

Washington Climate Change Report

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Energy Package Passed by House, Negotiations with Senate Ahead; Climate Change Bills Pushed to the Fall

*By Jessica Held**

The House passed its long awaited “Energy Package” on August 4 during a rare Saturday session. Passing by a vote of 241-172, this comprehensive piece of energy legislation (HR3221) is a melding of energy bills produced by 11 different committees, including a new mandate that utilities produce 15 percent of their energy from renewable resources by 2020. Additionally, a controversial tax measure (HR2776) was passed by a vote of 221-189. The House Energy Package now needs to be reconciled with the Senate energy bill adopted on June 21.

Over the last month, the focus in the House has been on the passage of energy legislation, rather than trying to further advance

see Energy Package, page 3

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Emission Offsets: Revenue Opportunities and Reducing Compliance Costs

*By Christopher K. Carr**

Provisions allowing for emission “offsets” are included in virtually all of the major federal greenhouse gas (GHG) “cap-and-trade” bills before Congress. Offset credits are generated from projects or activities that sequester or reduce GHG emissions. These credits can then be used by entities regulated under the GHG caps to meet compliance obligations. For instance, an electric utility could use a credit generated by a carbon dioxide sequestration activity to “offset” its emissions from a power plant.

Offset programs have been widely used in the international carbon market, most notably via certified emission reductions (CERs) generated under the Clean Development Mechanism (CDM) to the Kyoto Protocol. The annual value of the CDM market exceeded \$5 billion in 2006 according to the World Bank “State and Trends of the Carbon Market 2007” (see “For Further Reading,” p. 7). The value of any new U.S. offsets program may be even larger and thus could provide a considerable source of revenue for offset providers. Offsets may also be a cost-effective mechanism for mitigating compliance costs for regulated entities.

In the major federal GHG bills currently before Congress, the common “currency” for an offset credit is generally one ton of carbon-dioxide equivalent (tCO₂e). Thus, for instance, each ton of sequestered carbon dioxide could be used to offset one ton of power plant emissions.

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Comparison of Selected Provisions of the House and Senate Energy Legislation

	House Legislation (HR3221 and HR2776)	Senate Legislation HR6 (originally S1419)
Auto Mileage Standards	<i>No comparable provisions</i>	<ul style="list-style-type: none"> Increases fuel efficiency standards so that the entire fleet of cars and light trucks sold in the U.S. must average 35 mpg by 2020
Renewable Portfolio Standards	<ul style="list-style-type: none"> Requires utilities to produce 15 percent of their power from renewable sources by 2020; more than a quarter of which can be met through gains in energy efficiency 	<i>No comparable provisions</i>
Tax Measures	<ul style="list-style-type: none"> Extends and expands tax credits for renewable energy production and biofuels Extends production credits for biodiesel and diesel created from biomass Adds credit for plug-in hybrid vehicles and cellulosic fuels Creates tax credit bonds for “green community programs” Paid for in part by repealing 1999 manufacturing deduction for all oil and gas companies’ domestic manufacturing activities and tightening the foreign tax credit rules for oil and gas companies 	<i>No comparable provisions</i>
Ethanol	<ul style="list-style-type: none"> Extended biofuels tax credit Provides research grants 	<ul style="list-style-type: none"> Requires 8.5 billion gallons of biofuels be sold or put into commerce in 2008 and gradually increases the annual requirement to 36 billion gallons in 2022 Directs the president to set regulations to increase the amount of motor vehicle fuel, home heating fuel, and boiler fuel made from renewable fuels and sold
Energy Efficiency and Technology	<ul style="list-style-type: none"> Improves energy efficiency of lighting, appliances, and buildings Establishes a federal policy to support implementation of “smart grid” technologies Clarifies provision of the 2005 Energy Policy Act relating to loan guarantees for alternative fuels programs Creates loan guarantees and grants for development of renewable fuels infrastructure Improves state data collection required by Energy Information Administration to support efficient energy markets Creates loan guarantee and grant programs for development of advanced batteries and plug-in hybrid vehicle 	<ul style="list-style-type: none"> Sets efficiency standards for incandescent and florescent light bulbs, home appliances, and residential boilers – requires Secretary of Energy to revisit the standards every five years Requires modernization of national electricity grid and establishes programs to develop “smart grid technologies” Creates economic incentives for technology development, including renewable energy production projects, loan guarantees, and grants for advanced technology vehicle manufactures, etc.
Carbon Sequestration	<ul style="list-style-type: none"> Encourages renewable energy sources and carbon sequestration through funding for research Establishes programs to study climate change and its impacts on oceans and wildlife 	<ul style="list-style-type: none"> Amends Energy Policy Act of 2005 to include carbon capture and storage research, development and demonstration Provides large-scale testing of carbon sequestration

(Comparison – continued)

