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TAX ASPECTS OF A CAP-AND-TRADE PROGRAM

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BEFORE THE

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TAX ASPECTS OF A CAP-AND-TRADE PROGRAM

THURSDAY, APRIL 24, 2008

U.S. SENATE,
COMMITTEE ON FINANCE,
Washington, DC.

The hearing was convened, pursuant to notice, at 10:09 a.m., in room SD–215, Dirksen Senate Office Building, Hon. Max Baucus (chairman of the committee) presiding.

Present: Senators Rockefeller, Bingaman, Kerry, Salazar, Snowe, and Bunning.

Also present: Democratic staff: Bill Dauster, Deputy Staff Director and General Counsel; and Jo-Ellen Darcy, Senior Environmental Advisor. Republican staff: Nick Wyatt, Tax Staff Assistant.

OPENING STATEMENT OF HON. MAX BAUCUS, A U.S. SENATOR FROM MONTANA, CHAIRMAN, COMMITTEE ON FINANCE

The CHAIRMAN. The hearing will come to order.

First, I apologize to the witnesses for the delay. Many of us are deeply involved in the negotiations on the Farm Bill. I hope we get that wrapped up this week, and again, I apologize.

In May 1791, Thomas Jefferson wrote his daughter, Martha, "When we consider how much climate contributes to the happiness of our condition, we have reason to value highly the accident of birth in Virginia."

Well, I would say I would quibble a little bit about the choice of Virginia. I often think my State is a little better, especially in the summer. But no one would quibble with the sentiment that we have reason to value highly the accident of birth in America.

In the years since Jefferson's time, we have learned how very much climate contributes to our condition. It is much more than even Jefferson could have guessed. In the years since Jefferson's time, we have also learned how human activity is changing our climate.

Jefferson also wrote to his granddaughter, Cornelia, "Never put off to tomorrow what you can do today. Never trouble another with what you can do yourself." It is in that spirit that more and more Americans are coming to the view today that it is time to address the problem of climate change. More and more Americans are coming to the view of addressing climate change as something we can do ourselves rather than leaving it to our children and grandchildren.

As attractive as the climate may be in my State of Montana, we are already seeing the effects of climate change. Over the last 40

years, annual snowfall has decreased by 60 inches, and over the last 40 years, wildfires of more than 1,000 acres have increased 6-fold. Less snowpack, although not so much this year, but ordinarily over most of the last years, means less water for irrigation, and that can lower crop yields and, in some cases, our farmers are having a tough time hanging on.

We need to address the problem of climate change, but it matters how we address climate change. We must protect our way of life, we must protect our economy, and we must protect both our global competitiveness and our environment.

Majority Leader Reid has put addressing climate change on the Senate schedule. In June, the Senate will consider a cap-and-trade program for emitters of greenhouse gases. It is likely that much of the Senate debate this June will focus on the effect that a cap-and-trade program would have on our economy.

The Environmental Protection Agency recently analyzed the cap-and-trade proposal that the Senate will consider. The EPA found that under that program, from 2010 to 2030, America's economy will grow by 80 percent. Now, that is 1 percent less growth than without the proposal. That is, by and large, good news. As with any analysis, though, there are uncertainties, and we have to move ahead with the best information we have.

It is possible that action may have costs. It is highly likely that inaction will also have costs, probably greater. We have asked our witnesses today to share with us their analysis of the effects of cap and trade, and we also have asked them for their thoughts on the best ways to design such a system.

We will also want to ask, how should the tax code treat allowances allocated to emitters under cap and trade, and your general thoughts on that would be very helpful. For example, what about the revenues generated from an auction of allowances? How can we cushion the effect of increased energy costs that can result from the cap-and-trade program, and how can we minimize those effects on our economy and consumers?

So let us consider how addressing climate change may contribute to changes in our Nation's condition. Let us not put off to tomorrow the analysis that we can do today. Let us do all that we can to ensure that our children and grandchildren will continue to have every reason to value highly the accident of birth in America.

Let us turn now to witnesses. Senator Grassley, whom I had spoken to earlier, is also in the Farm Bill negotiations and will try to get over.

Our first witness is Peter Orszag, Director of the Congressional Budget Office; next, Robert Greenstein, who is the executive director of the Center on Budget and Policy Priorities; and next, Mr. Henry Derwent, president and CEO of International Emissions Trading Association and former Director of International Climate Change, Air, and Analysis at the Department of Environment, Food, and Rural Affairs in the U.K.

I would just remind all witnesses, we would ask you to hold your testimony to about 5 minutes, and your statements will automatically be included in the record.

Dr. Orszag, you are first.

STATEMENT OF DR. PETER R. ORSZAG, DIRECTOR, CONGRESSIONAL BUDGET OFFICE, WASHINGTON, DC

Dr. ORSZAG. Thank you very much, Mr. Chairman and members of the committee.

I want to make five points. First, global climate change represents one of the Nation's most significant long-term challenges. There is a growing recognition that the risks involved may be extensive, and possibly even catastrophic. Reducing greenhouse gases through something like a cap-and-trade system can limit the damages from global climate change, and especially the risk of substantial problems or damages.

Second, under cap and trade the mechanism for reducing emissions to meet the cap is an increase in the price of carbon-intensive goods and services. That is essential to the success of a cap-and-trade system. The price increases encourage demand shifts away from energy-intensive and carbon-intensive goods and services and encourage shifts in production toward less carbon-intensive methods. The size of the price increase depends on the stringency of the cap. The more stringent the cap, the larger the price increase. That is simply, again, to achieve the necessary reductions.

Under S. 2191, more commonly referred to as the Lieberman-Warner legislation, the Congressional Budget Office has estimated a permit price of roughly $30 a ton in 2015. Just to put that in terms that may be more understandable to people, that would be about a quarter per gallon of gasoline. There are other effects on other energy prices as well.

The CHAIRMAN. That is a quarter increase in the cost of gas?

Dr. ORSZAG. Per gallon.

Third point. The permits themselves will be very valuable. We estimate that in 2012, under Lieberman-Warner, the permits would be worth approximately $145 billion, and that value would rise over time as the cap became more and more stringent. What you do—what you as policymakers do—with those permits makes a lot of difference, both in terms of the distributional consequences and the macroeconomic effects.

In particular, you face a choice between auctioning the permits or giving them away. There is a false argument that is made that giving the permits away would avoid the price increases for consumers. As I have already said, those price increases are essential to the success of the cap-and-trade system, and they would occur even if the permits were given away.

So what are the real comparisons between auctioning and giving them away? And here I am going to refer to this chart, and I think you also have copies of it in front of you. If not, we can make sure you get them.

The CHAIRMAN. Do Senators have copies? Do you have a copy, Senator?

Senator BUNNING. Yes.

The CHAIRMAN. Good.

Dr. ORSZAG. So, just to walk across what we have presented here, there are, again, two dimensions to evaluate the effect: one is on distributional consequences and the second is on efficiency or macroeconomic consequences. If you sell the allowances (auction the permits) and you use the money to rebate, on an equal basis,

a lump sum (the same amount per household), then what you would do is change the distributional consequences (see panel 1). Those price increases by themselves that occur under a cap-and-trade system are regressive because low-income households consume more of their income in energy-intensive things than high-income households, and also consume a larger share of their income.

You can offset that regressivity through something like a lump sum rebate, and that is the pattern that you see here, where the percentage change in after-tax income is actually higher for low-income households than for high-income households, so that the overall program is progressive because what you are doing with the auction revenue is so progressive.

However, using the money for that purpose entails some macroeconomic consequences. There is a cost to changing the way we conduct business in the United States, and if you use the revenues fully to cushion the blow distributionally, you wind up with the macroeconomic and efficiency consequences that I show on the bottom part, a loss of about a half a percent of GDP.

Alternatively, you could sell the permits and use the revenue to reduce either payroll taxes or corporate taxes. If you did that, the distributional consequences are regressive, both because of the price increases and because of the tax changes themselves, but the macroeconomic consequences are attenuated because you are using the money to sort of cushion the blow on the macroeconomy. So you can see on the bottom panel that the macroeconomic loss is much smaller, about half as much, if you use the money for that purpose.

Now let us go to the final column and evaluate giving allowances away. There you see that you have all the regressivity of the second panel and all the macroeconomic costs of the first panel. When you give the permits away, you are effectively doing the same thing from an economics perspective as auctioning the permits and then giving the revenue that you raised as a result to companies, so you are getting neither the macroeconomic benefit nor the distributional benefits from doing that.

I will just leave you with the thought that you could combine different approaches, trying to hit distributional and macroeconomic objectives. But, regardless of how you rank those, it is going to be more difficult the larger the share of the permits that are given away, because on both dimensions you are not doing particularly well through that approach.

Thank you very much.

The CHAIRMAN. Thank you, Dr. Orszag.

[The prepared statement of Dr. Orszag appears in the appendix.]

The CHAIRMAN. Mr. Greenstein?

STATEMENT OF ROBERT GREENSTEIN, EXECUTIVE DIRECTOR, CENTER ON BUDGET AND POLICY PRIORITIES, WASHINGTON, DC

Mr. GREENSTEIN. Thank you, Mr. Chairman and members of the committee.

I would like to cover four points. First, the impact of a cap-and-trade program on low- and moderate-income consumers; second, how Congress could use the tax code and other tools to address

that so we do not get an increase in poverty; third, how you could use the tax code to address effects on middle-income consumers; and fourth, some other tax policy considerations.

Significant increases in the price of energy and energy-related products will occur as a result of effective policies to reduce emissions, and households with limited incomes will be affected the most by those higher prices, both because they spend a larger percentage of their budgets on energy, on necessities, and because they are the least able to afford, say, a new fuel-efficient car or heating system.

If nothing is done to protect them under a cap-and-trade program, many more Americans will slip into poverty, and those who are poor will become poorer. Specifically, just from a 15-percent reduction in emissions—what one would get to in about a decade or maybe a little less under many of the major bills—the bottom 20 percent of the population, that is the 60 million Americans with the lowest incomes, would, on average, pay increased costs of $750 to $950 per year as a result of the increased energy costs. But this is a group whose average income is only a little over $13,000 a year.

Now, the good news is, it would take only a modest share of the value of the permits to address that. We estimate that it would take only about 14 percent of the value of the permits to fund a climate rebate program that would preserve the purchasing power of the bottom 60 million Americans and provide significant relief to many of the next 60 million, the next 20 percent, as well.

My second point is, well, how would we do that? We would recommend doing it through two main mechanisms. The first is the Earned Income Tax Credit, which this committee knows well. Congress and this committee relied on the EITC expansions in both 1990 and 1993 to offset the impacts on low-income working families of increases in gasoline and other excise taxes enacted in those years, and a climate rebate could readily be built into the EITC, adjusted to be calibrated to increases in consumer energy costs as a result of cap and trade so that we would offset the average effects on low-income working families.

However, the relief for low-income families cannot be provided entirely through the tax system because half of the people in the bottom fifth would be missed. They are not in the income tax system. We are talking about low-income elderly and people with disabilities, and some of the poorest children in the country.

So a tax-based strategy involving the EITC would need to be coupled with a second form of assistance to reach those households. That, too, is readily doable. Every State in the country has an electronic benefit transfer system that uses debit cards to provide food stamps and various other benefits; they are just programmed onto the debit card.

One could program onto the debit card a climate rebate and simply automatically enroll all the households that either receive food stamps or are enrolled in the low-income subsidy for the Medicare prescription drug benefit. What you would then have, between that and the Earned Income Tax Credit, is a mechanism to very efficiently reach most low-income households in the country without setting up a new program or new bureaucracy, and with extremely

low administrative costs. Again, we estimate it would cost 14 percent of the value of the permits to do that.

Point number three: middle-income consumers. If most or all of the permits are auctioned, you would then have sufficient resources to also mitigate impacts on middle-income consumers. To add them in, we are talking about going from 14 percent of the permits to maybe in the vicinity of 50 percent of the permits, depending on how you do it.

The best mechanism for the middle-income relief would be a new climate change tax credit. This would be far more effective in mitigating effects on middle-income consumers than a reduction in personal income tax rates. If you reduce personal income tax rates, obviously you would get very small effects for people in the 10- and 15-percent brackets, the bulk of the middle class, and the biggest benefits for people at the top who are the people who least need help in shielding them from the impacts of higher energy costs.

My final point involves energy tax incentives. That is simply to make the point that the higher prices for energy products that would result from a cap on emissions would create strong market incentives for energy conservation and private-sector investments in clean energy technologies.

My point is, some investments, meritorious investments that require tax incentives today, because otherwise there is not enough market incentive for them, will no longer require tax incentives, or as robust tax incentives, under cap and trade because the market incentives will fundamentally change as a result of the much higher price for fossil fuel energy, thereby advantaging alternative energy sources.

I would recommend that the committee ask CBO or another appropriate body, if you pursue cap and trade, to evaluate existing energy tax incentives to try to sort through which ones would still make sense and which ones would no longer be needed or ought to be modified under a cap-and-trade system that modifies market incentives.

The bottom line is that well-designed—and I underscore well-designed—cap-and-trade legislation can generate sufficient resources to avoid increasing poverty to mitigate impacts on middle-income consumers, and obviously this committee would need to be in the middle of ensuring that that occurred.

Thank you.

The CHAIRMAN. Thank you very much, Mr. Greenstein. That was very interesting, very helpful. Thank you.

[The prepared statement of Mr. Greenstein appears in the appendix.]

The CHAIRMAN. Mr. Derwent?

STATEMENT OF HENRY DERWENT, PRESIDENT AND CEO, INTERNATIONAL EMISSIONS TRADING ASSOCIATION, GENEVA, SWITZERLAND

Mr. DERWENT. Mr. Chairman, distinguished members of the committee, thank you for giving me the opportunity to provide some testimony which is drawn from my own experience, not only as chief executive of the International Emissions Trading Association, which probably puts my preferences pretty firmly on the table al-

ready, but also from my previous role over 10 years in charge of domestic and international climate change policy in the lead department in the United Kingdom.

My written testimony offers you a story from the United Kingdom, with some notes of caution and some encouragement to design of taxation systems covering carbon. There is a cap-and-trade story from the U.K. and from the E.U. I think it is reasonably well known, and we may get into it later. But there are some important taxation proposals which accompanied it and had the same root in a public/private sector report in 1998, taken up by then-Chancellor of the Exchequer, Gordon Brown.

We have a climate change levy in the United Kingdom, which is a tax on the business use of energy. It is recycled, to a large extent, back to business by means of a rebate in the employer's contribution to National Insurance, so, if you like, a tax on employment. One of the rationales was to try to reduce such taxation in order to tax bads, rather than goods, and in this case, environmental bads.

A proportion of those levied proceeds, however, does go into a group of programs which were intended to cover venture capital investment in early-stage low-carbon technology, into loans for smaller companies looking to improve their energy efficiency, and in energy efficiency advice across business.

At the same time, the United Kingdom introduced climate change agreements for energy-intensive industries, by means of which 80 percent of the tax could be rebated if those companies met a negotiated target for improved energy efficiency.

It is not easy to see exactly how successful any policies in this field have been over a period marked by extraordinary fluctuations in the basic commodities of oil, gas, and so forth. However, there is quite a significant body of evidence to suggest that the levy on its own had only a limited impact on investment decisions and on behavior, certainly among less energy-intensive companies. It was generally regarded as a blanket tax about which companies could do very little.

The impact of the agreements, however, has been significantly greater, as management's minds were focused by the prospect of meeting a target and having a very large payment to the tax man dependent on achieving or not achieving that.

The whole package was regarded by the U.K. with parliamentary and our business associations as not damaging U.K. business overall because, in particular, it stimulates energy efficiency, much of which action results in savings to industry, and therefore savings to the national economy.

We have managed to make cap and trade and energy taxation work together in a variety of different ways over those years. They can be put together reasonably successfully, but there are a number of technical design issues which need to be covered.

How does this fare on the argument of whether to go for a cap-and-trade system or a taxation system? I think one of the strong arguments usually put forward in favor of taxation is the predictability of a cost impact and the low transaction costs. I do not think that the U.K. experience altogether bears that out, because the tax principles that were very, very simple to begin with were, after a

great deal of lobbying, turned into an extremely complex and changeable set of obligations.

The other conclusion one draws is that, whether through tax or trading, its artificial "cliff-edges" are affecting large quantities of money to be paid, which really does make the difference.

Our industry has, for a long time, supported the importance of a carbon price. I will end by quoting from a recent Confederation of British Industry report: "We believe that cap-and-trade schemes, such as the E.U. emissions trading scheme, have several distinct advantages over taxation as a measure focused on large emitters in the power and industrial sectors. By setting a cap on emissions for those sectors within the scheme, they offer certainty about the level of reduction. And despite calls for a global carbon tax, international agreement for a global cap-and-trade system looks very much more likely."

Plus, as I said before, the impact on U.K. competitiveness, once certain safeguards have been undertaken, is generally regarded to be neutral at worst. Thank you.

The CHAIRMAN. Thank you all very much.

[The prepared statement of Mr. Derwent appears in the appendix.]

