

The Financial Market Solution to Carbon Emissions

By Robert Huebscher

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While health care remains the hot topic on Capitol Hill, another piece of legislation is poised to gain similar attention. Regulating carbon emissions to address the threat of global warming is a top priority of the Obama administration, and its favored approach is to create a “cap-and-trade” market.

A cap-and-trade market allows carbon emitters to buy and sell allowances – the right to emit carbon dioxide (CO₂) – on an open exchange. The framework for this market has already been laid out in the Waxman-Markey Cap & Trade Bill (H.R. 2454), which passed the House on June 26 and now awaits Senate review.



John Parsons, a Senior Lecturer at the MIT Sloan School of Management and Executive Director of MIT’s Center for Energy and Environmental Policy Research, spoke about the proposed legislation to a group of analysts in Boston last week.

Parsons believes cap-and-trade is the best approach to addressing carbon emissions. He described two other successful attempts at regulating emissions through a cap-and-trade approach: the US has had a sulfur dioxide (SO₂) market since 1995 and the European Union has had a CO₂ market since 2005.

Success is far from guaranteed, however, and Parsons also spoke about a number of problems posed by the Waxman-Markey bill.

How it works

The goal of the cap-and-trade system under the Waxman-Markey bill is to regulate CO₂ along with a number of other gasses, including methane, nitrous oxide, and hydrofluorocarbons (HFCs), which are used in refrigerators and air conditioners. But the main target is the 6 million tons of CO₂ that US industry produces annually (as of 2005); the other gases combined contribute about 1 million CO₂-equivalent tons to global-warming pollution.

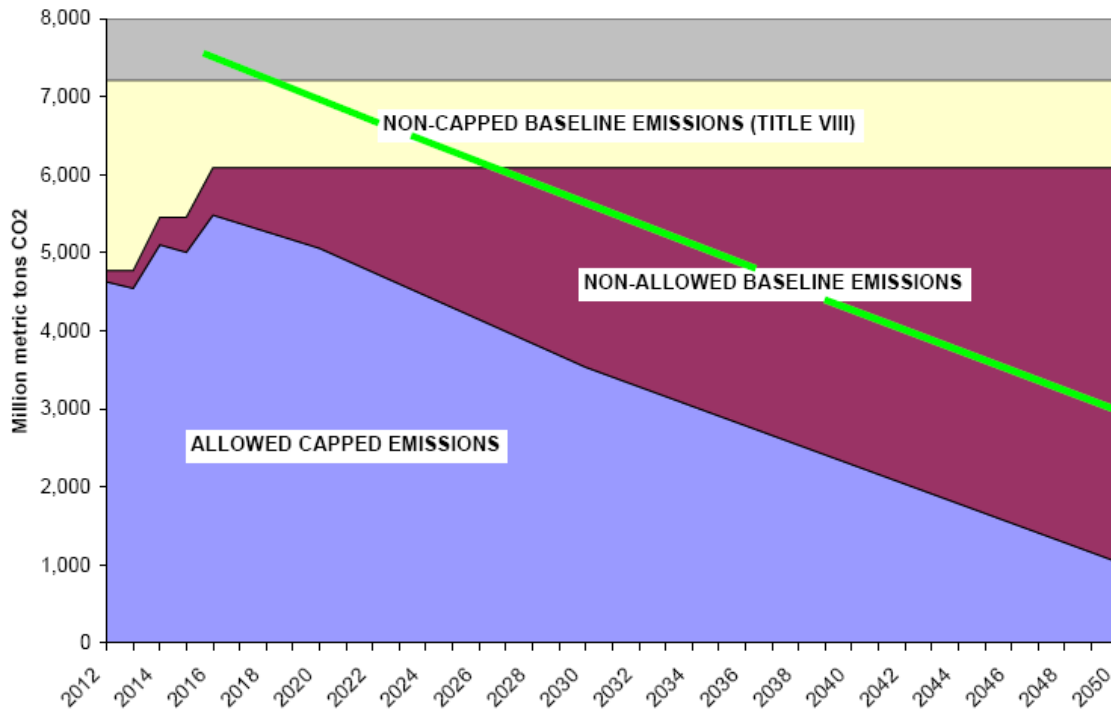
The Waxman-Markey bill aims to reduce CO₂ emissions to 17% of 2005 levels by 2050.

Coal- and natural gas-burning electrical utilities, which produce 39% of US CO₂ emissions, are the primary target of the legislation. Caps on those companies would be phased into the program beginning in 2012, along with automobiles, the second-largest



target at 31% of emissions. Industries such as steel production would be included in 2014 and natural gas distributors in 2016.

The graph below illustrates how the cap-and-trade program will reduce emissions:



The horizontal line at 7 million tons represents the 2005 level of CO₂ and other emissions. The blue region represents the decline in CO₂ emissions achieved through the program, and those “savings” are represented by the red region.

Certain emissions, such as those produced by agriculture and forestry, are excluded from the legislation. They are represented by the yellow region.