	House Legislation (HR3221 and HR2776)	Senate Legislation HR6 (originally S1419)
Public Sector Conservation	<ul style="list-style-type: none"> Contains provisions regarding climate change and fuel use in areas of mass transit use, railroads, pipelines, sea transportation, and public buildings with goal of reducing greenhouse gas emissions and expanding use of alternative energy sources 	<ul style="list-style-type: none"> Sets goal of a 20 percent reduction in operating costs at federal facilities within five years through application of energy efficient technologies and practices Promotes construction of high performance green buildings
Competition Policy	<i>No comparable provisions</i>	<ul style="list-style-type: none"> Makes petroleum price gouging a federal crime in a national energy emergency Subjects OPEC to U.S. antitrust laws
Renewable Energy Research and Development	<ul style="list-style-type: none"> Authorizes \$450 million through 2012 to support use and development of geothermal industry technologies Authorizes \$250 million annually through 2012 to study how to tap into energy from the ocean such as waves to generate useable energy 	<i>No comparable provisions</i>

Energy Package from page 1

major climate change legislation. On the Senate side, the major climate change developments have been the formal introduction of the Bingaman-Specter bill (S1766) and the release of climate change legislative “principles” developed by two senior members of the Environment and Public Works Committee. Only a discussion draft of the Bingaman-Specter legislation had been previously available. This bill aims reduce greenhouse gas emissions to 2006 levels by 2020, and to 1990 levels by 2030, with a 60 percent reduction from current levels by 2050, contingent on science, technology development and international efforts. The bill would also bill would set up an automatic “safety valve” of \$12 per ton of carbon dioxide equivalent. Additionally, Virginia Republican Senator John Warner and Connecticut Independent Joseph Lieberman released an outline and announced plans to draft bipartisan cap and trade legislation to cut emissions by 70 percent by 2050. Lieberman and Warner are the chair and ranking member of a key Environment and Public Works subcommittee on climate change. Their proposal is expected to be developed over the next several weeks and may be introduced in September.

Our next monthly *Washington Climate Change Report* will cover the latest developments regarding federal climate change bills. This month, the House Energy package has been a key development.

HR3221

The House Energy Package reflects a number of energy bills produced by 11 different committees. Major components of the bill include new provisions that would end certain royalty relief for the oil and gas industry, seek improvements in energy efficiency, and spur the use of renewable energy. Major contributions by various committees are as follows:

Natural Resources Committee

Large portions of the Energy Policy Reform and Revitalization Act of 2007 (HR2337), introduced by Committee Chairman, Nick Rahall (D-WV), are part of the House energy package. Sections of HR2337 incorporated into HR3221 would significantly revise the provisions regarding oil and gas in the 2005 Energy Policy Act. The bill ends so called “royalty relief” for oil and natural gas producers who do not currently pay royalties, changes the current fine system for energy ▶

companies that fail to pay required royalties, and contains provisions designed to reverse the negative impact of oil and gas drilling on the environment.

In a compromise with oil-patch Democrats, HR3221 drops language in HR2337 that would have limited the royalty-in-kind to oil used to fill the strategic petroleum reserve. The bill also drops language that eliminated deadlines for implementing a federal program established by the 2005 Act to designate national energy corridors. Additionally, the BLM would have 45 days to process oil and gas drilling permits under HR3221, instead of 90 days under HR2337 or 30 days under the 2005 Energy Policy Act.

The bill also requires the issuance of “guidance” on the siting of wind power projects. A proposal to regulate and certify all wind power projects was strongly opposed by the wind power industry. Instead, the bill will merely require the Department of Interior to study the effects of wind power on wildlife and the environment and issue guidance on project siting.

The bill supports carbon sequestration by mandating that the Secretary of the Interior create an inventory of all sites in the U.S. that would be suitable for carbon sequestration, and to create a regulatory and certification program to carry out sequestration activities on federal lands.

Additionally, the bill creates an intra-governmental panel to study the effect of climate change on federal lands and waters and contains provision focusing on the effects of climate change on coastal areas.

Energy and Commerce Committee

Many of the provisions contained in the six committee prints approved by the House Energy and Commerce Committee were also incorporated into the Energy Package.

The six measures incorporated into HR3221 would:

- (1) improve energy efficiency of lighting, appliances, and buildings;
- (2) establish a federal policy to support implementation of “smart grid technologies” to improve the nation’s electricity transmission system;
- (3) clarify provisions of the 2005 Energy Policy Act relating to loan guarantees for alternative fuels programs;
- (4) create loan guarantees and grants for development of renewable fuels infrastructure;
- (5) improve state data collection required by the Energy Information Administration to support efficient energy markets; and
- (6) create loan guarantee and grant programs for the development of advanced batteries and plug-in hybrid vehicles.

Just as significant as what these measures contain, is what they do not. A controversial provision introduced by Rick Boucher (D-VA), Chairman of the Energy and Commerce Subcommittee on Energy and Air Quality would have created a Low Carbon Fuel Standard, which would have mandated a maximum carbon content for fuels much as the way CAFE standards set minimum mileage standards for vehicles.

Science and Technology Committee

Bills approved by the Science and Technology Committee also made their way into the Energy Package. HR3221 contains provisions similar to Jerry McNerney’s (D-CA) geothermal energy bill (HR2304) and Darlene Hooley’s (D-OR) ocean energy bill (HR2313). The bill authorizes \$450 million through 2012 to support the use and development of geothermal industry technologies. The bill also authorizes \$250 million through 2012 to study how to tap into energy from waves, tidal flows or ocean currents to generate usable energy.