The CHAIRMAN. Dr. Orszag, in your testimony you state that the less fluctuation in price allowances, the closer the cap-and-trade system will come to achieving the economic efficiency of a carbon tax. One mechanism for minimizing fluctuation in the price bounces is the so-called "safety valve," which has been bandied about here as something that we should seriously consider, when the government sells additional allowances or once the price of carbon reaches a certain level.

I am just curious how you would work with all of that. To contain the cost of this new system is the key to make this thing work. The National Commission on Energy Policy and the Nicholas Institute have developed a new cost-containment proposal you may be aware of. Essentially, their proposal would take allowances for out-years and place them in the reserve pool. Allowances from the reserve pool would then be released if the price of allowances reached a certain level. The purpose, again, of this proposal is to achieve cost containment without compromising the environmental goals of the cap, and I would just appreciate your thoughts on all that.

Dr. ORSZAG. Well, that would be equivalent, just to be clear, basically to a safety valve in which any permits that are sold today under the safety valve then come out of some future allocation. So I think it may be clear to think about it that way.

The CHAIRMAN. Right.

Dr. ORSZAG. And you face the same trade-off there that you face in general, which is, all right, you will provide more certainty then about your ultimate emissions and concentration levels, but at a cost in those out-years of having potentially more uncertainty about prices and costs. So you cannot have perfect certainty both over the cost each year and emissions each year.

The CHAIRMAN. Right. Correct. Your thoughts on how to address that problem.

Dr. ORSZAG. The basic insight that comes from comparing the environmental dynamics and the economics is that a ton of reductions

this year is basically no different than a ton of reductions next year, and having some flexibility across time in terms of when you do the emissions reduction can matter a lot in terms of the cost of achieving any long-term objective.

That is the big reason why a tax, actually, in most studies, is more efficient than a simple cap and trade, because both of them allow you, in each year, to achieve the reductions where they are the cheapest, but a tax allows you to achieve them when they are the cheapest, and that makes a big difference.

The CHAIRMAN. How comfortable are you with your estimates as to revenue raised and the rebate program to address distributional problems and costs of cap and trade, and just the parameters? If you could just give a sense of the degree to which your estimates, you think, are pretty accurate, or the range.

Dr. ORSZAG. Yes. Well, let me do that. The permit prices, for example, are one way of calibrating that. We provide, at the end of our cost estimate of Lieberman-Warner, comparisons to other numbers that are out there. So, for example, I had given you—I am going to just look it up very quickly—roughly $30 a ton in the middle of the next decade under Lieberman-Warner.

There are studies. I will not cite them, but basically there are studies from EPA and from other entities. We are right in the middle of it. There is a significant range. I would say a reasonable range might be plus or minus $5 or $10 per ton, maybe even more than that. But we are in the middle of the range that is out there. I think I am comfortable, but there is significant uncertainty. I guess I would put it that way.

The CHAIRMAN. Now, comparing this with the Clean Air Act allowances and the cap and trade, clearly this is much more complicated. Lessons learned from SO_2 cap and trade that could be applied to this, and just, what are the big problems? If you can put your finger on the greatest additional complexities, what would they be?

Dr. ORSZAG. I was going to say, the big difference is, this is far larger. This effect basically is much more of the Nation's economy in a deeper sense than just the electricity sector, and it also has larger cost implications than the sulfur dioxide trading program. So I think there are lessons that we can learn about the volatility of permits in a cap-and-trade system with the fluctuations that occur each year, and other things from the sulfur dioxide program, but it is much, much smaller. Extrapolating from that can prove treacherous.

The CHAIRMAN. My time has expired.

I would turn to Senator Grassley, but he is not here. I have to leave to go to the Farm Bill negotiations, so Senator Bingaman will now take over the hearing. Thank you.

Senator Bingaman?

Senator BINGAMAN. Let me thank you all for your testimony. Let me start with you, Dr. Orszag, and ask, you made the point in your testimony, as I understood it, that the decision about whether to auction these allowances or permits or to give them away will not affect the price increase for energy products. Can you elaborate on that?

Dr. ORSZAG. Sure. And I think this is important because the contrary is often asserted. If you give the permits away to whatever firm, at some point that firm is going to realize that, yes, they have the permit in hand, but, if they are going to produce the widget or produce the kilowatt-hour of electricity, they are going to use up that permit.

Instead of doing that, they could sell it for whatever amount of money. If they do not then pass that cost on, if they do not then charge consumers for that lost opportunity, they are not serving their shareholders, and ultimately market forces will come to bear. That is one way of looking at it. Another way of looking at it is, you are not going to get down to the cap from wherever you were going to be unless there are price increases that encourage both consumers to switch their behavior and producers to switch the way that they do business, and that requires a pricing mechanism. It just does not happen any other way.

Senator BINGAMAN. But you are saying that prices will increase.

Dr. ORSZAG. For consumers, yes.

Senator BINGAMAN. For consumers. Either way, whether you auction them or whether you give them away.

Dr. ORSZAG. And I will give only a very small caveat, which is, in some regulated electricity sectors where the regulations are done at a State level, the effects may vary slightly if you give the permits away rather than auctioning them. But to a first approximation, consumers are going to pay the same regardless of how you allocate the permits.

Senator BINGAMAN. Let me ask about, if we were to adopt some type of safety valve, either through this mechanism that Senator Baucus described or otherwise—and as you know, we have such a safety valve in the bill that Senator Specter, I, and others introduced—how could you rationally settle on what the safety valve price ought to be? I mean, we put $12 in the bill that we introduced last year. That was, to some extent, taken out of thin air. I know Mr. Derwent was telling us right before the hearing that the price for a permit under the European trading scheme is now about 25 euros, which is about, what, 40 some-odd dollars. So how would we go about setting the price of a safety valve if we included such a thing in the legislation?

Dr. ORSZAG. I think the way you would do that is, you would take the models that are out there that try to calculate what the optimal path of carbon emissions and carbon prices would be, and you could set the safety valve either at that, or maybe slightly higher than that if you wanted to add a little margin in. But basically there are both academic and official agency estimates of what, in some sense, the optimal price is, based on the cost of changing our behavior and the environmental benefits that follow from that, and that is what you would want to use.

Obviously there still is some guesswork involved because it is model-based, but that is probably the best-informed way of going about choosing that number.

Senator BINGAMAN. Mr. Greenstein, you gave us a suggestion for how 14 percent of the value of permits could be used to buffer the effect on those with low income, the bottom two quintiles, as I understand it, of the population. As I understand the Lieberman-

Warner bill, it does provide that 18 percent of the revenue generated from auction of permits or allowances would be used for low-income assistance. I think it has half of that going to the LIHEAP program as it already exists. It has another 25 percent of that 18 percent going to weatherization, and another 25 percent going to a rural assistance program that is not yet established.

But you are saying that a better way to do it is through this EITC and this food stamp provision, the debit provision. Why do you believe that putting the money in those existing LIHEAP and weatherization programs does not make more sense?

Mr. GREENSTEIN. Well, let me start by noting that our analysis is that less than 5 percent of the value of the allowances under Lieberman-Warner is specifically set aside for low-income assistance.

Senator BINGAMAN. I think maybe that is 5 percent of the value of the allowances, but 18 percent of the expected revenue from the sale of the allowances, because they contemplate giving them away.

Mr. GREENSTEIN. Right. But you cannot compare that 18 percent to my 14 percent.

Senator BINGAMAN. Right.

Mr. GREENSTEIN. Let us suppose that you were giving away 90 percent of the allowances and only auctioning 10 percent.

Senator BINGAMAN. Right.

Mr. GREENSTEIN. If you used half of the auction proceeds for low-income relief, you would only have 5 percent.

Senator BINGAMAN. Right. I understand.

Mr. GREENSTEIN. Given the point that you and Dr. Orszag's answers just established, that the consumer price increases will be the same, essentially, whether you give away the permits or auction the permits, to determine how much you need for low-income relief there has to be a percentage of the total value of the permits, not a percentage of that value of the permits that is auctioned. You need about 14 percent of the total value of the permits to fully offset the impact on the bottom fifth, and part of the impact on the next-to-the-bottom fifth.

So, Lieberman-Warner, when you look at it, the only part that is specifically low-income is the LIHEAP weatherization part. Nine percent of the allowances would be allocated to load-serving entities, but (A) that would be for low- and middle-income relief combined; and (B) many load-serving entities do not have good data on the income of their consumers. It would be difficult, in many cases, to separate low- and middle-income, and you would, in effect, be replicating within private utility companies almost a kind of bureaucracy or mechanisms that we already have. The most efficient way, in our view, to provide low-income assistance is to use the Earned Income Tax Credit, as you did in 1990 and 1993, together with the various other efficient systems I discussed.

We already have the electronic benefit system, we already have the debit cards. We know how they work. We already have existing programs: the low-income drug benefit and food stamps. We could very simply use the existing mechanisms to offset the increase in costs, whereas I think Lieberman-Warner falls short on two fronts: (A) the total amount of low-income relief falls well short of what

is needed; and (B) the mechanism to deliver it would actually be pretty inefficient and would probably miss substantial numbers.

LIHEAP. That is the other point I should make. LIHEAP only reaches about one-sixth or one-seventh of the low-income households eligible for it. It is a block grant. Each State has its own eligibility criteria. What we get through something like the EITC and the EBT mechanism that I am mentioning is, you simply have a set national eligibility structure, you know who the people are who were enrolled, and you can simply reach them. LIHEAP is great for what it does, but, if you are talking about offsetting impacts on 60 million low-income people, the bottom fifth of the population, I do not think LIHEAP is equipped to be the main mechanism as distinguished from one that fills gaps that remain after you use things like the EITC and the Electronic Benefits System.

Senator BINGAMAN. Senator Bunning?

OPENING STATEMENT OF HON. JIM BUNNING, A U.S. SENATOR FROM KENTUCKY

Senator BUNNING. Thank you, Mr. Chairman.

Rather than ask some questions, I think I am going to read something into the record that needs to be said.

Let me make something clear: I do not think a mandatory cap-and-trade program is the right policy for America. I believe it will send our manufacturing jobs overseas, prevent economic growth, and cost the average American thousands of dollars a year in increased energy and food costs, not to mention the fact that America could bring its greenhouse gas emissions to zero and it would not reverse the growth in worldwide emissions, thanks to the rapid expansion in China, India, and other developing nations. But I can see the handwriting on the wall. I see what many of my colleagues in the Senate would like to do, and every one of our three presidential candidates has made their support for cap and trade very clear.

I know climate change legislation is coming. I will fight to make sure it includes a broad international agreement with China and India, safety valve prices, as you have mentioned, that protect Americans' hard-earned money, and emissions targets that are realistic. But that will not be enough. These mandatory cap-and-trade bills all require new technologies that we only hope will be commercially ready. I am not willing to bet America's economic future on a guess.

There are some things we can do today. Regardless of how the cap-and-trade debate plays out, we can provide the tax incentives American industries need to deal with carbon. I believe we need a Manhattan Project for carbon emissions. The greatest minds in America should be working on ways to capture and use carbon emissions and develop new, clean technologies.

For too long I have watched uneconomical technologies get all the financial support. I have seen members of this committee act with prejudice against some technologies, especially coal, in favor of less effective or unproven proposals.

Our proposals should be based on goals. If you can produce an environmentally sound transportation fuel, you should not care whether it comes from coal or switchgrass. If you can produce a

megawatt of clean energy, we should not care if it comes from waste heat on a paper mill or from underground geothermal. I will agree to aggressive carbon capture requirements and life-cycle greenhouse gas reductions, but we must be technologically and feedstock neutral.

Congress should help America do everything it can to replace foreign oil. Let me make that so clear, because that is one vein of our problems foreign policy-wise, economically, and everything right now, to reduce and reuse carbon emissions. If my colleagues are serious about addressing global warming, this is the place to start. Helping our economy deal with carbon now before we consider a cap-and-trade bill should be the goal we all agree on.

I want to thank you all for your information.

Senator BINGAMAN. Senator Salazar?

Senator SALAZAR. Thank you very much, Senator Bingaman.

Let me, Dr. Orszag, ask just a "yes" or "no" question.

Dr. ORSZAG. I do not like those, but all right.

Senator SALAZAR. Did you say that, if the allowances were sold or auctioned off, they would produce $145 billion under the Lieberman-Warner legislation? Was that the number you used, $145 billion?

Dr. ORSZAG. That is the number I used. Now, not all the permits are auctioned off under that legislation, but we treat even the permits that are given away as a form of revenue.

Senator SALAZAR. So you are looking at a $145-billion pot of money.

Dr. ORSZAG. In total, it is $145 billion. That is correct.

Senator SALAZAR. All right.

And I think you said that right now Lieberman-Warner would cost a consumer a quarter per gallon of gas. Is that 25 percent or 25 cents?

Dr. ORSZAG. Twenty-five cents.

Senator SALAZAR. So 25 cents on a gallon of gas. So, if Lieberman-Warner were to be passed, your projection would be that it would cause an increase of 25 cents on a gallon of gas?

Dr. ORSZAG. That is correct.

Senator SALAZAR. All right.

Let me ask you. I just wanted to clarify that in my mind, because there are other questions I am going to ask.

And I have a statement for the record, Mr. Chairman, that I will just submit for the record so I can ask questions.

[The prepared statement of Senator Salazar appears in the appendix.]

Senator SALAZAR. You, Dr. Orszag, have three models that you have up there on the bulletin board. One of them is, the allowances would be sold and you would have the rebates. The other one is, the allowances would be sold and you would have corporate tax cuts. The other one is, you have the carbon allowances simply given away. Then you have gone through the scenarios on what impacts it would have on the economy, as well as on consumers.

My question is whether or not there is another model here that could be followed that might marry up with what Senator Bunning was talking about here in terms of embracing a Manhattan Project

for how we deal with climate change that brings in the whole energy efficiency and technology world.

As Chairman Bingaman knows in the Energy Committee, and as we know on this committee, and as we know on the Agriculture Committee, this is an issue that we have been working on in 2005, 2006, and 2007. I look at a $145-billion pot of money, and I do not know whether this is the right allocation for that pot of money.

Now, what if you were to take a scenario where you would put 33 percent of $145 billion into energy efficiency programs and incentives? You would take 33 percent of that money for low-carbon intensive energy generation such as solar and wind and other kinds of geothermal. You take another 33 percent that you would invest in new technologies, such as clean coal technologies and carbon sequestration. So essentially you would say we would do an allowance. We can sell these allowances. We are not going to give them away. We can generate $145 billion into this pot, and what we are going to do is, we are going to incentivize the creation of a Manhattan-like project on energy.

Now, have you done an analysis on what that would do to our economy, and ultimately what that would mean to consumers?

Dr. ORSZAG. Well, a few things. First, and without judging the merits or demerits of that approach, what it would mean is that you would wind up with, at least initially, the regressive pattern of results because you are not spending the money to cushion the blow for lower- and middle-income households in any direct way.

Second, I also do want to just emphasize that, while additional government spending on research and development may be warranted and beneficial, it is also the case that the price increases that will occur will spur significant activity in finding low-carbon activities and new technologies. Markets work when you provide incentives for them to work.

Right now, there is very little to no incentive to find low-carbon technologies. With a price on that, markets will have a strong incentive to find those pathways to lower carbon emissions technologies. It may not be sufficient and you may want additional government assistance for that, but that would be a big spur to technological advances.

Senator SALAZAR. My only point here is, the three scenarios that you have in the chart that is being presented here, there are lots of other scenarios——

Dr. ORSZAG. Absolutely.

Senator SALAZAR [continuing]. That we could actually have you analyze in terms of what we would do with these $145 billion of money if we were to sell the allowances.

Dr. ORSZAG. And that is exactly right. Just very quickly, I think you have correctly hit the point: it is a lot of money, and you need to think carefully about what you do with it. You are exactly right, that there are lots of things you could do with it.

Senator SALAZAR. It is a lot of money, Dr. Orszag, and this is not your issue, this is our issue here. But when you think about the fact that we put about $200 billion a year into Iraq and we are talking here about the whole issue of climate change—they are two different issues, I recognize that—but the importance of what we

do with our planet and what we do with our energy future is something that also has a huge, huge priority.

You had a quick comment there, Mr. Greenstein? I know my time is already up.

Mr. GREENSTEIN. Yes. You really can do a combination here. In other words, you could use some of the proceeds for relief for low- and moderate-income consumers. You could use some of the proceeds for basic alternative energy research, which clearly would be a sound use of some of the proceeds. You also could get more money for the basic research by looking at all of the existing energy tax incentives and other subsidies and seeing which ones are no longer needed under a cap-and-trade regime, freeing up some money there and reinvesting it in more promising research on new technologies.

So you can do a combination effort where you try to get the best part of the investments in terms of new energy technologies, particularly from basic research, and things like low- and moderate-income relief, some protection for hard-hit communities, coal mining and others. It does not have to be—and I think Peter is saying this—all one or all the other.

Senator SALAZAR. Thank you very much.

Thank you, Mr. Chairman.