A murky area – one Parsons called a “fudge factor” – is offsets which have been built into the legislation. For example, farmers may be able to earn allowances that they can then sell into the market, increasing the overall level of allowed emissions. The collective impact of these offsets is highly uncertain – partly because the oversight of these offsets will be left to regulators. They may push the level of CO₂ emissions up to the diagonal green line, making the “cap” in the cap-and-trade system a moving target.

In the European CO₂ market, carbon emitters, such as the electrical utilities, are allocated allowances which can then be sold through the market. Utilities pass along



their increased costs to their retail customers, so those customers have the incentive to conserve energy. The same approach was used in the US SO₂ market.

The Waxman-Markey bill, however, takes an entirely different approach. Instead of the utilities that are the source of carbon combustion, allowances will be given to electrical distributors, who can sell them in the market. The utilities have the burden to surrender allowances as they generate emissions. In most cases, however, they do not receive them, but instead must purchase them in the market to meet their needs.

Distributors are expected to use the revenue from their allowances in a number of ways, including price benefits for low-income customers and investments in clean-energy projects. Distributors are tightly regulated monopolies, and their regulators will, to some degree, control how the allowances are spent.

Distributors will also have to pay higher costs for the electricity they purchase as the power generators are forced to lower emissions or pay for allowances. The distributors' costs and benefits are designed to offset one another in theory – but it remains to be seen how this will unfold in practice.

Thus, a key difference between the European and US approaches is that US retail consumers have no direct incentive to conserve energy.

Deciding who issues allowances and what their intended purpose is has become the center of the cap-and-trade debate. As the bill goes through Senate review, the process could change.

Operating the market

For the cap-and-trade program to succeed, an efficient market must develop for trading allowances. Parsons has studied the operation of the SO₂ and European CO₂ markets to assess how well they have operated.

The European CO₂ market covers more than 10,000 installations in 27 countries, primarily electrical power companies and heavy industry. It does not yet encompass transportation. The market capitalization of allowances is now \$63 billion, based on a price of approximately \$20 per ton of CO₂. That is about half the estimated size of the proposed US market.

One problem in the European market has been high volatility. In April of 2006, prices on the spot market fell by nearly 70% in just a few weeks. Price stability is critical, since industries need to plan and make capital investment decisions based on market price forecasts. If price uncertainty is too great, investment in research and development may be delayed because the payoff is too unclear.



Parsons attributed European volatility to a number of factors, including insufficient float and information flow that was “very lumpy.” Mostly, he said, high volatility came from a lack of liquidity, a problem that can be addressed with proper market design.

The US SO₂ market is much smaller – about 1% the size of the proposed CO₂ market. It had a positive reputation until early 2005 when, according to Parsons, there was a 50% price spike over a two-month period thanks to the implementation of tighter emission caps through the Clear Air Interstate Rule and to railroad disruptions that prevented the shipment of low-sulfur coal.

Neither of these two factors, however, explained the severity of the disruption, Parsons said – a lack float was again the real culprit. He believes price stability can be improved by allowing for more trading.

Other issues

The European CO₂ and US SO₂ markets allow banking and borrowing of allowances. If an emitter is below their needs, they can “bank” allowances and use them in future years. Conversely, if they have unforeseen needs, they can borrow against future allotments.

Banking and borrowing facilitate market liquidity and reduce price volatility, but they may lead to situations where emissions across the market vary on a yearly basis from targeted levels. Overall, however, the goal is to reduce emissions over the long term, and Parsons said banking and borrowing are important to increase market liquidity.

Also at issue is who will be allowed to trade allowances – specifically whether bankers and hedge funds can participate in the market.

Yet another issue is that windfall profits may accrue to low-carbon generators, including the nuclear power industry. This may be addressed by regulators by imposing additional costs on nuclear energy.

Will it work?

Parsons said there really are just four ways to deal with carbon emissions.

We can do nothing, which he said is “perfectly acceptable” if one does not accept the theory of global warming.

A second alternative is to regulate emissions using traditional command-and-control techniques, specifying allowed emissions technology-by-technology and activity-by-activity.



A third – the primary alternative to cap-and-trade – is to tax carbon emitters, in which case government-imposed cost increases will ultimately be passed on to consumers.

Cap-and-trade has the advantage of allowing the market to set the price of carbon emissions, rather than having it set artificially by regulators. Parsons believes that this is the right approach, and that volatility problems can be overcome.

“There is real volatility due to the uncertainty of science,” he said, as well as volatility surrounding many economic factors. This level of volatility should be embraced, not avoided, he said. Excess volatility can be overcome by establishing a market that trades a sufficient volume of allowances. “You need companies to make their best efforts on investment decisions and to let the chips and profits fall where they may.”

No US-based solution, whether it is a carbon tax or a cap-and-trade market, can effectively address the global problem of carbon emissions. That solution needs to come from international cooperation on the issue and, so far, the world’s largest carbon emitter, China, has been unwilling to participate in such a system.

Parsons expects a global cap-and-trade network to be gradually knit together, and he dismissed the possibility of a global system with a grand architecture. Right now, he believes a flexible and efficiently functioning market is the best approach to lower the cost of reducing carbon emissions

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