Transportation and Infrastructure Committee

Additionally, the Energy Package contains provisions from the Transportation and Infrastructure Committee’s “Transportation Energy Security and Climate Change Mitigation Act” (HR2701). The legislation contains provisions attempting to reduce fossil fuel use by mass transit, railroads, pipelines, sea transportation, and public buildings with the goal of reducing GHG emissions and expanding the use of alternative energy technologies. It includes grants to expand transit services and encourage their use, as well as providing additional funding for the use of “green” technologies by transit systems and railroads.

Other Committees

HR2331 also incorporates provisions from bills from the Foreign Affairs Committee, the Education and Labor Committee, and the Small Business Committee that authorize foreign aid and outreach to promote energy efficiency, create a training program for jobs in the renewable energy sector, and authorize programs to assist small businesses in the energy sector. Specifically, the bill incorporates language from the International Climate Cooperation Re-engagement Act from the Foreign Affairs Committee (HR2402), that would require senior U.S. officials to represent the United States at international climate change negotiations and lead the effort

to obtain commitments for reductions of CO₂ from China, India, and other nations.

The Tax Bill - HR2776

Approved by the House with a 221-189 margin, this bill reported by the Ways and Means Committee was combined by rule with HR3221 to be sent to the Senate as a single piece of legislation. The “Renewable Energy and Energy Conservation Tax Act of 2007” (HR2776), provides \$16 billion in energy tax incentives focusing on the promotion of renewable energy and energy efficiency.

The bill extends and expands tax credits for renewable energy production. For instance, the renewable energy production tax credit for wind, biomass, and other sources is extended by four years and the solar energy and fuel cell investment tax credits by eight years. The bill also extends the production tax credits for biodiesel and diesel fuel created from biomass for two years. Additional credits include a \$4,000 credit for plug-in hybrid vehicles and a 50-cent-per-gallon production tax credit for cellulosic fuels in addition to the existing ethanol credit. In addition, the bill contains a controversial provision creating tax credit bonds for “green community programs” that Republicans criticized as putting virtually no restrictions on how those funds could be used. To address this, the bill was amended to prohibit the use of the bond to purchase certain “luxury” products, such as water heaters installed for hot tubs or pools and home audio equipment.

The foregoing incentives would be paid for, in part, by repealing the section 1999 manufacturing deduction for all oil and gas companies’ domestic manufacturing activities and tightening the foreign tax credit rules for oil and gas companies.

The Senate energy bill does not contain any corresponding tax provision, therefore it is likely to be the subject of much debate in the conference committee.

The Renewable Energy Mandate Amendment

The House approved a contested renewable energy mandate amendment from Reps. Tom Udall (D-NM) and Todd Platts (R-PA) with a 220-190 vote. The provision requires that 15 percent of retail electricity come from renewable resources by 2020, more than a quarter of which can be met through increased energy efficiency. Despite opposition from Southern Democrats who argued their states did not have

sufficient wind power – the most economically competitive form of renewable energy – to meet the proposed standard, and other committee chairmen including Dingell and Rahall, the bill gained enough bipartisan support to pass. Senate Energy and Natural Resources Committee Chairman Jeff Bingaman (D-NM) has indicated that he will attempt to make this legislation part of the Senate energy bill. However, others in the Senate, including Senate Energy Committee ranking member Pete Domenici (R-NM), have stated that this portfolio standard will be a “major obstacle to the final passage of this bill.”

Lack of Fuel Efficiency Standard

Significantly, the House Energy Package lacks any increase to fuel efficiency standards for automobiles, whereas the Senate bill requires that the entire fleet of cars and light trucks sold in the U.S. must average 35 miles per gallon by 2020. Dingell has already indicated that he may not be able to support a bill including such stringent fuel economy standards. He has stated that he would fight “most emphatically” in conference to delay consideration of fuel economy standard issues until debate over the expected climate change bill this fall.

Outlook

Although both the House and the Senate were able to pass comprehensive energy legislation before the August recess, the final energy legislation to emerge is still far from certain. Tough negotiations over the renewable energy mandate, energy tax measures, and vehicle fuel economy standards remain. Moreover, the White House has threatened to veto both bills. In a statement released August 3, the White House states that the House bills “are not serious attempts to increase our energy security or address high energy cost. In fact, the combination of these two bills will result in less domestic oil and gas production, higher taxes to disadvantage a single targeted industry, and duplicative energy efficiency and R&D efforts that are largely underway already.” When Congress returns this fall, White House opposition and the differences between the House and Senate bills will need to be addressed. Discussions regarding climate change legislation are also to be taken up in the fall. Congress is due back from recess September 4, and our next *Washington Climate Change Report* will cover the evolving developments. ■

Emission Offsets, from page 1

Important issues regarding offsets arise from the bills, including limits on the *types* of available offsets, limits on the *volumes* of offsets allowable for use by regulated entities, provisions for developing a to-be-determined *regulatory infrastructure* to process offset transactions, and important definitional issues. As with other areas of the GHG bills, details matter.