Senator BINGAMAN. Senator Rockefeller, you go right ahead.

Senator ROCKEFELLER. I am just going to pause here for a moment and gather my thoughts.

Senator BINGAMAN. Should I ask my questions and then call on you? Is that acceptable?

Senator ROCKEFELLER. I think that will be good, yes.

Senator BINGAMAN. All right. We will do that.

Mr. Derwent, let me ask you for any comments you might have on one of the points Senator Bunning made, which is often made, that putting in place a cap-and-trade system like is being discussed here will drive manufacturing overseas. I would be interested in your experience in Great Britain, or your experience with the European trading scheme, generally. Do you believe that it has had that effect? Do you believe that it has accelerated the rush by companies to move their manufacturing out of the European community?

Mr. DERWENT. It is still in its early days. The schemes have not been in place for very long, and people do not make quick decisions about up and moving entire production facilities from one continent to another without a certain amount of thought about what is going to happen for the future.

The studies that have been done in the U.K., and more broadly in the E.U., have indicated pretty clearly that the amounts involved, the amount of additional costs, are trivial for 90 percent of the industries affected by the provision.

But that 10 percent includes one or two industries that are particularly energy-intensive and particularly exposed to foreign competition, about which something must be done. That is, I think, politically understood throughout the European Union. The way of doing it in the much more stringent third phase of the E.U. emissions trading scheme is, at this moment, being debated in the European Union, as it is here. I have just come, in fact, from testifying before the European parliament on precisely this point.

But it is the way that you choose to affect that decision by that comparatively small number of industries—aluminum being a good example, steel being another—otherwise, an increment on energy costs really does not make a huge amount of difference to profitability.

You need to make sure that you can constrain that effect, the effects of relocation, at minimal damage to the impacts of the scheme that you want to adopt, particularly a cap-and-trade scheme. While a price cap is a way of doing that, and in the thought of any other methodology it could be a good one, there are some warnings, I think, which need to be taken. You can create diverse behavior in the market, which can end up totally overwhelming the message that you wanted that price cap to give.

You can actually stop the supply of new low-carbon technologies when it is comparatively high cost and people say, hey, I do not quite know whether this is going to be justified or not. You fail to achieve what the entire objective of this exercise is, which is to reduce the concentrations in the global atmosphere of a global pollutant. That may be largely to do, certainly in the future, with what happens in China and India. But they follow the lead set by the United States, in particular, and the negotiating positions of the whole of the developed world is much, much stronger on the back of strong action taken, as it were, at home.

Senator BINGAMAN. Thank you.

Dr. Orszag, let me ask you. You make reference to the 25-cents-per-gallon increase that would result. My impression is that the biggest increase in cost of energy that consumers will see is not going to be in the price of gas at the pump, it is going to be in the price of home heating oil, it is going to be in the price of natural gas to heat homes, it is going to be in the price of electricity that they are purchasing from their utility company.

One of the big concerns that we hear from a lot of utilities is, if you put in place too heavy a burden too soon, the result will be that there will be a very major additional shifting for use of natural gas that will drive up the price of natural gas overall, and that will obviously be a great disadvantage to folks who depend upon natural gas for heating and air conditioning purposes.

What is your response to that?

Dr. ORSZAG. Well, first, with regard to the cost increases, the numbers that we gave you in Table 1 of my testimony for effects on middle-income families, for example, of roughly $1,200 from a 15-percent reduction in carbon emissions, I think that is not far off from the price effects that are embodied in the Lieberman-Warner bill. I think 25 cents a gallon is not going to cost most middle-income families $1,200 a year, which is consistent with your point that most of the effects are through some other mechanism.

The other part of your question had to do with switching technologies, and that is part of the adjustment that would occur, and there are then price effects that follow from that. As you shift away from coal and towards other technologies, you can drive up the prices of inputs of those other technologies. That is part of the adjustment process.

I know that time is running out. I just do want to emphasize the point that our distinguished international visitor made, which is,

with regard to the manufacturing question, it really is important to focus on, in particular, several sectors: iron, steel, aluminum, paper, chemicals, things like that, where energy costs are a much larger share of their value added or their activity than for manufacturing as a whole.

Senator BINGAMAN. Senator Rockefeller, are you ready with your questions?

Senator ROCKEFELLER. I am.

I am going to throw out a notion, and I would love it if you would react to it. You take the Lieberman-Warner amendment, which industry says is too radical, and you look at what that does, it reduces carbon dioxide emissions by 70 percent by the year 2050. Now, the question that some of us would honestly pose is, will we still have a planet in 2050? In other words, this thing seems to be moving so much faster than we think, so we are dealing with a carbon tax, cap and trade, tax incentives, all kinds of things. We created tax incentives here that we could not pass.

It also implies that there is a sector-by-sector solution: if we just add up all the sectors together and they all do the right thing, somehow it will come out right. My view is all different, and I would like to know what your view is.

George Bush has used a borrowing technique for budgeting, which is why we never saw the Iraq war, any of those things in the budget. He borrowed from China, South Korea, Japan. They all have plenty of money, and they can continue to do so. My thought is that we would take maybe three, maybe four but no more, and carve out four subjects in our National agenda, obviously the lead of which would be climate change. There would be health care, there could be infrastructure, there could be scientific research and development, all that kind of stuff. So, you pick out four.

But let us just concentrate on climate change. Then you say, no, we are not going to do this sector by sector. We are not going to have companies coming out with different solutions and getting their patents, therefore precluding others from doing things which they think are either a little better, a little worse, or whatever. But we would have a national solution.

The only way you have a national solution is if you have a national budget. So you set aside and you say, now, we are not going to do pay-go. Democrats are so proud of our pay-go, who feel so virtuous, as we are able, therefore, to do absolutely nothing regardless of who gets elected. That is not very sensible on any account, but it certainly is not sensible if you believe that climate change is coming faster than I think it is, than most people think it is.

You just say, all right, the government is going to pay for this. It is going to do the whole thing, maybe $10, $15, $20 billion. I mean, a year ago George Bush gave $20 billion to the Saudis to buy more arms; am I not correct? I was just thinking, gee, they really need arms. What is this really for? What it really is for, obviously, is oil relations. We have to get rid of that. We can get rid of that. You have to use nuclear. You have to use everything that everybody can think of.

And you have to use coal. People do not like coal. There is coal as it is, and there is coal as it could be. So my idea would be for the government to pay for—not to control. No government person

would be in charge of this project. It would be a Robin Oppenheimer, Jr., who is a scientist, so to speak, and knows this field—and they spend whatever money it takes. I would posit that, over a period of 5 years, they would be able to come up with a way to completely sequester carbon dioxide, CTL (coal-to-liquids), plus emissions for power. But you do that, because any other system fails.

Now, on our side, so proud of pay-go, we are trying to get tax credits for the Children's Health Insurance Program, which got vetoed twice. Why? Because we raised the cigarette tax. The President does not want the tax—I cannot imagine anything that goes together better than the cigarette tax and Children's Health Insurance, but no matter, it was vetoed, so we do not have it. So along comes the rest of this. We are sort of tinkering with our different little things. A tax on carbon has never been passed here. We know that. Cap and trade can. Jeff has an amendment—Senator Bingaman has an amendment—Senators Warner and Lieberman have an amendment. All of these seem to be small pieces of solving a huge, huge world problem.

I have some ideas, which I will not share here, how the Chinese could solve their problem. I do not have any ideas on how the Indians—I am going to leave that up to you, Peter—can solve their problem. We have to solve our problems, first. So just respond—my time is already over—to the idea of simply carving out four subjects of prime national survival interest, because I think we have about 25 to 40 years to fix this country or else we are going to be tipped down forever on many fronts, climate change obviously above all.

So we exempt them. Everything else is pay-go. But these four areas, of which climate change is the lead, we borrow. The theory on that is, if we have a $9-trillion debt, you say, well, we cannot do that, we will add onto our great-grandchildren's debt. I just want to make sure I have great-grandchildren. So, I would like your reaction.

Dr. ORSZAG. Well, Senator, as you know, I have testified before this committee many times. I think this is the first time I have heard a very similar idea from you and Mr. Bunning, who also proposed——

Senator BUNNING. I thank you for seconding my original proposal. Thank you.

Dr. ORSZAG. Let me just say, to come back to your broader point, climate change is among the most serious long-term problems we face. We are running an experiment, and we do not know how it will come out, and there are lots of things that could be done, whether it is additional research and development or whatever. Cap and trade can actually provide, to the extent you auction the permits, for example, funding if the pay-go rules still apply. It can provide funding for that activity. I know that raises other questions.

There are lots of things that can be done. It is also the case, as Senator Bunning pointed out earlier, that just the U.S. paths by themselves are not sufficient, both because they end in 2050, and it matters what happens thereafter, and because global emissions are what really matter.

But this is clearly among the largest risks that we are running, and I think most analyses suggest that well-designed policies to start bending the curve on emissions have larger benefits than costs.

Senator ROCKEFELLER. That would mean that my idea is not impressive to you.

Dr. ORSZAG. I did not say that. What I said earlier is that—first of all, I am not going to get into the debate over pay-go, because part of my official responsibility is helping you enforce the rules that you may not like. But second, let us just talk about a Manhattan Project for climate change, basically, which is what Senator Bunning suggested. There are clearly technological changes that need to occur as part of the process of moving to a different emissions path that is more consistent with longer-term sustainability and minimizes the risks that we are running. That is one sensible approach to starting down the path that we need to for the changes that we need.

I would just note that you would also get an additional kick to research and development activity through pricing carbon. In other words, a carbon tax or a cap-and-trade system would then elicit private sector activities in a way that could be supplemented by government research and development, and, if all you did was massive government research and development, without any price signal, I would be concerned that you would not get the results that you would want.

Mr. GREENSTEIN. May I respond also?

Senator ROCKEFELLER. Please. And I apologize.

Mr. GREENSTEIN. I view your idea as having a couple of components, but the core of it being a significant increase in investment in R&D. The pay-go part is really your mechanism to come up with the money for your goal, which as I understand it, is significant increased investment in R&D. I do not think there is any question that it would be desirable to have that significant increase, particularly in basic alternative energy and other energy research.

A couple of points on the financing. First, much of that would normally be, and ought to be, funded through the discretionary side of the budget. The discretionary side of the budget, as you know, is not subject to pay-go. I would argue that if we do not enforce and adhere to pay-go on the tax and entitlement side, that the result over time will be to dramatically decrease the money available for investment on the discretionary side of the budget.

Second, as Peter just indicated, I would argue that a cap-and-trade system is a natural complement that would help further what you are talking about, in other words, significant increases in this kind of research, in three ways: first, as Peter just indicated, the price signal, the higher cost for fossil fuel energy, will incentivize the private sector to invest more in the kinds of research we need than it would do in the absence of the price signal; second, by auctioning allowances, one would gain money, a significant share of which could be used to fund the R&D; third, as I noted earlier, some of the existing government investment in energy R&D would become superfluous or redundant in a cap-and-trade regime because the price signal would mean that certain things you now need incentives for you no longer do, and you could free up that

money for the higher bang-for-the-buck kind of research you are talking about.

So it seems to me, from all of these perspectives—having more investment on the discretionary side of the budget, incentivizing private sector investment through an emissions cap, auctioning the permits under an emissions cap and reinvesting some of that money in this research, and cleaning out some of the existing research that will no longer need it and shifting that money to where it is more productive—that between this combination of mechanisms we could get a significant investment in what they are talking about.

Senator BINGAMAN. Senator Kerry? He has not asked any questions. Is that acceptable to you, Senator Bunning?

Senator BUNNING. I would love for Senator Kerry to ask questions.

Senator BINGAMAN. Why don't you go right ahead?

Senator KERRY. Thank you, my colleague. I appreciate that. I will not be long.

Dr. Orszag, my preference in this is to have the highest level of auction possible. I think it is the cleanest, it is the most effective way to set the market price, it is the most effective way to get the benefits to the folks who need them without all the politics and all the pressures that are going to come in.

Can you talk about that for a little bit, please? There are allowances in the cap-and-trade bill that we have. We have sort of begun, fundamentally, upstream with certain sectors. Do you see any problems with that? Is that going to be effective, in your judgment? Are the levels that we have set with respect to allowances versus auction appropriate?

Dr. ORSZAG. Well, first, just to unpack that a little bit, we estimate that in 2012 the value of the permits, under the Lieberman-Warner legislation, will be $145 billion. Most of that in that year will be permits that are given away to firms. So, as my testimony emphasized, when you give permits away to firms, you are foregoing an opportunity to use that money either for a macroeconomic benefit or for research and development in new technologies, or for cushioning the blow for low- and middle-income households.

So I am not going to say whether it is appropriate or not, but it is difficult, for other than political economy considerations, to come up with a policy justification for that approach relative to other uses of that same money.

Senator KERRY. So you are concerned about that level of allowance in the bill?

Dr. ORSZAG. I would say, regardless of whether your motivation is to promote technological advances or to a distributional concern or a macroeconomic efficiency concern, it is hard to justify giving the permits away rather than using the revenue for some other purpose that furthers those objectives. So, you may have some other objective in mind.

Senator KERRY. Like passing the bill.

Dr. ORSZAG. That may be among them, yes.

Senator KERRY. Well, I think we have to think about that very closely.

It is your judgment that the auction itself would be far more effective, is it not?

Dr. ORSZAG. Well, it would raise revenue that you could use for other purposes.

Senator KERRY. What about the effectiveness of setting the market price? I mean, I remember when we did the 1990 Clean Air Act, the industry came in and said, oh, please do not do this to us, it is going to cost us $8 billion, you are going to put us out of business, it is going to take 10 years, we are going to be non-competitive. The environmental community said, no, that is just business argument. They are trying to give you a worst-case. It is going to cost $4 billion and take 5 years, and we can do this.

To the credit of George Herbert Walker Bush and John Sununu and Bill Reilly, they agreed to do it, and we did it. Guess what? It cost half of what even the environmentalists said it would cost and it was done in half the time. The price went from over $1,000 down to below $100, and then it bounced up to about $100. So does that not give you a pretty fair indication that the market, in fact, has a dramatic ability to attract capital, solve the problem, and set the price without enormous disruption?

Dr. ORSZAG. One of the significant benefits of both a cap-and-trade system and a tax as opposed to a strict regulatory approach is that you are using the power of markets to achieve the emissions reductions where they are cheapest to achieve, and that is a huge benefit. Yes, sir.

Senator KERRY. And that experience speaks to that, does it not, in volumes?

Dr. ORSZAG. Yes, it does, although there have been some caveats raised about the development of sources of lower sulfur coal that had not been anticipated. But the basic point is, the marketplace——

Senator KERRY. Well, you are saying that it was possible that there were additional benefits that came through unforeseen changes in behavior.

Dr. ORSZAG. Yes.

Senator KERRY. But the same is almost certainly going to be true with respect to the marketplace on carbon as a whole, whether it is a new fuel or a new technology. I mean, the reason nobody could accurately set the price is that nobody has a way of measuring what happens in the innovative scientific community once the capital begins to flow towards a nationally established goal. Then there are the unforeseen events which we have seen throughout the computer industry, and every technology, as a matter of fact. Is it not a fact that we are going to see unforeseen benefits that will flow through the market that we cannot predict today?

Dr. ORSZAG. There is a lot of uncertainty. I guess I would say there are unforeseen benefits. There may be unforeseen costs. We are not going to know what the permit price actually is until we do this. One of the benefits of some of the things that we were discussing earlier, like a safety valve or other ways of trying to limit price fluctuations, is that it helps you mitigate the effect if things turn out to be either too high or too low relative to what you had anticipated.

Senator KERRY. Last question, because my time is rolling by and I will have to wait until the next round. But just very quickly, Mr. Greenstein, or anybody else who wants to add to this, it has been suggested that incentives may need to be reviewed as a consequence of putting in place the cap-and-trade system.

What type of tax incentives do you believe, or are capable of being ascertained now as no longer being needed, conceivably? Second, there is sort of—what kind of new tax incentives might complement the cap and trade? So, both sides of that.

Mr. GREENSTEIN. This is to identify the specific tax incentives that would be useful and the ones that currently exist that could be modified. I would hesitate to comment on it; it is kind of beyond my expertise, and I have not looked at it. What I think is clear, and Dr. Orszag has said this a couple of times this morning, is that you would have a different set of market incentives under a cap-and-trade system under which prices for fossil fuels were rising than you have today. And certain kinds of activities that are not profitable today, unless you provide a tax or other incentive, would become profitable without the incentive under a cap and trade regime.

What I recommend is not that someone like me sort of off the top of my head make some comments, but that you ask CBO or other institutions, as you are doing cap-and-trade legislation, to do a review of the existing incentives. The idea would be to figure out which ones make sense or might be augmented, which ones are no longer needed and you might phase out, and which ones would need to be modified.

Out of that, if you were able to do that politically, you would save some money that you could reinvest in other forms of incentives for which there would be higher value, and it would seem to me that you would want to shift more towards those kinds of basic research that would be important to making breakthroughs, but for which the private sector would not be able to capture enough of the gains, or the gains would be so uncertain that there would not be enough incentive for the private sector itself to finance that kind of basic research.

