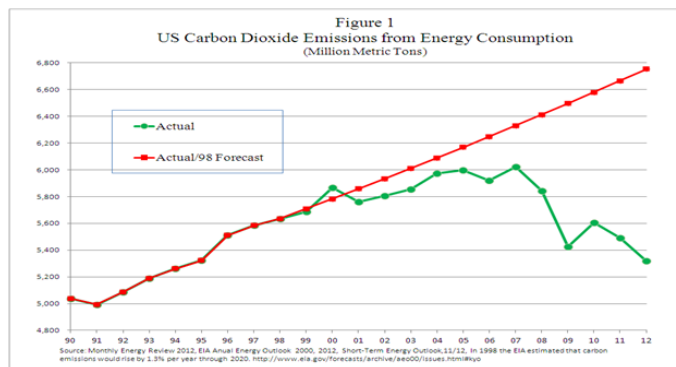
Environmental activists seem elated that the Obama administration may tackle climate change in its second term. In order to determine where climate change fits into the priority ranking of our nation's most important agenda items, it seems worthwhile to step back and take stock of the quiet but tremendous progress that the U.S. has already made in reducing carbon emissions, and take a few moments to understand the underlying factors that are bringing about such benefits.



In the first quarter of this year, U.S. carbon emissions hit a 20-year low. As Figure 1 below demonstrates, the U.S. has observed substantial reductions in CO2 emissions over the last five years. These reductions contrast with the increases

in CO2 emissions that the Energy Information Administration forecasted in 1998 when the U.S. was considering committing to CO2 emissions reductions in the Kyoto Agreement. At the time of these discussions, the EIA estimated that CO2 emissions would increase at a rate of approximately 1.3 percent annually through 2020. In fact, to reach the Kyoto Agreement target for 2012, the U.S. would have needed to reduce CO2 emissions to 7 percent below 1990 levels—to approximately 4,700 million metric tons.

Fast forward to 2012: The U.S. achieved approximately 70% of the CO2 emissions reductions targeted under Kyoto (as compared to the 1998 EIA CO2 forecast). That's substantial progress. A major factor in CO2 emission reduction is shale gas, which, with the continued displacement/retirement of coal plants, has the potential to provide even more CO2 reduction benefits in the future.



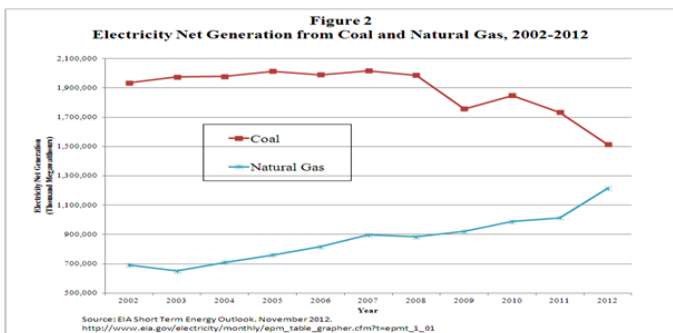
Also noteworthy is the fact that the U.S. appears to be within reach of President Obama's 2009 environmental goal of reducing emissions to 17 percent below 2005 levels by 2020, which equates to 5,000 million metric tons. In 2005, the CO2 emission level was approximately 6,000 million metric tons.

Today, the EIA estimates that total U.S. 2012 energy-related CO2 emissions will equal 5,320 million metric tons.

One of the primary factors for much of the improvement in the U.S. environmental picture includes the shale gas revolution. The benefits of the shale gas explosion include the newfound abundant supply which will provide more than enough natural gas to meet U.S. domestic

consumption needs and provide an expectation for relatively low natural gas prices in the future. However, the country's increased reliance on natural gas (and displacement of some coal-fired generation) has already benefited the environment, and will continue to do so in the future.

As a result of current low natural gas prices, natural gas-fired power plant operating costs have fallen so much that they are now displacing previously lower cost coal-fired power in the dispatch order of many electricity supply regions. Figure 2 shows that electricity net generation from coal-fired power plants declined by an estimated 25 percent between 2007 and 2012. Over this same period of time, electricity net generation from natural gas-fired power plants increased by approximately 35 percent. Much of the uptick in production is a direct result of the sharp decline in the price of natural gas which has been largely triggered by the unprecedented growth in shale gas production. Additionally, the market-driven decline in coal is expected to continue into the future. While Environmental Protection Agency clean air regulations such as the Mercury and Air Toxics Standard (MATS) can explain some of the future expected displacement of coal by natural gas, shale gas economics is a significant reason for the displacement.



The economic downturn associated with the 2008 – 2009 recession also contributed to CO2 emissions reductions. While this is not an event anyone is hoping to repeat, consideration of the state of our economy is directly relevant in the context of discussing whether or not potential climate change policy should be pursued at the present time. Specifically, the unconventional oil and gas industry is currently one of the strongest sectors in our fragile economy, and at this point, an effective tax on this sector could impede economic growth.

Finally, the same energy policies which drove increased reliance on renewable generation and energy efficiency requirements have also contributed to carbon emissions reductions. Electricity generation from renewables (including conventional hydro) grew from approximately 9 percent of the U.S. electricity generation mix in 2007 to 13 percent in 2012. In addition other factors contributed to today's lower CO2 emission levels, including efficiency improvements in energy usage standards set for buildings, appliances, and fuels, as well as regulatory compliance requirements designed to reduce energy use.

The U.S. has made astounding progress towards the original Kyoto climate change goal for CO2 emissions, and additional progress is possible. Nearly 20 GW of coal-fired generation is scheduled retirement prior to 2021, and industry observers believe additional coal fired generation is at risk for retirement in the coming years. These coal fired power plants will be displaced by new cleaner burning natural gas fired power plants, further reducing CO2 emission. This progress has to be considered when evaluating where climate change policy ranks among list of national priorities. It is interesting to note that the progress already made can be attributed significantly to natural market solution as the shale gas revolution facilitates the displacement of coal by natural gas-fired power generation without specific government intervention or subsidization.

Julie M. Carey is an energy economist with Navigant Economics who provides consulting and testifying services. Navigant's unconventional oil and gas offerings include advisory services for strategic business decision analysis, construction risk management, economic and antitrust analyses, investment banking and restructuring advisory services, and expert services for disputes and investigations.