This offset analysis examines indicative terms of the major GHG cap-and-trade bills before Congress. In doing so it considers economy-wide cap-and-trade bills before Congress, including S280 (Lieberman-McCain), HR620 (Olver), S309 (Sanders), and S1766 (Bingaman-Specter). It also considers the power sector GHG cap-and-trade bills: S317 (Feinstein), S1168 (Alexander), S1177 (Carper), and S1201 (Sanders). It does not discuss HR1590 (Waxman), as this bill does not specifically address offsets. In general, the offset provisions in the bills have some similarities, though significant variation across the bills still remains.

Types of Offsets

Generally speaking, the offset provisions in the major GHG bills provide for offset credits or allowances for “sequestration.” However, sequestration means different things in different bills. Several bills generally define sequestration as the long-term capture, separation, isolation or removal of GHGs. A number of bills (e.g., Lieberman, Olver, Sanders, Feinstein, Carper) specifically identify agricultural and forestry practices as being included types of sequestration. The Olver bill also specifically mentions the production of cellulosic biomass crops as a sequestration method. Others bills also specifically mention geologic sequestration (e.g., Bingaman, Sanders, Alexander, and Carper).

Agricultural lobbies are likely to push for agricultural sequestration being a component of a GHG cap-and-trade bill. For a regulated entity or offset provider, tracking how the definition of “sequestration” evolves on Capitol Hill (and in any implementing regulations) will be important. For instance, a narrow definition of sequestration could limit certain projects. Notably, the Carper bill puts a limit on geologic sequestration requiring that such storage in geologic formation must be for at least 300 years and not release more than one percent of the stored carbon.

A number of bills also allow offsets from projects beyond sequestration that reduce GHGs. The Bingaman bill allows a variety of offset projects and streamlined procedures for land-

fill methane, animal waste or municipal wastewater methane, reduction in sulfur hexafluoride emissions from transformers, and coal mine methane projects. The Feinstein bill includes even more categories as potential offset projects. Other bills (e.g., Alexander and Carper) explicitly include energy efficiency projects. Still other bills have rather open-ended provisions potentially allowing for a wide variety of offset projects.

International credits are also included in several bills (e.g., Lieberman, Olver, Feinstein, and Carper). The Lieberman and Olver bills allow the use of international offsets from an EPA-approved international offset program, as well as tradable allowances from projects “in developing countries resulting in certified emission reductions.” Thus, emission reductions of this kind generated under the Clean Development Mechanism to the Kyoto Protocol could conceivably be used as offsets under a federal GHG program.

Forestry credits are mentioned in several bills. Forestry and sequestration credits have been subject to debate on the international level, in part due to concerns about the permanence of such credits. For instance, if a forest burns down, the carbon sequestered in that forest will be released into the environment, and the offset value of any credits arising from that forest may be compromised. Due to concerns such as these, forestry offset credits have not been allowed to be used in the European Union Emission Trading Scheme (EU ETS). However, permanence is an issue not just limited to forestry, and can impact other types of sequestration projects.

To address the permanence issue regarding sequestration, the Lieberman and Olver bills require a covered entity using sequestration offsets to submit to the EPA every five years information demonstrating that the sequestration still exists. Moreover, the entity must offset any loss of sequestration by submitting additional tradable allowances of equivalent amount in the calendar year after a loss occurs. As mentioned above, the Carper bill requires that geologic sequestration must last at least 300 years.

Caps on Offset Use and Early Action

Offset credits have the ability to reduce overall compliance costs by allowing credits from lower-cost abatement options to be used for compliance by regulated entities. However, an over-abundance of inexpensive offset credits could dilute the incentives of regulated entities to undertake modifications at their own facilities.

Several bills put caps on the number of offsets that regulated entities can use for compliance purposes.

These caps – based on a covered entity’s allowance requirement – include up to five percent in the Bingaman bill (for agricultural sequestration credits), 15 percent in the Olver bill, and 30 percent in the Lieberman bill. The Feinstein bill imposes a five percent cap on forest management offsets and a 25 percent limit on international offsets. Other bills provide for implementing regulations or other restrictions on the types of offsets that may serve as de facto caps on offsets.

Most bills provide some form of provisions for credits to be generated by “early action.” For instance, the Bingaman and Carper bills permit for allowances to be allocated to “early action” projects undertaken before an initial allocation period as long as the reductions were reported under Section 1605(b) of the Energy Policy Act of 1992, the EPA Climate Leaders Program or a state or privately-administered registry. The Bingaman bill caps these early actions at one percent of the allowances to be allocated over the first nine years of the program. The Lieberman bill also permits for allowances to be allocated for early action projects registered in a to-be created national GHG registry system (as does the Olver bill) or early actions required under a qualifying mandatory state program.

Regulatory Infrastructure

Notably, the specific details of the offset schemes are often left to implementing agencies. Most bills explicitly delegate at least some measure of authority to the U.S. Environmental Protection Agency. By comparison, the Bingaman bill defers to the President, who would then delegate such authority. In comparison to other more general bills, the Alexander bill contains detailed requirements for individual types of offset projects.

A classic regulatory tension arises in this delegation by Congress. Resolving many technical issues may be beyond the expertise of Congress, or strain the ability of Congress to obtain the necessary consensus in order to pass legislation. However, leaving significant details to be sorted out through implementing regulations can lead to increased litigation over those regulations, and whether the implementing agencies correctly interpreted the will of Congress. It can be easier for an aggrieved regulated entity to challenge an agency regulation than legislation passed by Congress.