Senator KERRY. That makes sense to me. I think that is a pretty good principle.

Do you want to add anything?

Mr. DERWENT. I would, if I may, agree very much with Mr. Greenstein on that point. If you introduce market instruments, then they should be enough. But to deal with the deployment issues, what is much more difficult to deal with—particularly if the time scale is as condensed as Senator Rockefeller was, I think, right in saying it is—is making sure that the next generation of low-carbon technologies, those which we can see all around us at the moment, at least in embryonic form, must be supported by government. If government has money, that is the place to be putting it. When you are talking about making sure that the existing technologies are actually used, where they are not used at the moment, look for the reason—the reason is, there is no economic price of carbon—and create that price.

Senator KERRY. Right.

Mr. DERWENT. But if I may, I will just, perhaps not totally, return the compliment that Dr. Orszag made to me at an earlier stage, by saying that I think that the price effect on its own often is frustratingly ineffective. This has more to do with psychology, I suspect, even in very well-run businesses, than it has to do with strict economics. But our experience in the U.K. has been that you have to actually create a tipping point, or a focus, or a target before you find that the economic rationality of finding a way of producing stuff with less carbon and selling the carbon, for example, hits home to management. That is the thing to do and that is the way to——

Senator KERRY. So the target is critical?

Mr. DERWENT. I believe so.

Senator KERRY. I agree. I totally agree. I do not see how you do it without it, but I just wanted to reinforce that.

Thank you very much, Mr. Chairman.

Senator BINGAMAN. Yes.

Senator Bunning, did you have questions?

Senator BUNNING. Yes, I do.

Mr. Greenstein, you insist that a cap-and-trade program will focus on the most economical solutions. I am concerned that we are missing the big picture. Have you considered that the most efficient market outcome may not be the most desirable? For example, utilities will be able to pass through much of their costs to consumers and therefore engage in significant emission reductions, but a manufacturer will still compete with products made in other places, like in China, or India, or anyplace else in the world, and would be forced to go abroad unless they could afford allowances.

While this creative destruction would be efficient under cap and trade, do you think it makes sense to force American companies to move jobs abroad to stay competitive? Does it limit the areas in which we can expect technology to improve rapidly?

Mr. GREENSTEIN. Let me say that both of the other members of the panel, I think, probably have more expertise than I do on the international question. But there is a conundrum here. There is the risk that, if we do not take action and we simply wait, that we do not create enough incentives for those countries that also need to act to do anything and we move further down the path, where significant economic damage from global warming may be irreversible.

Obviously part of your analysis of how to design a cap-and-trade system or a carbon tax will necessarily, and should, involve these international questions. There are a variety of mechanisms—I think the other two members of the panel probably know them in far more depth than I—that could be looked at as to whether there are certain border adjustments that might be made, for example, for products that are imported from countries that do not take any action that is comparable to what Europe, or under this the United States, would do. All these things obviously should be looked at. But I think we have to find the answer for how to move forward, and how to move forward in a way that incentivizes China and India and those countries to move as well.

What we cannot afford to do, I think, is to sort of say we cannot take strong action because they are not taking strong action. What the best mechanisms are, either in a cap-and-trade regime or under

international treaties, to make progress internationally, other panelists probably could answer better than I.

Senator BUNNING. Dr. Orszag, I will ask you. You testified a cap-and-trade program would increase the prices of energy and energy-related products, and the consequences would be investors losing money in the stock market and workers losing their jobs.

Just looking at our economy today and the people in Kentucky who are struggling to pay for gas at the pump—$3.53 yesterday, and diesel, $4.28 at the pump per gallon—I cannot imagine a worse time to deliberate passage of legislation to devalue stock and force people out of their jobs.

Could you explain more about the consequences of higher energy costs?

Dr. ORSZAG. Sure. And I think, just to put it in context, again, the reason that policymakers would adopt this kind of approach is to try to minimize or reduce the risk of potentially catastrophic greenhouse gas emissions and global climate change. Against that, though, there is some short-term economic costs. That economic cost is both——

Senator BUNNING. Now, how long is short-term?

Dr. ORSZAG. That depends on what you do, and it depends on the evolution of technology and what have you. But this is fundamental to the nature of the problem that we face. We have to pay up front for a long-term benefit.

Senator BUNNING. We understand that. But it is just a question of, how much can the economy tolerate up front?

Dr. ORSZAG. Well, the macroeconomic effects, while they are there, are not overwhelming.

Senator BUNNING. Well, this economy is not overwhelming right now.

Dr. ORSZAG. That is true, also. But even the things that I was talking about, with regard to the permit prices, were for 2015, they are not for today. Almost all of these programs would be gradually phased in and the macroeconomic consequences would not be felt immediately.

Senator BUNNING. Thank you, Mr. Chairman.

Senator KERRY. Mr. Chairman, would it be possible just to say to Senator Bunning that, as one of the authors working on this bill with Senators Boxer, Lieberman, Warner, et al., those are legitimate questions? But the bill puts literally hundreds of billions of dollars over the next years specifically at the disposal of those kinds of impacted industries. I think the Senator needs to take a look.

We were working yesterday, for instance, with Senator Levin and Senator Stabenow, who are trying to deal with some of the manufacturing cost increase impacts. There are major mitigation efforts in this legislation, I mean, literally in the billions of dollars, that are going to go out into manufacturing and into industry, combined with incentives to try to balance that. The impacts are, there will be increased costs in energy in certain areas, inevitably. There are going to be, anyway.

Senator BUNNING. I do not want to get into a debate. We bailed out Bear-Stearns because it was too big to fail. The consequences of a Lehman Brothers or someone like that failing because we put

on a cap-and-trade piece of legislation that makes Lehman Brothers insolvent, or Citicorp insolvent, what happens to the U.S. economy under those circumstances if, in fact, we impose a cap-and-trade bill?

Senator KERRY. Well, in fact, we have imposed a cap-and-trade bill previously, Senator, and we heard these same arguments back in 1990 and 1989.

Senator BUNNING. But you will admit, Senator Kerry, that comparatively speaking, it was a 10-percenter compared to a 100-percenter.

Senator KERRY. Well, it was a targeted area of the economy. What it proved, however—and this is a targeted area of the economy, as a matter of fact. This is not economy-wide. There are many people who thought we should have made this economy-wide. But in effect, this is not. This is beginning as sector-specific—utilities, manufacturing—and then moving down the economy over time.

But you have to look at the other costs and consequences at the same time. Europe just did this. Europe has cap and trade in place. They had some dislocated. Now, there are a number of reasons. When we were in Kyoto, I remember negotiating with the Europeans then to get them into it. We just had Stu Eizenstat in front of our committee the other day talking about this. They did not want to take part in the cap and trade. They did not believe in cap and trade. They fought against it.

Ultimately, they did sign on and bought into it and they put it in place, but they did not do it with the kind of experience that we had through the Clean Air Act, and generally speaking in our economy, so that they made some mistakes. The cement industry got hit, and there were some sectors where they did not make adequate allowances. But now I think they have learned. There is a general acceptance of this in Europe. You can look at the euro versus the dollar today and you can look at their economy, which, generally speaking, did not take an enormous hit as a consequence. But there are all kinds of costs, as Senator Rockefeller and Senator Bingaman and others would agree, to not doing this. I mean, the costs are going to be far——

Senator BINGAMAN. Before we get into too elaborate a discussion about the costs of not doing this, let me ask the witnesses a couple of questions here.

Your chart there. Let me ask you about the middle part of that chart, Dr. Orszag. You have there, "Allowances Sold and Corporate Taxes Cut" as one of the options. You say that has the least macroeconomic adverse effects on the economy, as I understand it, of the three options.

Dr. ORSZAG. Of those three. The results would be similar if you reduced payroll taxes, too.

Senator BINGAMAN. Well, how does that relate to Mr. Greenstein's proposals, which are that we take up to half, or whatever amount, of the revenues and use those to cut taxes, essentially, for the average consumer? So we are cutting taxes for corporations and we are cutting taxes for the average consumer. How do we fit those all into one bill? I mean, we are talking about a bill here where you have all these allowances. If we do what you are suggesting and sell them all as one option——

Dr. ORSZAG. I did not suggest that. I just pointed that out as one of the options.

Senator BINGAMAN. That is one of the options.

Dr. ORSZAG. Yes.

Senator BINGAMAN. How much of that goes to corporate tax cuts, how much of that goes to individual tax cuts? To what extent are we doubling up, if we are?

Dr. ORSZAG. And I would just note, some of the proposals that Mr. Greenstein and others have put forward, for example, that relate to the Earned Income Tax Credit, do get you potentially two benefits. They have a distributional effect. They tilt towards the bottom. They also are the kinds of tax changes that encourage work. That is the key here. The corporate income tax change or the payroll tax change has positive economic incentives, and, if you can combine positive economic incentives and a distributional effect that you may or may not favor, you can kind of double dip to some degree.

Senator BINGAMAN. Mr. Greenstein?

Mr. GREENSTEIN. Could I also note, looking at the charts up there, that the first set, "allowances sold and lump sum rebates provided to households," under that scenario all of the money that is available from the auction proceeds goes in the form of rebates to households. I am suggesting that part of the money—not all of the money—go to households.

The other thing I would note——

Senator BINGAMAN. But are you also suggesting we cut corporate taxes? I understood you to be saying we should take some of it and give it to households and to average Americans to offset the increased cost of energy and the rest we should use for things like Senator Rockefeller was talking about, where we invest in research and we do all these good things. I did not hear you suggesting we cut corporate taxes. I think that is what Dr. Orszag says is the most efficient thing to do, from the macroeconomic perspective.

Mr. GREENSTEIN. One could. It would not be my priority for the remaining use of the money. To help explain why, let me just note that on this chart, note that the part where all of the money is used for corporate taxes, compared to the other scenario, the one where all the money is given to consumers, the difference in—your year, Peter, is 2020? 2015? The difference in overall efficiency cost is very small for a 15-percent reduction in emissions, which is probably where you would get in roughly the 2015 to 2020 period with something like the Lieberman-Warner targets.

The difference is equal to three-tenths of a percent of GDP. In other words, what that would mean, if you take the CBO baseline, the CBO baseline would suggest that in 2017 we do not do anything in this area, just baseline. The economy, that is $14 trillion today, would be something like $22 trillion. Under the scenario in which all the allowances are given to the households, it is $21.9 trillion instead of $22 trillion. Under the corporate tax cut scenario in the middle, it is $21.96 trillion instead of $21.9 trillion.

Senator BINGAMAN. You are saying the macroeconomic difference is——

Mr. GREENSTEIN. The difference is small.

Senator BINGAMAN [continuing]. So small that we ought to go with option one instead of option two.

Mr. GREENSTEIN. I am actually not suggesting option one either. I am suggesting a combination. To make sure we do not push low-income people deeper into poverty, that is 14 percent of the allowances. You can dial up or down the middle-income consumer relief. You do not have to offset 100 percent of the consumer impact.

That is, frankly, in part a political choice as well as a substantive choice. You want to make sure you have an adequate portion of the new proceeds going into basic research, although the amount you need is affected, in part, by how much you can clean out of the base of things that are in there today the ones that are inefficient or would no longer be needed.

You clearly are going to want to—and need to, politically—spend some money to mitigate effects on hard-hit sectors of the economy, like coal mining communities. There are other areas: adaptation, international effects, wildlife. I am getting beyond things I know well. You will have to weigh all of those against each other. I am not against, in principle, the corporate piece, but I think the differential impact on economic growth is small and there are a lot of other priorities for the money as well. For me, it would not be high on the priority list.

Senator BINGAMAN. Senator Rockefeller?

Senator ROCKEFELLER. Thank you.

Let me clarify. I need to break the shackles that are on Dr. Orszag and his loyalty to pay-go.

Dr. ORSZAG. Thank you.

Senator ROCKEFELLER. Because that is what he is paid to defend. I think in the living world, you know that, so I am free to say something like that and you are not unhappy about it.

I think that, first of all, there was not anything in my suggestion which said that you stop any of the things that have been talked about: cap and trade, tax incentives. We had a big tax incentive thing, as I recall, in our bill last year, and it was just killed on the other side. So I foresee, this is the reason for my taking the research. You know, talking nuclear in West Virginia is not very popular. But the fact is, we have to do everything. So, please hold that as part of what I say.

What I am proposing has nothing to do with what all of you were talking about. What I am talking about relates only to the research on the largest chunk of what is going to affect climate change, which happens to be coal. Sure, I come from a coal State. That has nothing to do with my thinking, it really does not, because we will be affected by the uptick in prices like everybody else will be.

But I want the research. I mean, I can just see us. I know this institution well enough that I can just see us cross-referencing amendments that fail and are filibustered on the floor, barely get through the Finance Committee or through the Environment and Public Works Committee, and fail on the floor. Then back we go to work and we talk and we talk and we talk. We have been talking for 3 or 4 years, and yet nothing has really happened.

I think the way to start getting out of this is not to necessarily create—but I think we have to create, as I just said—the public policy, cap and trade, the Bingaman approach, the Lieberman ap-

proach, whatever you want, but that in the meantime somebody has to be doing the research, specifically on coal because it is going to be 58 percent of what we are talking about.

We have to get that down to virtually, or literally, zero emissions. Now, there is no way in the world that you can convince me that we cannot get people from across our country and across the world, scientists, into what—Jim Bunning and I now have a patent fight because we both referred to the Manhattan Project, but that is just to make it dramatic, and we will drop our patent fight.

But you just totally emphasize getting the smartest people in the world, 150 of the smartest scientists in the world on this subject from all over the world, some of whom will come from China, some of whom will come from South Korea, from Sweden, from other places, and a lot from this country, and that you simply focus on doing that research so that, while you are worrying about all these other things, that the research for cleaning up coal—whether it is from Gillette, WY, which needs lots of attention, or from deep southern West Virginia, which needs attention but not nearly as much—that you get the research going now. I would almost suggest that the research will make some of the other problems easier to put into effect, because nobody now has confidence that you can do it. I mean, I know a couple of chemical companies and coal companies that are doing their level best to achieve this.

But there is also a great timidity across that world about this subject. The subject simply has nothing to do with cap and trade, it has nothing to do with tax incentives, it has nothing to do with all the rest of it, it is simply to get the research going on cleaning up something called coal, which is now 51, and will be 58, percent of the problem in a number of years.

I just do not see anything wrong with that. I just do not see anything wrong with keeping pay-go for virtually all of our budget, and to keep you happy, Dr. Orszag, but then pick out four things—and I just do that so you do not just make it one, but, if I have to go down to one I will do one—and I think a couple of other things.

Mr. Greenstein, you worry about problems. One that you should be worrying about, and you are, is Medicaid and Medicare. Well, what are we going to do about those? Where is the money for those? Those have been cut to ribbons, and rural clinics and hospitals are in trouble all over the country. I mean, there is an endless number of things that we have to do. All I am saying is, we go ahead with everything that Jeff and John, Senator Bingaman and Senator Kerry, have suggested and that you have suggested, but that behind the scenes in the meantime we create this caveat of research opportunity and start doing it. Votes for that will be hard, and I understand that. But that is the way I think this ought to work.

Senator BINGAMAN. Do any of the witnesses want to comment on that? Then, Senator Kerry.

Mr. Derwent?

Mr. DERWENT. Thank you. I would like to comment on that. I agree entirely with the Senator's perspective on the huge importance of research, but I have a little bit of a caveat on the particular industry and the particular technique that he uses to illustrate his argument. I think that carbon capture and sequestration

is just around the corner as the salvation for the coal industry as a means of ensuring that the coal reserves that are available in this country, in China, and elsewhere can be used, consistently with the achievements of emissions reduction of the type that we need to see.

There is an enormous amount going on in Canada, there is an enormous amount going on in Australia, there is a fair amount going on in Europe. What is needed for that industry at the moment is a series of demonstrations and a price signal to deploy. It is generally spoken of in Europe that, at 45 euros a ton, which if people thought it would sustain, you would get CCS as a viable economic proposition. Some people have said, yes, that is just to begin with. After a while, as the learning effect happens across the world and other countries, including the United States, come in, that price will crash and you will see CCS as a real technique.

But until somebody actually says that what CCS produces—which is lower carbon—has actually got an elemental value, it is not going to happen. Research, by all means, but also identify those areas where you need an economic stimulus and not just the production of research.

Mr. Chairman, if I may take the opportunity of making a point of information. I know that Senator Bunning has gone, but he spoke of a position of Lehman Brothers and Citigroup. I would just like to point out that, far from being the sorts of organizations which could be destroyed by cap and trade, they both are members of the International Emissions Trading Association because they see that this is a major new market that they want a part of.

Frankly, at the time after Kyoto and after the change-around in positions when the United States turned its back on emissions trading and Europe decided to go forward, the city of London took the bread out of the mouth of New York. Well, you may think that it is pay-back time now, and I would not blame you. As one door closes, perhaps, in these businesses, another opens. That applies not just in the financial sector, but also in some of the manufacturing sectors that we heard about today.

Senator BINGAMAN. Well, Senator Kerry, did you want to go ahead?

Senator KERRY. Thanks.

That is a good point, Mr. Derwent. I appreciate your making it. I am sorry Senator Bunning was not here to hear it.

Dr. Orszag, in your written testimony you talk about how cap and trade can be designed to avoid large fluctuations in the price allowances. The notion of a safety valve has been kicked around here a little bit. I understand the inclination to want to do that, but I am very apprehensive that that just becomes a way of avoiding the target. The environmental goals get completely subsumed as a consequence.

Can you share with us, are there other features of a cap-and-trade program that we should consider to limit price fluctuations, but without losing or limiting the emissions reduction itself that can be achieved?

Dr. ORSZAG. Yes. You can allow, as the Lieberman-Warner legislation does, banking and borrowing, that is, for firms to be able to save allowances for future years or to borrow from future years,

and that can help smooth price fluctuations. But in general, you would still face this fundamental conflict between certainty over price and certainty over emission levels. That is just unavoidable. There is uncertainty about what is going to happen in the future, and you can kind of choose a little bit more certainty on one dimension at the cost of a little less certainty on another.

Senator KERRY. But, if you decide to do this, you are making the decision to do it fundamentally because of the scientific imperative, the down side. I mean, if you accept Jim Hansen and Bob Correll and the other scientists involved in this, that there is a tipping point, if we get to the tipping point it is going to be catastrophic, and we have to avoid the tipping point.

If suddenly the costs are going up, do you not have to meet those costs in some other way than to let people out from their responsibility to avoid the tipping point?

Dr. ORSZAG. Well, I think the problem is, we do not know where the tipping point is. I do think the best way of thinking about climate change is that we have some small, but nonetheless real, risk of very high damages, of catastrophic costs, and that what you are doing through these kinds of policies is, you are purchasing insurance to reduce that risk.

You might imagine from that analogy that how much you are paying for insurance would be one part of the calculation you wanted to do, and that you would want to balance the risk that you are reducing against the premium that you are paying, and things like a safety valve or trying to limit the price fluctuations are aimed at kind of reorienting that balance, to some degree.

Senator KERRY. Does that not play——

Dr. ORSZAG. If we knew exactly where the tipping point is, the calculation could change. That is a different situation.

Senator KERRY. Well, we do not know exactly where it is, but what we do know is that all of the evidence is coming back faster and to a greater degree than had been predicted, in every instance. We know that scientists, who are by nature and discipline conservative in their predictions and have to submit to peer review, we know that those scientists have revised downward the levels that we can tolerate of temperature increase from 3 degrees Centigrade to 2, they have revised downward the parts-per-million of greenhouse gases we can tolerate from 550 parts-per-million to 450, which ought to set a lot of alarm bells off because we are currently at 370.

It took us from the Industrial Revolution until now to go from 270 to 370. But with China and India and the United States itself promising some 280 pulverized coal-fired power plants coming online in the next few years, we are looking at the prospect of going from 600 to 900 parts-per-million.

So, it is pretty hard for me to see how, within that context, you start creating an "out" and not forcing the process to find the most efficient, effective, cheapest, productive means. If you create sort of an off-ramp, or whatever you want to call it, everybody knows, hey, we can get off of this. Let us let the other guys see how much it costs. They will start to do it, and we will sit back and we will wait and see what the impact is, and then we will catch up based on the new technology, and you will never get the benefit of pushing

your whole economy in the same direction with the capital values being assigned to the reductions that you want.

Dr. ORSZAG. And I would just say, first, with regard to the science, we are running an unprecedented experiment and we are running a very substantial risk, or at least a significant risk of substantial damages, and addressing that is among the Nation's, and the world's, highest priorities.

I think the question becomes, hypothetically, if it turned out that the cost per ton—just to make a ridiculous number—were $1,000 a ton, it may affect the amount of reductions that we would want to undertake, and obviously if you did a safety valve, where you chose it would matter a lot. If it were very low——

Senator KERRY. See, I disagree with that. Maybe if you left that price there, what it will do is it will drive a reality about what we ought to be doing. I mean, maybe it forces people to say, all right, we have to get solar/thermal out there a hell of a lot faster. I know some companies that are taking positions on land in Arizona and New Mexico and other places who are prepared to build like crazy, and when the price gets set right, you bet they will. But you cannot be half pregnant on this. You cannot decide, oh, we have to do this because global climate change is coming, and here is the time frame we are operating in, and then all of a sudden, create a whole bunch of avoidance mechanisms.

Dr. ORSZAG. Well, you are absolutely right. I mean, the safety valve is geared to balancing the economic costs and the environmental benefits. If you think that balances, it is up to you to either reach that balance or not.

Senator KERRY. The balance makes an equally presumptuous—it makes a more presumptuous, arrogant kind of debt that is all right to avoid doing which everybody in the scientific community is telling us we cannot avoid doing. That is what it does. That is the balance. I think we are going down the wrong road.

Does anybody else want to comment on that?

Mr. DERWENT. Thank you, Senator. At the risk of introducing a controversial additional element into this, I think you can find an alternative to a safety valve which does not simply offer people a complete way out. That is to allow into your system, under the rules to the extent that you are happy with, emissions reductions that occur in cheaper places in the world. That is how a number, for example, of State schemes have been going.

Use the possibility of offsets as a means of introducing a lower cost alternative if the cost of doing it domestically rises just too high. Many people talk about this in terms of, oh, we do not believe that those offsets are real, or we do not like the countries which they come from, or we do not like the sorts of projects which have produced them. All those are——

Senator KERRY. Which offsets are you talking about?

Mr. DERWENT. Those which have been criticized, those in particular that are ozone-depleting, but also greenhouse gas emissions in China, in chemical plants in China. But there are many, many good offsets in India, South Africa, and Brazil which are available at lower cost simply because of economic factors, like across the world, which can be brought in and which, if people pay for them,

emissions get reduced and the atmosphere feels the effect just the same as if that were happening in Baltimore or San Francisco.

Senator KERRY. Yes.

If you give away free allowances to impacted industries, which is under discussion right now, I think—I am not sure who, either you, Mr. Greenstein or Dr. Orszag, testified that a lot of these costs are just going to be passed on by businesses. I mean, that is just the way it usually happens, and it is the way the economy works. If that is true, are these allowances going to become windfall profits or just plain windfalls to those industries if they are passing on, plus we are giving them the big mitigation, and as a result they—does more have to be asked? Does there have to be some other kind of accountability scheme here?

Dr. ORSZAG. If you gave away all the permits, there would be a very substantial increase in profits, which would be a windfall to the companies that received them. You do not have to, obviously, give away all the permits. Even when the companies can pass costs along, there can still be some effect on their operations because the cost increases then diminish demand for their products. You could essentially try to just offset that cost.

Mr. GREENSTEIN. I think there is general agreement among economists—Dr. Orszag said this earlier, and it is also in my testimony—that the impacts on consumers are going to be essentially the same whether the permits are given away free or are auctioned. That clearly suggests that, to the degree that permits are given away in excess of what may be needed to offset what would otherwise be net financial losses to companies, that these would be windfall gains. CBO's analysis suggests that something less than 15 percent of the value of the permits would be needed to offset the net financial losses.

You might find of interest, on the website of Greg Mankiw, who is a distinguished Harvard economist—he was the chairman of the Council of Economic Advisors for President George W. Bush several years ago—he discusses this on his website and essentially says that, if there is a cap and trade whereby allowances are given away free in excess of what it would need to offset losses, that the result would be—these are Greg Mankiw's words—"corporate welfare."

Senator KERRY. So how we structure them is pretty important, obviously.

The last question on the regional cap-and-trade regimes that have been created voluntarily in both New England, the Midwest, and California. How do those get impacted when we set a national system? Do they just get subsumed? Do they continue down the road they are going, and somehow you have two tracks? What happens? Does anybody know?

Dr. ORSZAG. That is a significant issue. I saw some past discussions of that this morning, and we have a Federal system. I think I would just say I do not know the answer to that, and it would depend on what you do in the legislation.

Senator KERRY. *I.e.,* preemption versus——

Dr. ORSZAG. Correct.

Senator KERRY. Got you.

Mr. DERWENT. Just to state an obvious point of economic principle, markets are more effective, basically, the larger they are. The

transaction costs for companies which are national, or even globalized, are dealing with lots and lots of different cap-and-trade schemes with different principles and different rewards and incentives. Those transaction costs can be pretty high.

Senator KERRY. Yes.

Mr. DERWENT. But there is some learning, I think.

Senator KERRY. Well, I agree with that. I think that my basic instinct is that you want to have a national standard and you want to have a national structure to manage it. I think the market will respond more effectively and with greater clarity. I think that certainty is important. But then you have the question, well, what happens if somebody wants to, because they are expressing leadership as they have in the past on this, go to a higher level and thinks the standard ought to be higher?

Dr. ORSZAG. Again, that is an issue for you to decide.

Senator KERRY. Just a policy issue.

Dr. ORSZAG. It is a policy issue. I mean, there is an efficiency cost to having fragmented systems across the United States, but that would be weighed against any potential environmental benefits that would be perceived or real.

Senator KERRY. I guess I would answer that by saying that the policy would be impacted, from where we sit, by whatever the level is that we establish as our mandate. If we establish a sufficiently realistic sort of scale here that we are trying to achieve, then I think you could make a strong argument that that ought to be the standard.

Mr. DERWENT. Can I add just one piece of experience from the U.K.?

Senator KERRY. Certainly.

Mr. DERWENT. We have run a national target for CO_2 reduction, which is considerably stronger than our part of the international target which was given to us through the Kyoto negotiations. We have met the international one with ease. The national one has proved to be much more stringent, but that does not mean it is not doing a lot of good.

Senator KERRY. Well, it is interesting. I think these experiments have been very important. For instance, in Portland, I do know that Portland moved on its own to address the Kyoto standards, and they are at or below the 1990 Kyoto standard, and they did it by building LEEDs, building standards, building codes, fleet purchases, recycling, transportation grid, a whole bunch of a different mix, very creatively, and they have proven that you can get there.

California is obviously light-years way ahead of other States with respect to their base, what they rely on. Now, they have some advantages in geothermal and other things, but nevertheless, it is an example of what can be done.

Just a last thought. I think if we could get our grid opened up and more effectively managed, we could facilitate enormously the ability to be able to meet those lower costs. There is a lot of resistance on that just from certain special interests at this point, and we need to fight it.

Any other thoughts, last things before we close out here?

[No response.]

Senator KERRY. Well, I thank you very, very much for being here. It is an interesting subject, and very timely. We are going to have this debate very shortly, so we really appreciate your input.

We stand adjourned.

[Whereupon, at 12:05 p.m., the hearing was concluded.]

APPENDIX

ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

SENATE FINANCE COMMITTEE - HEARING THURSDAY 24 APRIL 2008

CARBON TAXES AND REVENUE RECYCLING

TESTIMONY OF HENRY DERWENT

Background of the Witness

My name is Henry Derwent. Until 15 January this year (2008) I was Director, International Climate Change at the United Kingdom's Department for Environment, Food and Rural Affairs (Defra), which is the lead UK Department on climate policy and sustainable energy, including energy efficiency. During most of the 10 Years that I held Director-level posts, variously named, dealing with climate change and energy I had responsibility for domestic and European climate change policies including economic instruments.

Other UK Departments of State have other relevant roles relating to climate policies, including the Department of Trade and Industry (now known as the Department of Business, Enterprise and Regulatory Reform) and the Treasury, which has lead responsibility for all taxation matters. The Treasury leads on the Climate Change Levy (CCL), the UK's primary energy tax, introduced just before I took up the above responsibilities in Defra; but my part of Defra leads on the Climate Change Agreements (CCAs) which allow energy intensive industries a substantial discount on this tax, on the energy efficiency programmes which are one of the applications of the CCL revenue, and on the UK and EU Emissions Trading Schemes which were introduced alongside energy taxation in the UK.

Current responsibilities of the witness

On 18 February this year I took up the post of President and Chief Executive of the International Emissions Trading Association, a not-for-profit trade association dedicated to the achievement of climate and environmental policy objectives with minimum cost and maximum efficiency through the establishment of market-based greenhouse gas trading systems across the world. IETA has a membership of nearly 180 companies spanning the whole value chain of emissions trading, from major industrial and power sector emitters of greenhouse gases through companies specialising in the measurement and verification of emissions, to the providers of emissions reductions from offset

projects, to the providers of the financial services used by companies to reduce their risk and comply cost-effectively with their compliance obligations. The largest tranches of member companies are in Europe and North America, but there are companies from across the rest of the world as well. A copy of IETA's current membership list is annexed to this testimony statement.

I therefore do not testify on behalf of the UK Government, but from my experience gained while working in that role and from the perspective of my current role.

Energy taxation in the UK – the Climate Change Levy

In March 1998 the UK Government appointed Lord Marshall, then President of the Confederation of British Industry, to report on the role of economic instruments in reducing greenhouse gas emissions while safeguarding the UK's competitiveness. His report, in November 1998, provided the basis for the Climate Change Levy package (which included negotiated climate change agreements and a capital allowances regime) and the UK Emissions Trading Scheme. The levy is a tax on business use of energy, charged via fuel and electricity bills. The suppliers of those commodities collect the tax along with their sales. The levy formed part of the 1999 Budget proposals, and came into effect in 2001.

The levy is payable by business consumers – so not by the power sector or by domestic consumers. The levy is charged at standard rates per kilowatt-hour of kilogramme for different fuels (including electricity), designed to minimise fuel-switching. As a result the carbon price equivalent differs significantly between the levy rates on different fuels. The rates were frozen for some years, but have recently been allowed to rise with inflation. The levy is paid by all but the smallest businesses. There are certain exemptions for energy produced from most renewable sources, coal mine methane and combined heat and power (cogeneration).

The proceeds of the levy are, unusually for UK taxation practice and in response to concern about competitiveness impacts of the new tax, recycled back to business by means of a rebate in the employers' contribution to National Insurance. The objective was to make the tax revenue-neutral to the Government; however the rebate rate chosen has turned out to be more generous than intended so the whole system has so far actually cost the Government money. And the benefit of the rebate is not equally felt by companies: those with larger workforces gain more.

A proportion of the levy proceeds (14% in 2006-07) is, however, not recycled in this way but is used to finance Government energy efficiency programmes for business, managed by the Carbon Trust, a private sector not-for-profit company set up by Government which has added to its original energy efficiency business roles including venture capital investment in early-stage developments of low-carbon technology, loans for smaller

businesses, promotion and publicity for carbon reduction by business, and policy support and commentary.

Climate Change Agreements

In recognition of the cost impact on energy-intensive industries, such industries are offered the facility of negotiating agreements with Government to reduce their energy consumption to appropriately challenging levels, the achievement of which trigger an 80% reduction in the CCL tax bill. The reductions have to be achieved by 2010, with 2-year interim targets, and two trigger points at which the Government has the right to renegotiate the targets. The definition of "energy-intensive" has been changed, and now starts with a process-based definition taken from pollution control regulation, to which are added a general criterion of energy costs as a proportion of production costs, with a lower level if the product concerned has a 50% import penetration ratio.

There are 51 business sectors covered by the agreements, covering 10,000 facilities (processes or sites). The Government has struck agreements in some cases with sectors, in some cases with individual businesses, and in some cases with both. Negotiating the agreements required considerable help from consultants and proved extremely time-consuming. The agreements require businesses to reduce their energy consumption either in absolute terms or relative to units of production: few companies or sectors chose the absolute alternative. Various tolerances and allowances for changes in external circumstances (including shifts in the average energy intensity of a product mix) were also added into the equation; and companies were also given the facility of trading their obligations between each other, linked for a period to the UK's emissions trading scheme, though few CCA companies did so.

How successful have these policies been?

There a great many uncertainties to be negotiated in answering this question, stemming mainly from uncertainty about the counter-factual (particularly difficult for energy efficiency improvements where economic rationality suggests improvements should be made, but unidentified transaction costs get in the way) and the role that survey data or collections of anecdotes should have in the analysis. The levy is estimated to save some 3.5MtC by 2010, making it one of the more significant components of the UK's greenhouse gas emissions reduction, and the Government has said that there has been a £100 benefit to the UK economy from every tonne saved.

Some analysis has suggested the main impact comes from the "announcement effect" rather than the price effect, but that the savings achieved by the announcement effect are permanent (unless cost consequences are relaxed). There is however a significant body

of anecdotal evidence to suggest that the levy on its own has had little effect on investment decisions and behaviour among less energy-intensive companies, despite the fact that energy prices increased by around 15% - fluctuations in the underlying gas and electricity prices and changes due to new market regulation have tended to disguise the levy's impact. A number of companies have commented that the levy is a "blanket tax" which cannot be reduced by the company's own actions. Despite the permanence of original energy efficiency improvements, few companies regard the levy as a continuing stimulus to energy or carbon reduction.