In sum, offsets provide a source of revenue for offset providers, and can also be a useful mechanism for reducing compliance costs. Offsets allow regulated entities to find lower cost mechanisms for abating GHG emissions outside of capped sectors. The offset provisions in major GHG

cap-and-trade bills currently before Congress generally contemplate the use of sequestration offsets, as well as some broader use of offset projects. A smaller number of bills allow for international offset credits. Some bills also explicitly cap the total amount of offset credits that can be used. Entities that may either use credits from, develop, or invest in, offset projects thus are well advised to continue to closely monitor the evolution of current language before Congress, especially if entities have specific goals or concerns regarding offsets.

For Further Reading

“State and Trends of the Carbon Market 2007,” The World Bank (May 2007)

This report contains an overview of recent trends in the international carbon market, including the Clean Development Mechanism (CDM) offset program under the Kyoto Protocol. The report also discusses the European Union Emission Trading Scheme and other developments in the international carbon market. Available at www.carbonfinance.org

“State of the Voluntary Carbon Markets 2007: Picking Up Steam,” The Ecosystem Marketplace and New Carbon Finance (July 2007)

This publication surveys the voluntary carbon markets, both in the United States and internationally. Available at www.ecosystemmarketplace.com

“Voluntary Carbon Markets: An International Business Guide to What They Are and How They Work,” Ricardo Bayon, Amanda Hawn and Katherine Hamilton (2007)

This book provides an overview of the international market for carbon credits that are traded voluntarily. It also includes an analysis of how the voluntary carbon market relates to the U.S. market for tradable renewable energy certificates (RECs). Published by Earthscan www.earthscan.co.uk

“World Bank experiences in contracting for emission reductions,” Christopher Carr and Flavia Rosembuj, 2 Environmental Liability (2007)

This article provides an overview of CDM offset purchases by the World Bank and looks at methods for allocating risk in carbon purchase agreements. Available at www.carbonfinance.org ■

An Inconvenient Tax: Could Carbon Fees Become Plan B?

By Gregory C. Staple*

When it comes to curbing U.S. greenhouse gas (GHG) emissions, cap-and-trade proposals have thus far dominated the discussion on Capitol Hill. But an alternative approach to stemming unwanted emissions — namely, a carbon tax, long favored by former Vice President, Al Gore — is gaining attention in Washington policy circles.¹ If cap-and-trade proposals begin to falter in Congress, some form of tax on fossil fuels, based on the amount of CO₂ emitted upon combustion, just might provide a fall back option. This is especially so if the tax were to be folded into a broader climate change package and made largely revenue-neutral by, for example, pairing it with a significant middle-class tax credit (e.g., \$1,000 for a family of four). Such a “rebate” is possible, in principle, even if the carbon tax were quite modest.

Both a carbon tax and cap-and-trade system can be designed to achieve like emission reductions. A cap-and-trade program does so directly by setting an overall annual emissions cap. The market then determines the price for emission allowances so that companies subject to the program can decide if it is cheaper to use allowances (or offsets, as permitted) or not to emit an extra ton of GHG (e.g., by switching fuels or investing in a cleaner power plants and cars).

A carbon tax directly sets the price for CO₂ emissions (methane and other greenhouse gases would not be covered – which is a drawback) but lets market forces determine the overall level of emission reductions from year-to-year as higher fuel prices work their way through the economy and consumers decide how best to adjust.

In theory, therefore, a carbon tax and a cap-and-trade program would both rely on market prices to curb emissions or, as economists say, to set the marginal cost of abatement. Thus, it should be possible to set a tax that achieves a similar level of reduction to that mandated under an emissions cap.

In practice, however, because a carbon tax would largely rely on existing tax authorities and would be monitored indirectly, whereas a cap-and-trade program would require a new government program (e.g. to issue and retire annual allowances and offset credits; to track the emissions of covered parties), the programs would operate quite differently, have different overhead costs and likely yield

different outcomes. To get a better sense of how these two approaches differ, some additional background is helpful.

Designing a Carbon Tax

The most commonly mentioned type of carbon tax involves a new excise tax on fossil fuels, typically stated in dollars per ton, based on the volume of expected CO₂ emissions. That amount can be readily determined using established standards for calculating the carbon content of a given fuel (coal, oil, natural gas) taking into account its thermal energy (BTUs). The tax would be higher on coal per BTU than oil, and higher on oil than natural gas. In general, the tax would be levied “upstream” near the point of extraction or importation, and it is estimated that only approximately 2,000 entities would need to be taxed “at the source” to achieve near economy-wide coverage.

A carbon tax hence would be borne initially only by coal mines, oil and gas importers, refineries, and natural gas producers. It would be passed through to the rest of the economy (e.g., the electric power and transport sectors) through the wholesale price for fossil fuel inputs. Consumers (and other end-users) would, in turn, face higher retail prices for electric power, gasoline, home heating oil and the products that rely on same in rough proportion to the relative carbon content of the fuels involved.