Anecdotal evidence also suggests that the impact of the agreements has been significantly greater than that of the levy itself: the prospect, for energy intensive companies for whom the add-on of energy taxation is a significant proportion of costs, of avoiding 80% of the tax by concentrating on beating a negotiated target appears to have caught more of management's attention and to have led to more strategic planning than the gradual impact of the tax itself. Because of the continued "carrot" of the tax discount and the repeated milestone comparisons and negotiations over time, this effect is likely to be more persistent than the rather similar "announcement effect" identified for the levy. Those organisations such as the Carbon Trust who work closely with businesses on carbon reduction and energy efficiency find the prospect of clear and repeated opportunities for saving money very helpful in keeping managerial focus.

The Government's estimates have been that the agreements will have achieved another 1.9MtC by 2010 (though this is less than half of the savings reported under the agreements, much of which is attributable to other factors), with a net economic benefit of £90 per tonne. It follows that many of the energy reduction targets in the agreements, however fiercely negotiated, turned out to be comparatively easy to achieve, through some combination of negotiation asymmetries of information, genuinely wider availability of efficiencies than companies thought, and unrelated external economic and other circumstances. The first review of targets attempted to apply a more standardised reduction in energy use, but still encountered difficulties.

As for the impact on competitiveness, a recent full assessment of the evidence and arguments by the House of Commons Environmental Audit Committee concluded:

> Given the relatively limited price impact of the Levy, and the cost-savings that should accompany meeting Agreement targets, we believe that the CCL package has not been a damaging burden for UK business overall. In many cases it may have been good for the economy, given the savings in energy costs available for investment elsewhere, and the stimulus given to providers of energy efficiency products and services.

How does this relate to emissions trading?

It is not the purpose of this testimony to explain the development of greenhouse gas emissions trading in the UK and then in the EU, on which the Committee is probably

already well-informed. It should be noted, however, that in the UK (as in a number of other jurisdictions), energy taxation and a cap and trade system have existed side by side relatively harmoniously. Indeed limited fungibility between the tax-discounting climate change agreements and the UK's original non-mandatory cap and trade regime provided a rare example of the two approaches acting in a linked fashion. Business has complained repeatedly that there is (here and elsewhere in the UK system) an inefficient overlap of instruments – for some companies there are a number of different regimes that bear down on their energy and carbon consumption. This criticism has a common-sense force, added to by the fact that the dominance of carbon as opposed to energy as the key metric arose after the climate change levy scheme was designed, and moving the tax system towards carbon has taken a long time. However these schemes often impact in different ways and on different actors in a supply chain – the power sector, in particular, being a key target of the EU-ETS but not directly impacted by the climate change levy; and the unavoidable nature of at least some of the tax contrasts with the flexibility offered by trading, particularly when enhanced by lower-cost offsets. Plus, the cumulative effect may be a way of getting to the level of impact that local or national policy desires. In general the reasons why energy efficiency opportunities are not picked up are disparate and complex, and a mix of different instruments is likely to be necessary to combat them.

On the other hand some of the technical fixes in the UK are very complex: double counting of benefits and penalties under the EU-ETS and climate change agreements can occur, and is quite difficult to deal with equitably when the two schemes have different reconciliation timetables, different metrics, or different site or facility boundaries. While the worst of these problems are largely historical, as a result of the different parentage of the schemes, any approach that taxes consumption progressively but also caps consumption is going to entail some awkwardness. The UK Government has just finished consulting on a Climate Change Simplification Project aimed at going through these arguments.

One important verdict on the consistency and desirability of tax and trading together has been delivered by the UK in the form of that country's commitment, made in last year's Energy White Paper, to pursue a new UK domestic cap and trade scheme known as the Carbon Reduction Commitment, aimed at the tranche of emissions-producing businesses below the energy-intensive industries, including the service sector and large commercial operations such as the big supermarkets, who pay the climate change levy but are not incentivised by climate change agreements. Encouraged by the enthusiasm of many of the companies in this sector, the Government is pursuing the CRC scheme as a potentially significant producer of incremental emissions reductions

Which is to be preferred – tax or trading?

Assuming that a choice has to be made, what does the UK experience say about the criteria for that choice? IETA, unsurprisingly, has in general a strong preference for trading. The two strongest arguments in favour of tax are usually taken to be that tax is

predictable from the perspective of the taxed entity, and that the incremental transaction costs are low. The UK's alteration of real tax rates, the changes in the definition of energy intensive industries and the many tricky and negotiable criteria for exemptions or derogations from the basic tax calculation for energy-intensives, mostly offered in response to strong lobbying, suggest that predictability and low transaction costs do not necessarily follow. The total constraint on cost to industry is however stronger under tax than under trading, though the availability of lower cost offsets is one well-known way in which a cap and trade approach can have its potential costs mitigated.

The standard arguments against taxation in comparison to cap and trade do appear to be borne out by aspects of the UK experience. There is clearly no certainty of outcome in terms of carbon reduction. While estimates of what the tax instruments in the UK has produced in terms of the primary output of a climate policy – a contribution towards greenhouse gas stabilisation – are substantial, there is massive uncertainty about the error factor or double-counting around those numbers. There is also not much evidence of sustained behavioural change from tax on its own: the artificial "cliff-edges" of the climate change agreements seem to be necessary to make a real difference, and caps can at least equally well provide those edges. There are fewer positive incentives under taxation: while the agreements can provide them based on parameters that public servants have been able to negotiate, at the expense of total revenue, trading offers the possibility of motivating other companies to do more cheaply what some of their peers are struggling to manage.

The UK does provide a good example, however, of the possibility of dedicating revenue to specific purposes that reduce the net economic cost of the tax – the UK chose reduced employment taxation and energy efficiency programmes, but other desirable choices could be made. There is a comparable approach, however, under trading where the conditions that justify widespread auctioning (most importantly, the availability of cost pass-through) are satisfied and the proceeds of auctioning are also available for distribution. These are arguably less obviously a tax, though public sector accountants in some jurisdictions consider the differences technically insignificant, and perhaps easier to hypothecate to desirable purposes, even though the UK has managed this under a tax. Finally trading in emissions has developed the concept of project-based offsets, which can incentivise cases where the more generalised approach of taxation cannot reach. Potential offsets in the non-traded part of the UK economy are certainly not being identified through taxation.

UK business has for a long time supported the importance of a carbon price, while having significant doubts about the Climate Change Levy and its application. In its November 2007 report Climate Change – Everybody's Business", the CBI concludes:

> We believe that cap-and-trade schemes, such as the EU ETS, have several distinct advantages over taxation as a measure focused on large emitters in the power and industrial sectors. By setting a cap on emissions for those sectors within the scheme, they offer certainty about the level of reduction which will be

achieved. And despite calls for a global carbon tax, international agreement for a global cap-and-trade system currently looks very much more likely.

Conclusions

The UK provides valuable evidence of ways in which a tax approach to climate change can work out, including the significant complexity that can be created out of some apparently simple principles. It shows that a tax regime and a cap and trade regime can exist side by side, though preferably when some of those complexities have been reduced or avoided. The evidence for the benefits of recycling of revenue is to some degree hidden: it was a principle adopted at the start and strongly supported by business that recycling was a necessity, and this led a jurisdiction usually opposed to hypothecation to alter its principles somewhat, and not look back. The UK also arguably provides evidence of the comparative attractions of a cap and trade system, to which the Government and the great majority of UK industry remains solidly committed.

SENATE FINANCE COMMITTEE HEARING
APRIL 24, 2008
TAX ASPECTS OF A CAP-AND-TRADE PROGRAM

HENRY DERWENT, PRESIDENT/CEO INTERNATIONAL EMISSIONS TRADING ASSOCIATION

ANSWERS TO SUPPLEMENTARY QUESTIONS – 6 JUNE 2008

GENERAL NOTE: THESE ARE PERSONAL ANSWERS; ALTHOUGH THEY DRAW ON MY RECOLLECTIONS OF MY PREVIOUS ROLE IN UK GOVERNMENT SERVICE IN THE CLIMATE AND ENERGY FIELDS OVER THE PAST 10 YEARS, THEY ARE NOT TO BE TAKEN AS OFFICIAL VIEWS OF THE UK GOVERNMENT

Questions from Chairman Baucus

1. At the hearing, Mr. Greenstein testified that providing a "climate rebate" added onto the earned income tax credit would help low-income families meet the costs they are anticipated to as a result of a cap-and-trade system. Was this idea or any others considered by your government to offset the impacts of climate change policy on low-income households? If so, why did it not go forward? What do you think of Mr. Greenstein's idea?

To the best of my knowledge no particular consideration was given to specifically counteracting the impact on low-income families of the UK's energy tax measure, the Climate Change Levy (CCL), which was the main subject of my testimony. This tax applies to businesses, and the only way it affects energy suppliers is through the costs to them of acting in effect as the Government's tax collectors. The only impacts on consumers, including low-income families, would be indirect ones through marginal changes in the prices of the goods and services they consume. The UK emissions trading scheme likewise applied to businesses and not energy suppliers

By contrast the EU emissions trading scheme does affect energy suppliers directly, and increases in the cost of electricity to domestic as well as business consumers of electricity are freely acknowledged to have taken place. The current UK Energy White Paper suggests an increase of 10-15% for domestic consumers compared to a position where there was no carbon price. "Fuel poverty" is the name given in the UK to disproportionate expenditure by poorer households on fuel, in particular for keeping warm in winter. The Government has a legal obligation to eliminate "fuel poverty", as statutorily defined, for vulnerable households by 2010 and for all households by 2016, and this is one of the four objectives of UK energy policy (alongside the environment, security of supply, and competitive pricing). The application of the EU-ETS in the UK was taken as part of a large package of new measures affecting energy and energy pricing, and the impact on fuel poverty of the whole package was considered. The package includes various measures to promote energy efficiency and a communication strategy to improve the take-up of the specific Government support measures to help the fuel-poor (for example by free or low-cost home insulation), as well as specific focusing of specific new energy policies or schemes

on the fuel-poor. The net effect of these policies together was expected to be a reduction of 200,000 in fuel-poor households in 2010. However, this was against the background of a significant increase in the fuel poor caused by rising fuel and electricity prices in world markets, an effect which has continued since the publication of the Energy White Paper.

My lack of knowledge of tax credits in the US makes me cautious about giving a personal opinion on Mr Greenstein's proposal for an increase in those credits to counteract the effect of price rises on low-income US families. I would note, however, that the increase in the cost of fuel and electricity is an intrinsic part of policies to reduce consumption and the emissions consequences of that consumption. This price effect has to be felt in order to be effective. The primary means of relieving impacts for poorer families ought, against that background, to be to help them reduce their demand while protecting their need for the services they must have, in particular for winter heating. Targeted programmes to improve insulation and provide more efficient heat sources are effective, and improved funding for them seems to me to be the first-best application of available revenue for the fuel-poor. However, a general tax-credit, while presumably compensating for the net impact of increased prices, has the benefit of not shielding households from the perception of rising fuel bills, which may lead to some of the desired reduction in demand. So to my mind it would be a second-best.

2. Your testimony stated that the Climate Change Levy is estimated to save 3.5 million tons of carbon (MtC) by 2010 and that the government reports there has been 100 pounds of benefit to the economy for every ton saved. Some suggest the impact is from the "announcement effect" rather than the price effect. Can you elaborate on what the "announcement effect" is and how it is analyzed?

The "announcement effect" is a subset of the measured effects of a tax or policy change which is best defined by the authors of a consultants study (Cambridge Econometrics) of the Climate Change Levy, drawn upon by the UK Government and by the UK National Audit Office in their assesssments of the CCL. The authors say:

> The AE, following an official proposal to impose an environmental tax, is defined as responses taken between the time of the announcement of the tax and its actual implementation, whilst the general effect is defined to include any further effect in the sectors affected by the tax after its announcement, including the effects due to the rise in the price. (See "Hysteresis and Energy Demand: The Announcement Effects and the effect of the UK Climate Change Levy", Agnolucci, Barker and Ekins June 2004).

The authors used an econometric approach to construct a baseline and indicators of the effects of the tax, regressing energy consumption on its determinants over time, looking for statistically significant alterations in time-series of energy consumption in different sectors.

The thesis which this work supports is that companies were stimulated to reduce energy consumption simply by the information that Government action to increase the cost of energy was going to take place, so they had better start preparing for it, and that the changes visible them persisted, rather than significantly changing in the light of the actual impact of the ultimately increased costs.

There is some skepticism in the UK energy community about the size and importance of this effect.

The National Audit Office (NAO) enquiry into the Climate Change Levy and the Climate Change Agreements tested it by interviews with a number of affected companies. It was clear that many energy-intensive firms did start to review their energy consumption after press and other reports of Government action and new fiscal proposals. It was also clear that subsequent investment decisions in well-managed energy-intensive businesses factored in actual prices, net of all taxes applying, rather than giving any particular weight to a continued heightened sensitivity to this particular tax. (And it was also clear that among non-energy intensive firms, there continued to be widespread ignorance of the existence of the tax; two surveys in 2002 found between 20 and 45% of smaller businesses unsure whether the tax was in place or affected them.)

The NAO left the question of announcement effect as opposed to price effect open. Evidence within the Department of Environment, Food, and Rural Affairs (Defra, which negotiated the Climate Change Agreements) drawn from working contacts with the businesses affected suggested that businesses were more focused on the specific trigger-levels under the Agreements as motives for action, rather than the background tax.

3. Part of the debate surrounding a cap-and-trade system is whether the allowances should be given to emitters at no cost or auctioned. At the hearing, Dr. Orszag stated that giving away a large share of the allowances rather than selling them would be more costly to the economy. Could you please comment on a system that would phase out the free allowances over time, as proposed in S. 2191, the Climate Security Act of 2007?

The phasing out of free allocation over time is the approach which is now proposed by the European Commission for the third Phase of the EU-Emissions Trading Scheme, and the explanatory material and economic studies published by the Commission on 23 January this year give an account of the reasons. In strict economic terms, the efficiency of an auction-based approach to the distribution by Government of new assets of value, rather than distributing them for free according to measures of equitable entitlement, is well-attested (see for example Auctioning in the European Union Trading Scheme, Matthes and Neuhoff September 2007, and Auctioning of EU-ETS Phase 2 Allowances – How and Why?, Hepburn, Grubb, Neuhoff, Matthes and Tse 2006). However, the transitional effects of paying a significant amount for something that was previously not priced can be significant. They vary from situation to situation, depending largely on the extent to which the increased price can affect the pricing of the goods and services produced by the entity directly affected by the original price increase, and also on the extent to which those goods and services compete against others less affected by the price increase, perhaps most importantly in the case of imports from jurisdictions where there has been no comparable increase. Also, where there are investment choices for capital assets that could be affected by the raised costs of energy or any other specific factor of production or use, phasing in the increase reduces the possibility of stranded assets.

The EU proposal to proceed directly to 100% auctioning of emissions allowances to the power sector is driven largely by the perception that in this sector prices can be passed on and external competition is very low. However, there is significant debate about whether the first of these assumptions is true, and many firms would only accept auctioning to the extent that regulatory and other obstacles to cost pass-

through are removed. The substitution of auctioning for free distribution in other EU-ETS sectors over the period to 2020 is a pragmatic solution rather than one based on specific sector by sector analysis; and importantly exceptions are allowed in principle where there is evidence that competitiveness would be significantly affected. The Commission is collecting that evidence and will come to a decision about such sectors in 2011. The means of collection, the weighing of the evidence, and the timetable are all currently under scrutiny in the processes leading from the Commission proposals to the finalization of the new Directive.

4. The Congressional Budget Office has estimated there will be an increase in federal revenue resulting from the auctioning of allowances of more than $1.2 trillion from 2009 to 2018. The legislation the United States Senate will be considering in June directs those revenues to various programs. The early auction proceeds would all go to an energy technology deployment program and in the later years the money will go to funds set up in the Treasury for new programs. What do you think about directing revenues this way and what will the impact be on the economy?

The least distortionary way of making use of the funds amassed by an auctioning programme is to return it to the sectors from which it has been raised, in a way that at least does not negate the price signal and if possible amplifies it. Or it can be used for the pursuit of fiscal reform, or in pursuit of other government policies intended to reduce existing distortions. The UK used CCL revenue to reduce distortion, by redistribution, and to amplify the signal, by funding energy efficiency programmes directed at least in part at the industries paying the tax, and also for fiscal reform, by reducing taxes on employment without losing net Government revenue. A new UK trading scheme for non-energy-intensives has proposed amplifying the signal by redistributing by reference to historic performance in improving energy efficiency. But many finance Ministries – and financial statisticians – regard the income simply as an undifferentiated tranche of general Government revenue, to be deployed without reference to its source.

There has so far been little auctioning in pursuit of the limited provisions of Phase 1 and 2 of the EU-ETS, and therefore little opportunity to choose how to distribute the proceeds. There will be some - perhaps 100mt – auctioning as Phase 2 continues through to its close in 2012, the largest amount likely to be coming from Germany. There is no real pattern so far; each country has its own national answers to the questions about distribution. In phase 3, the balance between national and European-level choices of how to distribute has yet to be established, but the Commission has proposed that 20% of the income should be devoted to climate-related purposes.