To ensure fairness and avoid double counting, most carbon tax schemes would provide an exemption or credit for a non-combustion use of a fuel (e.g., for natural gas required as a feed stock for plastics). A credit or tax rebate would also apply if a fuel is exported from the U.S. and to inventory exchanges between covered parties. In addition, some proposals would provide a ton-for-ton tax credit if CO₂ that otherwise would be vented is later captured and sequestered by, for example, a downstream power plant.

How high should a carbon tax be to serve its purpose? An economist would answer that the tax should force emitters to bear the full social cost or negative externality – that is, the global warming potential – from each additional ton of CO₂ that is released. These costs include the loss of coastal property from rising sea levels and the resulting displacement of local populations; the health impacts from the spread of tropical diseases; higher insurance costs caused by elevated risks of extreme weather; and so on. Estimating these costs is not straight forward and has led to considerable controversy given the uncertainty which still exists regarding future climate

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change scenarios and the assumptions which must be made about valuing human health and other impacts over time.²

Absent a consensus on the actual social cost from GHG emissions, in the U.S., several tax advocates have suggested an initial fee of \$10-\$20 per ton of CO₂, (or roughly \$36-\$72/ton of carbon³). The fee would then be raised significantly as the level of GHG approaches the target stabilization level (i.e., a level beyond which the potential costs of climate change are dramatically greater), and the social cost of additional emissions therefore would become much higher.

Behavioral Impact

But is a CO₂ tax of \$10-\$20/ton sufficient to induce emitters to invest in alternative, low-carbon technologies and processes, or to encourage consumers of GHG-intensive goods and services to change their spending patterns? In other words, how much of a reduction in CO₂ emissions might we expect to see in the U.S. from a tax of this magnitude? The same question could be asked with respect to a cap-and-trade scheme that includes a safety valve price in the same range (\$10-\$20 per ton of CO₂) as does S1766, the new cap-and-trade bill introduced last month by Senators Bingaman and Specter.

One recent study published by the American Enterprise Institute (AEI) found that a \$10 per ton CO₂ tax might reduce U.S. CO₂ emissions by about 7.4 percent; a \$20 tax would lead to almost 15 percent reduction with the bulk of the reduction coming from a decline in the use of coal fired electricity.⁴ However, another recent study conducted by the Brattle Group, which focused more closely on the electric power sector, found that even a \$30 per ton CO₂ tax would only lead to marginal fuel substitution by coal power generators given rising natural gas prices. As a result, Brattle estimates that a \$20/ton tax might only reduce power sector CO₂ emissions by about 8 percent.⁵

In short, based on the limited evidence available, it is likely that a carbon tax would need to be fairly high – perhaps \$50/ton of CO₂ or more – to begin triggering the type of substantial GHG reductions contemplated from the power sector by most cap-and-trade bills. This is also true when it comes to the transport sector given that consumption of gasoline is not overly sensitive to price either, even in the longer term. Economists have found that a sustained 10 percent increase in the price of gasoline only reduces consumption by 6-7 percent over time (and less than three percent in the first few years).⁶ Thus, given that each \$1 of CO₂ tax would translate into about a \$.01 increase at the gas

pump, even a \$.50 per gallon new gas tax (\$50 per ton of CO₂) – as Congressman John Dingell has threatened, largely to test public support for a tough global warming bill – might lead to only an 11 percent long-term decline in consumption.⁷

Because carbon taxes are designed to discourage a public “bad” (excess GHG emissions) and not to raise government revenues, tax advocates generally argue that all (or the great bulk) of the resulting revenue should be rebated to taxpayers. But there is little agreement on how best to rebate the billions of dollars that could be generated by a new tax; even a tax of \$20 per ton of CO₂ would generate roughly \$100 billion annually given U.S. CO₂ emissions are over five billion tons a year. Some would rebate the tax primarily to energy consumers. But most economists favor using tax revenues to reduce existing taxes that penalize work and investment (payroll taxes; the “double taxation” of corporate income) or to support R&D for clean energy technologies and to reward energy efficiency.

Legislation

To date, the benefits of carbon taxes have won over only a handful in Congress. This past April, Rep. Pete Stark (D-CA), a senior member of the House Ways and Means Committee, introduced the Save Our Climate Act of 2007 (HR2069). The bill, now co-sponsored by two other House Democrats (Reps. Tim McDermott and Raul Grijalvo) imposes an excise tax on “any taxable fuel sold by the manufacturer, starting at \$10 per short ton (2,000 pounds) of carbon produced or imported.” (That is only about \$2.72 per ton of CO₂.) After 2009, the tax would be increased \$10 annually until U.S. CO₂ emissions are reduced to 20 percent below 1990 emissions.

HR2069 provides an exemption for sales or in-kind exchanges of fuel deposited in the Strategic Petroleum Reserve and for certain inventory exchanges. Refunds or credits are also provided for fuel exports and for downstream uses where the fuel’s carbon content is later embedded or sequestered. But persons subject to the tax may not earn credits from any non-fuel related carbon offsets (e.g., methane capture or a reforestation project). And the bill does not provide any guidance on how the revenue from the new tax should be spent. Nor does it contain any provision for monitoring the year-to-year impact of the new tax on U.S. emissions, which would apparently make the bill’s annual price escalator clause dependent on other legislation.