My view is that there are advantages in giving priority to minimizing the distortionary effect of the tax, but if positive spending proposals are required, deploying revenue on appropriate low-carbon technology support is excellent and may help to create a broad political constituency in favour of auctioning. But it must be backed up by determination to focus on a few key technology issues (rather than allow the income to be dissipated in small amounts), by political courage to defend the choices, and by a willingness to face up to the risk that the Government may, as Governments have many times before, be unsuccessful in picking winners. The proposal to concentrate first on deployment of existing

technologies not yet in wide commercial use, and then on research funding for new technologies, is also sensible.

Questions from Ranking Member Grassley

1. Can you comment on whether the recycling of revenue from the Climate Change Levy to reduce other employment taxes has helped retain the competitiveness of the British industries affected by the Climate Change Levy?

I am not aware of any formal examination of whether the choice of CCL recycling method impacted on UK competitiveness. Anecdotally, however, it stands to reason that by returning revenue to firms, the UK reduced the deleterious impacts of the CCL on the cost of doing business in the UK.

There was some concern during the formative stages of the CCL about the discrimination against capital-intensive, rather than labour-intensive, companies that was implicit in redistribution of revenue by reductions in employment tax. The concern increased in particular when it was suggested that public sector bodies would tend to be winners more often than private sector (which led to some adjustments). At the margin, the chosen recycling method could impact on a small part of the cost base of manufacturing industries with export markets, compared with an alternative methodology. But at first sight, the effect seems likely to be slight, and many comparatively employment-heavy service industries have just as much of a part to play in the UK's national competitiveness.

2. You testified that the constraint on cost to industry is stronger under a carbon tax than with cap-and-trade, but that lower cost offsets can help reduce the cost of compliance under a cap-and-trade system. To what extent do you believe that offsets should be included in a cap-and-trade system and should there be any limit?

I believe that it is essential to keep costs to industry as low as possible consistent with the achievement of the objective of the policy. Otherwise GDP, competitiveness and stakeholder support will all suffer. The objective of the policy is to achieve a quantum of emissions reduction (greenhouse gas reductions now have to occur very rapidly if there is to be any chance of stabilizing emissions at an acceptable level). And the true cost of carbon is uncertain, needing to be discovered by the market. Predetermining a cost, which is what a tax does, leaves the achievement of the quantum uncertain and removes pressure to find lower cost solutions. The wider the field in which the search for lower costs takes place, the greater the likelihood of finding them. The benefit of emissions reduction is equal wherever in the world they take place. Looking for reductions among possible offsets, as well as in the capped sectors, will almost always lead to lower costs.

To maximize economic benefit there should be no artificial limit on the amount of emissions reductions that are taken from offsets: the whole point of trading is that compliance should be achievable as much by emissions reductions that have been bought as by those that have been produced by the company

subject to the compliance requirement. A number of arguments to the contrary have been proposed, but none of them are entirely satisfactory:

1. It is often said that there is a national public policy objective achieved if companies are required to produce a proportion of the reductions themselves, or by trading within a narrow national field. The argument is that a country whose companies have no experience of direct emissions reduction and ignore carbon price signals in their own businesses will suffer significant transition costs and stranded assets at some time in the future, causing national economic damage. This is a difficult argument since it suggests that Governments are better at protecting private sector interests than companies are.

2. There is also an argument of equity based on the assumption that emissions reductions at home will be costly or uncomfortable and it is right for countries which caused the greenhouse gas problem to feel some discomfort. Some developing countries feel this very strongly.

3. It seems to be increasingly argued at present that emissions reductions achieved by offsets, or abroad, are by nature untrustworthy. It is true that the measurement against a counterfactual of reductions achieved by projects (wherever they are situated) is tricky, but systems such as the Clean Development Mechanism of the Kyoto Protocol go to enormous lengths to ensure additionality and reliable delivery , and on the whole they are successful (though additionality is an extremely slippery concept).

4. There is a protectionist argument that buying emissions reductions abroad saps the wealth of the purchasing country, However, most countries have little difficulty with the principle of comparative advantage on which international trade is based, and buy commodities (a price on carbon makes it a commodity) as well as labour abroad on a regular basis when they are cheaper.

5. Finally there is the pragmatic argument that achieving the international agreement necessary to deal with a global problem requires some compromise with those convinced by the second argument above, or some of the others. The Marrakech Accords under the Kyoto Protocol enshrine such a compromise, in the form of the so-called principle of supplementarity, which simply requires countries with targets to achieve at least 50% of those targets at home. Countries which have ratified Kyoto have a legal obligation, to ensure that the use of international offsets is limited accordingly; countries that expect to ratify a successor that could well enshrine the same principle will need to address this point as well.

Questions from Senator Bingaman

1. Could you explain the "announcement effect" that you mentioned in your testimony and how that might alter market behavior and investment decisions in a US program?

For an explanation of the announcement effect, see the answer to Question 2 from Chairman Baucus above. In principle, heavy publicity given to a Government intention to penalize emissions in some way should have an immediate impact on the behaviour and plans of emissions-heavy companies, in particular as they consider investment in capital goods that could lock-in an emissions profile for some years or decades. There should be no distinction here between the US and any other jurisdiction. If an early change in behaviour is desired, maximizing the announcement effect is a good policy, irrespective of the subsequent balance between the continued effects of the announcement and the effects of the actual price changes as later introduced – insofar as those can in fact be distinguished.

2. Your testimony seems to suggest that the "overlap of instruments" that results from having in place both a tax and a cap-and-trade system is cumbersome but also, in some instances, useful. For example, the energy tax promotes efficiency improvements in a way that a cap-and-trade system does not. If you were starting from scratch, what sort of combination of mechanisms would you advocate to advance both supply and demand-side reductions in CO2?

This is an under-researched area. My own view is that different actors will respond to different stimuli. For some, advertising alone might be enough. For others, a simple graduated increase in price (typically achieved by a tax) is enough to change behaviour, and this is usually described as the price-elasticity of demand. Some countries have regarded a tax as the base on top of which other incentives can be built. But for many companies, price increases are soon assimilated or passed through to customers, and something more challenging or stimulating is required to change behaviour. This could be the creation of a trigger point for carbon or energy efficiency, above which a steep step-change in some form of cost occurs. For others, the greatest stimulus might be prospect of making money by finding carbon or energy reductions more quickly than others and selling the difference. Others again might lack the capacity to assess and make changes in behaviour, or might find the transaction costs for their business outweigh all the gains that could be made. For those, direct Government help with energy or carbon efficiency through an audit and consultancy assistance might be the most effective approach. Finally, households and individuals can be stimulated to change behaviour by a whole variety of different forms of monetary and psychological persuasion.

The importance of the objective of emissions reduction, the speed with which it must be achieved and the lack of certainty about responses to policy measures suggests to me that all the mechanisms outlined above should be available. Good policy design can and should be employed to make sure the incentives do not clash and are all simple to understand. Emissions trading is a smart way of combining two of these mechanisms - a step-change in cost (at the capped level) and harnessing the immense power of the market in finding ways of making money as well as avoiding cost.

3. In your testimony (page 2), you indicate that the proceeds from the energy levy, paid by all but the smallest businesses, are "recycled back ... by means of a rebate in the employers' contribution to National Insurance." Can you explain why you chose to attach the rebate to payroll, rather than business income taxes? How would you evaluate the success in meeting the stated objective of addressing competitiveness concerns?

The answers above to the 4th question from Chairman Baucus and the first question from Ranking Member Grassley are relevant here. The principal reason for using the majority of the CCL revenue for a reduction in taxation on employment was one of general direction of fiscal policy. Applying a tax to an environmental "bad" and lessening the tax on a social "good" was regarded as a satisfactory and politically beneficial shift. I was not party to the discussions on this within the Treasury, but my

understanding is that the alternative of reducing corporation tax or other taxes on business income may have risked being more distortionary because of significant differences in the corporation tax liability of companies, as well as being less immediately appealing from social and political perspectives.

The impact on competitiveness of imposing a new element of tax is in itself quite difficult to measure. Across business as a whole, a comparatively small addition in energy costs, net of the effects of action taken to reduce energy consumption, makes only a small percentage difference to companies' cost base. Satisfactorily identfying companies and sectors affected by a combination of susceptibility to external competition and unavoidable energy-intensity is contentious. A series of analytical studies has been conducted by the UK's Carbon Trust based on the concept of "value at risk" from the increases in energy costs created by the EU-ETS, and represents probably the best attempt so far, though there are still disagreements about the conclusions to be drawn from it. (EU-ETS Impacts on Profitabilty and Trade – a Sector by Sector Analysis, Carbon Trust January 2008)

Recycling the revenue from the tax at issue back to the business groupings from which it was taken clearly must remove at least a large proportion of such damage to competitiveness as the tax may have caused. I am not aware of any work that has attempted to define the impact on UK competitiveness of the residual changes in tax distribution or the effect of the "top-slice" of revenue taken to fund the energy effiicency consultancy and other work of the Carbon Trust, some of which again may have impacted positively on the economic situation of companies whose competitiveness might have been affected.

H C S DERWENT

President/CEO, International Emissions Trading Association

Geneva, 6 June 2008

OPENING STATEMENT OF SENATOR CHUCK GRASSLEY
Tax Aspects of a Carbon Cap and Trade Program
April 24, 2008

Thank you, Mr. Chairman.

Today's hearing is about the tax aspects of a cap-and-trade program.

In fact, a cap-and-trade program for greenhouse gas emissions is essentially a tax in many ways.

Most economists agree that it would impose significant costs on the economy that will ultimately be paid by every American.

Many proposals would also raise substantial revenue for the federal government – $1.21 trillion from 2009-2018 for the bill reported by the Environment and Public Works Committee according to CBO.

Those revenues would then be dedicated to specific purposes, which is in effect a trust fund.

Of course the Senate Finance Committee has jurisdiction over federal trust funds.

As such, this committee can add it's experience and perspective to issues that perhaps have not received as much attention in other venues.

It's important to have a discussion about how we can attempt to lessen the impact of any cap-and-trade program on economic growth and jobs.

Americans are already feeling the pinch at the gas pump and the supermarket.

We have an obligation to make sure that government regulations don't put them in the poor house.

If we don't think things through and we end up creating an overly complex, bureaucratic, and inefficient program, then we'll end up piling on even more costs with no additional benefit.

We have a distinguished panel of witnesses here today that will share their ideas about how to design a cap-and-trade system that addresses some of those potential problems.

Welcome and thank you for being here.

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Testimony of Robert Greenstein,
Executive Director, Center on Budget and Policy Priorities

Hearing on the Tax Aspects of a Cap-and-Trade System
Senate Committee on Finance
April 24, 2008

Strong and effective measures are needed to reduce greenhouse gas emissions and prevent costly and potentially catastrophic environmental and economic damage as a result of climate change. The Center on Budget and Policy Priorities' area of expertise is not in environmental policy per se but in the impacts that climate-change policies can have on the budgets of American families — especially those of modest means — and on the federal budget.

Congress can develop climate-change policy that is environmentally and economically sound and fiscally responsible, treats low-income families equitably, and avoids increases in poverty and hardship. To achieve these objectives, the policy will need to be well designed. This means, in part, that the policy will need to generate sufficient resources to address the requirements and challenges of sound climate-change policy and to mitigate the impact on vulnerable populations, especially people with low incomes. If Congress decides to adopt a cap-and-trade approach, it will be important to auction off most or all of the emission allowances, to devote an adequate share of the proceeds to assisting low- and moderate-income consumers, and to make wise use of the other proceeds. As explained below, this has important implications for tax policy.

My testimony covers the following matters:

- Significant increases in the prices of energy and energy-related products will necessarily occur as a result of the enactment of effective policies to reduce greenhouse gas emissions.

- Households with limited incomes will be affected the most by these higher prices, because they spend a larger fraction of their budgets on energy and energy-related products and because they are less able to afford investments that could reduce their energy consumption (such as a new, more fuel-efficient heating system or car).

- A relatively modest percentage of the total value of the tradable emissions allowances that would be created by a cap-and-trade program — we estimate about 14 percent — would be sufficient to fund a climate rebate program that would preserve the purchasing power of the poorest 20 percent of the U.S. population and provide significant relief to people in the next poorest 20 percent.

- Making sure that sufficient resources are available to shield low-income households from increased poverty and hardship is a necessary — but not a sufficient — step to avoid increases in poverty. It also is essential to design measures that are effective in actually reaching low-income people, are efficient (with low administrative costs), and are consistent with energy conservation goals.

- The tax system, including the Earned Income Tax Credit, has an important role to play in the design of such policies. For example, a "climate rebate" could be added onto the EITC to help maintain the purchasing power of low-income working families. At the same time, such assistance cannot be provided entirely through the tax system. Many low-income consumers (including low-income elderly individuals, poor individuals with disabilities, and some of the poorest families in the nation) do not fall within the scope of the income tax system and will need to be reached through other means.

- This can be done; policymakers can tap other existing mechanisms to identify eligible low-income households and efficiently deliver a climate rebate to low-income consumers who are not reached by the EITC. As explained below, this can be accomplished efficiently and effectively through the electronic benefit transfer (EBT) systems that state human service agencies already use to provide various types of assistance to millions of poor households.

- The impact of climate-change policies on low-income consumers goes well beyond the direct effect of higher energy prices on their utility bills; more than half of the increased costs that low-income households would face would be for goods and services *other than* utilities. This is one reason that relying on utility companies and expansions in the low-income home energy assistance program as the main ways to deliver low-income relief (an approach some climate-change proposals take) would not be especially effective or efficient, and why a rebate type of approach is more advisable.

In addition to issues relating to low-income consumers, my testimony makes the following points about the allocation of emissions allowances to meet crucial priorities:

- Arguments that a large fraction of the allowances should be given away for free to existing emitters do not stand up to careful analysis. The Congressional Budget Office has estimated that only 15 percent or less of the value of the allowances would be needed to offset the net financial losses that shareholders in companies affected by these policies would otherwise face.

- If most (or all) of the permits were auctioned, Congress would secure sufficient resources to also mitigate impacts on *middle-income* consumers (as well as to address various other important needs related to climate change). Later in this testimony, I describe one promising way to provide relief to middle-income consumers through a new climate-change tax credit. This would be much more effective in protecting middle-income consumers than a reduction in individual income tax rates.

- The higher prices for energy and energy-related products that would result from a cap on emissions would create strong incentives for energy conservation and private-sector investments in clean-energy technologies. Proposals for additional tax incentives (or other federal subsidies) to promote alternative technologies and conservation should be carefully

examined to ensure that resources are used only for cost-effective activities that *would not take place anyway*, in response to the higher energy prices that a cap-and-trade policy will generate.

- I would suggest that the Finance Committee consider asking the Congressional Budget Office or other appropriate entity to undertake a comprehensive review of existing energy tax-incentives and subsidies to determine which incentives and subsidies would no longer be necessary or appropriate under a cap-and-trade regime that leads to higher prices for carbon-intensive energy sources and thus creates market incentives for investing in alternative energy sources and other means of reducing emissions. Under a cap-and-trade system, the private market will provide much more robust incentives for such activities to be undertaken, and preferential tax treatment should no longer be necessary in some cases. Eliminating current incentives that would be wasteful or redundant under a cap-and-trade system could free up resources to fund a substantial fraction of worthwhile *new* investment and conservation incentives that would complement the cap-and-trade program's price signals.

The remainder of my testimony elaborates on these points.

Four Key Numbers on Climate Policy, Low-Income Consumers, and the Budget

Much of our analysis of the effects of climate-change policy on the budgets of low-income households and the federal budget can be summed up in four key sets of numbers.

1. $750 - $950 per year: the average increase in energy-related costs for the poorest fifth of the population that would result from a modest (15 percent) emissions reduction

Effective climate-change policies work in part by raising the prices of fossil-fuel energy products to encourage energy efficiency and the substitution of clean energy sources. This is essential to prevent extensive environmental and economic damage as a result of global warming. However, this will raise costs to consumers for a wide array of products and services, from gasoline and electricity to food, mass transit, and other products or services with significant energy inputs.

Households with limited incomes will be affected the most by these higher prices, since they spend a larger share of their incomes on energy-related products and services than more affluent households do. They also are less able to afford investments that can reduce their energy consumption, such as buying a more efficient car or a new heating and cooling system. If nothing is done to protect people of limited means, many more of them will slip into poverty, those who are poor will become poorer, and the trend toward widening income inequality will be aggravated.

$750 to $950 per year is our estimate (based on analysis by the Congressional Budget Office and data from the Consumer Expenditure Survey) of how much, if left to fend for themselves, average families in the poorest 20 percent of the population would have to come up with to cover the increased costs that would arise from a 15 percent reduction in emissions.[1] This is a group whose average income is only modestly over $13,000 a year.