Senator Christopher Dodd, (D-CT) also has publicly endorsed a “corporate carbon tax” starting at roughly \$10 per ton. Dodd would use the resulting revenue to “fast track” ▶

renewable energy R&D and to bring more energy efficient technologies to market. In several campaign appearances (he is also a Presidential hopeful), Dodd has pitched his tax plan (which, as yet, had not been formalized in a bill) as one of a several related tools to reduce GHG emissions consistent with the strictest cap-and-trade bill currently before the Senate (S309). That bill, which Dodd also supports, would reduce U.S. emissions 80 percent below 1990 levels by 2050.

Plan B?

So are Pete Stark and Christopher Dodd on to something? Probably not, at least not yet. Tax increases are still regarded as political suicide by most members of Congress and a new carbon tax is no exception. Many in Congress also believe that the Clinton Administration's ill fated 1993 plan to tax energy producers based on the heat content (BTU value) of fuel helped the Republicans regain the House in 1994, although Clinton's BTU tax was not designed to curb GHG emissions but to close a budget deficit and would have applied equally to renewable energy sources.

Hence, on Capitol Hill, economics aside, carbon taxes generally fail the first test for any alternative public policy – political feasibility. This is frustrating to many tax advocates because the impact on energy prices from any properly structured cap-and-trade program (i.e., one that auctions emission allowances at a price approximating the social costs of unwanted emissions) is likely to be similar. It is all a question of perception which, of course, can be everything in politics and in the marketplace.

Cap-and-trade schemes promise results but at a price that is largely masked; the cost of emission allowances will also be passed through to consumers but in less obvious ways, particularly compared to a gas tax. The public also may find it hard to grasp the economic subtlety of the tax camp's strongest point – in the near term, the cost to the economy of setting the wrong tax level could be much less than setting the wrong emissions cap.

This is so because, assuming the tangible benefits of any emission reduction by the U.S. are still quite low (some would dispute this strongly), then an overly strict cap will force “uneconomic” abatement decisions – that is, abatement actions whose marginal costs greatly exceeds the marginal benefits. The near-term benefits are assumed to be roughly the same for any feasible cap today since the current atmospheric level of GHG is not economically critical, and reductions in U.S. emissions will not tip the balance.

By comparison, if the tax is too high, then downstream consumers will simply pay the tax rather than invest in more expensive and uneconomic abatement technologies.⁸ Tax advocates also assert that a carbon fee can be more easily adjusted without concern for compensating persons who have invested billions in emission allowances issued under a cap-and-trade program.

The trouble with these arguments is that there is not – and probably never will be – any economic or political consensus on just what the marginal dollar benefit really is from abating an extra ton of GHG. And if caps prove too costly in the short run (however measured), they can be relaxed too. Investors in any cap-and-trade scheme will simply factor that political risk into the price of allowances.

So what is to be done? Tax and rebate or cap-and-trade? The latter approach is still the safer bet. Yet, proponents of a carbon tax have made it clear that the other camp needs to do a better job of explaining itself. The general public still needs to be convinced that a large new federal emission trading program really is the most efficient and fairest way to ratchet down America's carbon footprint. (See the next article). ■

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- 1 Carbon taxes have also been advocated by many Republicans including Gregory Mankiw, the former Chairman of President Bush's Council of Economic Advisors. For a sample of supporters, see www.carbontax.org
- 2 The leading work on this subject is *The Economics of Climate Change*, *The Stern Review*, directed by Nicholas Stern. (Cambridge University Press, 2006). It found that, absent government intervention, GHG emissions will place a cost on the global economy equal to at least five percent of GDP annually for an indefinite period.
- 3 Upon combustion, one ton of carbon yields approximately 3.67 tons of CO₂. Thus, to convert a CO₂ tax rate to a carbon rate, divide the carbon rate by 3.67 and vice versa. A \$10 per ton CO₂ tax is equal to a tax of about \$36.70/ton of carbon and a \$10/ton carbon tax is equal to a tax of about \$2.72 per ton of CO₂.
- 4 See “Climate Change: Caps vs. Taxes” by Kenneth P. Green, Steven R. Hayward and Kevin A. Hassett, *Environmental Policy Outlook*, American Enterprise Institute June 2007.
- 5 “The Economics of U.S. Climate Policy Impact on the Electric Industry,” Technical Report, The Brattle Group March 2007.
- 6 Evidence on the impact of the price changes in gasoline consumption can be found at “Elasticities of Road Traffic and Fuel Consumption with Respect to Price and Income: A Review,” Phil Goodwin, Joyce Dargay and Mark Hanly. *Transport Reviews*, Vol. 24, No. 3, pp. 275-292 May 2004.
- 7 A \$.50 per gallon gas tax would increase the current \$3 pump prices by about 17 percent, although it would more than double existing gas taxes. U.S. motorists already pay an average of about \$.43/gallon in taxes – an 18.4 cent federal excise tax and an average of roughly 25 cents in state and local taxes.
- 8 See *The Stern Review*, Chapter 14 for a more extended discussion of this point. Accordingly, the report argues that policy instruments (the use of taxes and caps) should distinguish between the short and long run and should recognize that the expected costs and benefits of mitigation actions will vary over time.

Climate Change Policies: What Does the Public Want?

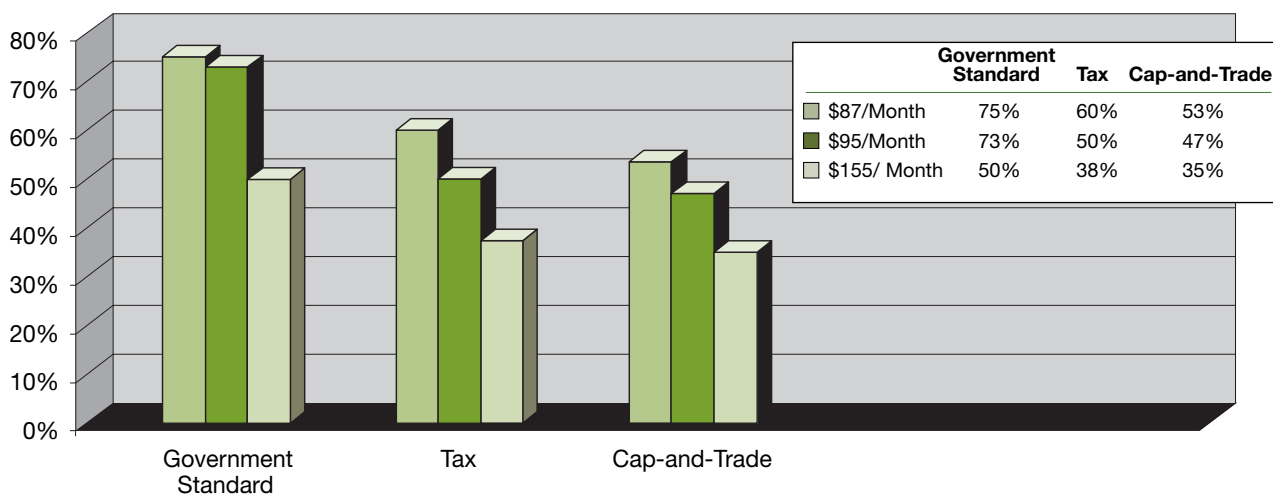
By Sarra S. Mumayiz and Nicholas M. Gulan*

While the debate on Capitol Hill continues on the best approach to minimizing the level of greenhouse gas emissions, the American public is becoming more aware that the increased costs — explicit or not — will inevitably be shifted toward consumers. Only a handful of polls have been published regarding what Americans think about the best policy options for reversing global warming and their willingness to pay for them.

companies to reduce emissions; b) a tax on GHG emissions; and c) a market-based cap-and-trade system that puts a ceiling on total emissions.

The survey found that the public was more likely to favor imposing any of these policies on the electricity sector than on the petroleum industry, presumably due to the direct effect the policies would have on vehicle fuel prices. When asked about their willingness to pay increased household electricity costs extrapolated to 2020 at three

Respondents Who Chose Each Policy at Different Price Levels in the Electricity Sector



The chart shows the preferences of survey participants for policies designed to reduce GHG emission for the electric power sector. Respondents were given three price ranges for prospective rises in monthly household electricity bills from adoption of a given policy: \$87, \$95, or \$155. At each price point, respondents preferred a government standard or tax to a cap-and-trade program. The survey involved 1,491 respondents conducted by Knowledge Networks between April 13 and May 19, 2007.

Data Extracted from *New Scientist* magazine's poll "American's Evaluation of Policies to Reduce Greenhouse Gas Emissions," June 23, 2007.

One of the most detailed surveys was published in the June 23, 2007 edition of *New Scientist*. It looked at Americans' opinions regarding hypothetical policies affecting the petroleum and electricity sectors. Subjects were asked to respond to three policy options: a) a government-mandated standards that require

different price levels, 75 percent of respondents voted for a \$2 monthly increase and 73 percent voted for a \$10 monthly increase. The greater support for policies in the electricity sector may demonstrate Americans' willingness to make changes in their energy consumption at home, while many find it difficult to curb their gas consumption. ▶

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Washington Climate Change Report

Of particular note to policy advocates was the finding that, for both sectors, a mandated standard was favored over a carbon tax or cap-and-trade system. In fact, the vast majority of Americans still preferred mandated standards even if it meant a \$4 per gallon increase in vehicle fuel or a \$150 monthly increase in the average household electricity bill.

The study also highlights Americans' oil dependence and their reticence to alter their habits at the pump. This is consistent with other studies on rising fuel prices. According to a June 2007 survey conducted as part of the Discover® Spending Confidence Monitor, 80 percent of Americans believe that their cars are an essential part

of daily life. If gasoline prices rose more than a dollar per gallon (the average price for regular unleaded was \$3.14), roughly 70 percent of those polled said they would simply cut back on discretionary spending and even living expenses.

In theory, increased costs should discourage consumption, but if Americans are willing to make financial sacrifices elsewhere to keep up with rising fuel prices, the intended effect may be negligible. A CBS News/*New York Times* poll conducted in April 2007 seems to corroborate this attitude. When asked if they would favor an increased federal tax on gasoline to reduce both energy consumption and global warming, 58 percent of respondents were opposed. ■

2007 Congressional Calendar

AUGUST						
SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

SEPTEMBER						
SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

OCTOBER						
SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

■ House Recess ■ Senate Recess

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