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[1] The Congressional Budget Office has provided a figure of $680 for the average increase in cost for the bottom 20 percent of *households* under a 15 percent reduction in emissions. Using CBO's own household-size-adjustment methodology, we have estimated the impact on the poorest 20 percent of *people*. (The bottom fifth of *households*

The $750-$950 estimate is the average impact on these households after taking into account the increases in Social Security and other cost-of-living adjustments that some of these households would receive as a result of the higher energy costs. Moreover, the 15 percent reduction in emissions is a 15 percent reduction from the levels to which emissions *otherwise would climb*, as estimated by CBO. (This is the standard that CBO has used its analyses of various near-term impacts of climate-change policies.) This is modest by the standards of current legislative proposals. For example, the Lieberman-Warner cap-and-trade proposal (S. 2191) sets a more stringent target for emissions in 2020 — a reduction of *19 percent* below *actual 2005 levels*. Moreover, the required emissions reductions would become steadily larger in subsequent years, which means the added costs that low-income households would bear would eventually rise well above the $750-$950 level.

2. $50 billion to $300 billion per year: resources potentially generated by climate-change policies to help low-income consumers and to address other climate-change-related needs

Fortunately, the same climate-change measures that would generate higher energy-related costs also could generate substantial resources to mitigate the effects of those costs. CBO estimates that various recent proposals to limit greenhouse-gas emissions by establishing a cap-and-trade system would create a valuable resource — emission permits — that would be worth $50 billion to $300 billion per year by 2020, depending on the specifics of the proposal. This is the amount of revenue that the government could expect to raise if it auctioned off all of the permits.

3. Approximately 14 percent: the share of the auction proceeds needed to fully offset the increased energy-related costs faced by low-income consumers

The amount of revenue that the government could raise by auctioning off all permits in a cap-and-trade system far exceeds what would be needed to protect low-income consumers from higher energy-related prices arising from climate-change legislation. We estimate that a program designed according to the principles laid out later in this testimony to fully offset the impact on the poorest 20 percent of Americans and also provide some relief to many hard-pressed working families in the next 20 percent of the income distribution could be funded with approximately 14 percent of the resources that would be generated by auctioning off all allowances.

The specific dollar amounts in our first two sets of numbers — $750 to $950 per year of added costs for low-income consumers from a 15 percent reduction in projected emissions and $50 to $300 billion per year of potential revenue — are tied to specific emissions-reduction targets. The 14 percent figure, in contrast, is not tied to those targets. When the emissions target is looser and the amount of emissions reduction required is smaller, as it would be in the early years of most cap-and-trade proposals, the dollar amount of revenue that could be raised would be lower — but so would be the increase in energy prices and the added costs that households would face. As the cap tightened and larger emissions reductions were called for, the added costs to households would increase, but so would the revenue that the cap-and-trade system could generate to offset those added costs. As a result, no matter what the point in time or the tightness of the cap, the amount needed to protect low-income consumers would always be about 14 percent of the revenue that could be generated. Congress would not need to guess at the right amount to provide to shield low-

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disproportionately consists of one- and two-person households, and as a result, includes significantly less than one-fifth of the *people* in the United States.) For a fuller explanation of this adjustment, see http://www.cbpp.org/10-25-07climate.pdf, footnote 1.

income consumers; an amount equal to about 14 percent of the allowance value in a cap-and-trade system would always be sufficient to protect these consumers from the price impacts they would face.

If Congress wanted to assist middle-income consumers as well, that, too, could be accomplished, as long as a sufficient share of the allowance value from a cap-and-trade regime were used for that purpose. For example, with approximately half of the allowance value, Congress could fully compensate the bottom 60 percent of American households and provide significant compensation to the next 20 percent as well, leaving out only the most affluent 20 percent of households, the group that has the most disposable income, consumes the most energy, and is the most able to make adjustments to its own consumption patterns to reduce its carbon footprint. A later section of this testimony discusses how a proposal to offset the added costs that low-income households would bear could be modified to include consumers further up the income scale as well.

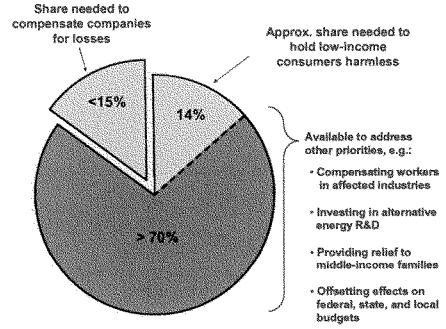
4. Less than 15 percent: the share of potential budget resources needed to compensate energy companies and other emitters for financial losses due to climate-change policies

Although the resources that can be generated by sound climate-change policies are substantial, so are the budget claims that will arise from those policies. Besides the need to protect vulnerable populations, those claims include: basic research into alternative energy sources; assistance for workers and communities that depend on the coal industry and other industries that would be most affected by the shift to a less carbon-intensive economy; and various other needs. Higher energy prices also would drive up the cost to federal, state, and local governments of providing many important services and benefits. Unless those costs were offset, either government services would have to be reduced, taxes would have to be raised, or the federal deficit would increase.

In a cap-and-trade system, making sure that there are adequate resources to address these matters requires that most of the emission allowances be auctioned off, not given away for free to energy companies and other emitters due to misconceptions about the financial losses they would incur. One misconception is that those losses would be very large. CBO's review of the evidence concludes, however, that less than 15 percent of the total value of the allowances would be sufficient to offset the net financial losses of companies affected by policies to restrict emissions. More than

FIGURE 1

Well-Designed Climate Policies Can Generate the Resources Needed to Address Crucial Priorities



Source: Share needed to compensate companies for losses based on estimates cited by the Congressional Budget Office (CBO). Share needed to hold low-income consumers harmless reflects CBPP calculations using the Consumer Expenditure Survey, Current Population Survey, and CBO methodology.

that would simply create what CBO calls "windfall profits" for companies receiving the free allowances.

A related misconception about cap-and-trade may also contribute to the belief that large numbers of emission allowances should be given away to energy companies and other industrial emitters. This is the mistaken belief that energy prices will not rise (or not rise as much) if the allowances are given away. That belief is *not* correct; it flies in the face of the basic law of supply and demand. A cap on emissions will limit the supply of energy produced from fossil fuels. When supply is restricted, prices rise — just as when there is a banana shortage, the price of bananas goes up. Regardless of whether the government gives away or sells the allowances, energy companies will be able to sell their products at the higher price.

If companies receive allowances for free, they will still be able to charge the higher price — i.e., they will be able to charge what the market will bear — and thus will reap what CBO has termed "windfall profits." For these reasons, Harvard economist Greg Mankiw, who served as Chairman of President George W. Bush's Council of Economic Advisers, has characterized a cap-and-trade mechanism under which the allowances are given away as a form of "corporate welfare."[2] (As an analogy, if a distributor has purchased large quantities of a product at one price but some external event then causes the supply of future quantities of that product to fall — and the market price of the product to rise correspondingly — the distributor will not keep his prices low just because he purchased the products before their price climbed. He will charge what the market will bear. In the same way, energy companies will charge what the market will bear whether they obtain emissions allowances for free or purchase them through an auction.)

Avoiding Regressive Outcomes While Meeting Other Climate-Related Priorities

The policies needed to reduce greenhouse-gas emissions would, by themselves, result in regressive changes in energy prices. As noted, however, they also can generate substantial revenue, and the revenue from auctioning off emission allowances under a cap-and-trade system could yield more than would be needed to offset the losses likely to be experienced by low- and moderate-income families and by workers in the industries hit hardest by the adjustment to a less carbon-intensive economy. The revenue could be sufficient both to address these issues *and* to meet various other legitimate purposes arising from the legislation (see Figure 1).

In contrast, giving away a substantial fraction of emission allowances to existing energy producers would do almost nothing to compensate low- and moderate-income families for their losses. A very large percentage of the benefits of such a giveaway would go to shareholders of the energy companies, most of whom have high incomes. Little revenue would be available to mitigate the effects on those least well-off.

Addressing regressivity and adjustment costs would not be the only claims on the resources that a cap-and-trade system could generate. Governments at all levels would pay more for the energy and energy-related products that they consume directly. For example, the Defense Department is the single largest consumer of energy in the United States and would incur higher costs. The higher

[2] Greg Mankiw, "Greg Mankiw's Blog: Random Observations for Students of Economics," August 2, 2007.

energy costs also could trigger increases in automatic cost-of-living adjustments in Social Security and other benefit programs and some modest reductions in tax revenues. At state and local levels, governments could face higher costs for heating schools, public hospitals, and the like.

These issues can be addressed and any increases in deficits and debt avoided by using a share of the allowances to offset such tax and expenditure effects.[3] It should be noted that action to address climate change should have positive effects on the budget over the longer run, by reducing government expenditures for such things as natural disasters, crop failures, and disease epidemics that are likely to occur sooner or later in the absence of effective climate-change policies.

Evaluating claims for energy industry subsidies and tax incentives

I would also like to sound a note of warning here. In conjunction with cap-and-trade legislation, this Committee is likely to be beset with claims for additional tax subsidies to encourage a wide variety of activities related to new energy technologies, efficiency measures, and the like in the name of addressing climate change. In some cases — for example, the need to expand certain types of basic alternative energy research — increased federal investment can be a valuable complement to the market incentives that a cap-and-trade system would provide. But in other cases, federal tax incentives or other subsidies will not be warranted. Tax subsidies will be wasteful to the extent that they subsidize activity that would take place anyway, even without the subsidies, or activity that is not well focused on reducing greenhouse-gas emissions.

This is an important issue. The nation already has an extensive set of energy subsidies and tax incentives, and proposals for more incentives and subsidies are likely to proliferate as climate-change legislation moves forward. But some meritorious energy-related activities for which government tax subsidies are warranted *today*, because the private market does not currently provide enough of an incentive for such activities, will *no longer* require such tax incentives under a cap-and-trade system because the increased costs of fossil-fuel energy will make the market incentives much more powerful. To avoid wasteful spending, the Committee should consider undertaking a comprehensive review of existing energy tax-incentives and subsidies to determine which ones would no longer be necessary or appropriate under a cap-and-trade regime with strong market-price signals. Eliminating current incentives that would be wasteful or redundant could free up resources to fund a substantial fraction of worthwhile new investment and conservation incentives to complement the cap-and-trade program's price signals.[4]

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[3] The Congressional Budget Office does not explicitly enumerate these tax and spending effects in its budget estimates for climate change legislation, but the conventional "income and payroll tax offset" that CBO applies to determine the net revenue change from auctioning emission allowances does, in effect, account for these effects on the federal budget (although not for their effects on state and local budgets). Roughly speaking, for a cap and trade system with auctions to be deficit neutral, only three-quarters of the proceeds from auctioning allowances can be spent. The rest needs to be set aside to account for the losses of income and payroll tax revenue that take place under the conventional assumption used in CBO and Joint Tax Committee cost estimates, which is that overall national income does not change. See for example, the two April 10, 2008 CBO cost estimates of S. 2191, one of which is for the bill as ordered reported by committee and the other of which is for an amended version of the bill that sets aside sufficient auction proceeds to make the legislation deficit neutral.

[4] For an excellent discussion of this issue, see Jason Furman, Jason E. Bordoff, Manasi Deshpande, and Pascal J. Noel, "An Economic Strategy to Address Climate Change and Promote Energy Security", The Brookings Institution, October 2007, Part 2, pp. 20-27.

If lawmakers capture the necessary revenue (by auctioning most of the permits) and make wise choices among competing claims in designing climate-change policies, they can achieve the economic and environmental benefits from reducing greenhouse-gas emissions while having the resources to address the impact of higher prices on low- and moderate-income consumers and to support other legitimate new claims on the available resources. (It might even be possible to achieve some modest deficit reduction, which would be valuable at a time when the pressures on the federal budget will be increasing.)

If, however, lawmakers give away too many emissions rights to existing emitters, as some bills currently pending in Congress would do, or use substantial amounts of the proceeds for energy tax incentives that lack strong merit under a cap-and-trade system, they likely will fail to secure sufficient resources to meet the needs of Americans of limited means and to adequately address other high priority needs related to climate change. Such a course could result in significant increases in poverty and hardship and in a further widening of the gap between rich and poor.

Designing Climate-Change Legislation That Shields Low-Income Households from Increased Poverty and Hardship

Ensuring that sufficient resources are available to shield low-income households from increased poverty and hardship is crucial in the design of climate-change policies. But it is only the first step needed to avoid increases in poverty. It also is essential to use the resources made available for this purpose in a way that is *effective* in reaching low-income households, *efficient* (with low administrative costs), and *consistent with energy conservation goals*. At this early stage of the debate, no climate-change legislation introduced on Capitol Hill meets this goal, although there is a growing interest among a number of lawmakers in finding effective ways to protect low-income people from increased costs.

To shield vulnerable households from higher energy costs in a manner that is both effective and efficient, we recommend that policymakers follow five basic principles.

1. ***Protect the most vulnerable households.*** Climate-change legislation should not make poor families poorer or push more people into poverty. To avoid that outcome, "climate rebates" should be designed to fully offset higher energy-related costs for low-income families. A good place to start is by fully protecting households in the bottom fifth of the income spectrum — a group whose average household income is only a little more than $13,000.[5] Families at somewhat higher income levels that struggle to make ends meet also will need some help in coping with the higher bills they will face.

2. ***Use mechanisms that reach all or nearly all low-income households.*** Members of some low-income households work for low wages and could receive a climate rebate through the tax code, such as through an increase in the Earned Income Tax Credit. But others are elderly, unemployed (especially during recessions), or have serious disabilities and are not in the tax system — and experience at state and federal levels shows that attempts to

[5] Since $13,300 is the *average* income of households in this income group, some of these households have incomes lower than that, while others have incomes that are somewhat higher. Among families of three, those in the poorest 20 percent of the population are those that have incomes below about $27,000.

use the tax system to deliver relief to such households have been unsuccessful.[6] Yet climate rebates need to reach these poor households as well.

Fortunately, policymakers can tap existing mechanisms to reach the large number of low-income households that are not reached through a tax-rebate mechanism because their incomes are so low that they do not file a tax return. For example, "climate rebates" could be provided through the electronic benefit transfer (EBT) systems that state human service agencies use to provide various types of assistance to many poor people. (This is discussed further below.) Policymakers could fill any remaining gaps, and provide weatherization assistance, through some increases in the Low Income Home Energy Assistance Program.

3. ***Minimize red tape.*** Funds set aside for low-income consumers should go to intended beneficiaries, not to administrative costs or profits. Accordingly, policymakers should provide assistance as much as possible through existing, proven delivery mechanisms rather than new public or private bureaucracies.

4. ***Do not focus solely on utility bills.*** For households in the bottom fifth of the population, higher home energy prices will account for *less than half* of the hit on their budgets from a cap-and-trade system. Furthermore, about 20 percent of the households in the bottom fifth have their utility costs reflected in their rent, so they pay for utilities indirectly, through the rents their landlords charge. Policymakers should structure climate rebates so they can help such low-income families with the rent increases they will face as a result of climate policies, as well as with the higher prices low-income households will incur for gasoline and other products and services that are sensitive to energy costs.

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[6] Over the years, a number of states have established refundable tax credits that are available to all low-income households, including those that have no or little earnings and do not file state income tax returns. These state tax credits are most commonly designed to provide relief from state sales taxes or property taxes. In most such states for which data are available, a large portion of the low-income households that are not required to file state income tax returns fail to file for these tax credits and thus do not receive them.

States have found it difficult to get the word out to the diverse array of low-income people who are not otherwise connected to the income tax system. In addition, many people apparently are reluctant to have anything to do with state or federal revenue agencies and do not file income tax returns if they are not required to do so.

Another example of this phenomenon occurred last year at the federal level, when all households with telephones qualified for a small refund for certain federal telephone excise taxes paid for the past three years, as a result of a court decision. To obtain these rebates as flat dollar amounts of up to $60, households not filing a federal tax return needed merely to file a short, simple form with the IRS. Treasury data show the *fewer than 6 percent* of the eligible low-income households who do not ordinarily file an income tax return (but whom the IRS expected to file for this rebate) actually did so. (For further discussion of these issues, see Robert Greenstein, Sharon Parrott, and Arloc Sherman," "Designing Climate-Change Legislation that Shields Low-Income Households From Increased Poverty and Hardship," Center on Budget and Policy Priorities, revised March 21, 2008.)

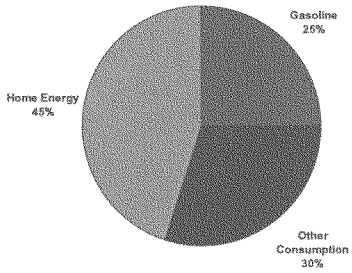
Many of these state tax credits and the federal telephone tax rebate are smaller than a federal climate-change tax credit would be, and a larger tax credit would be expected to induce greater participation. Even so, a significant percentage of low-income households would likely be missed. Indeed, there are early indications that this phenomenon also is occurring this year with regard to the delivery of economic-stimulus rebates to low-income elderly households and others who are not required to file federal income tax returns. Of the 14 million tax filing units that the IRS has identified as potentially eligible for stimulus payments because they consist of people who receive Social Security or veterans payments but who do not ordinarily file tax returns, only 1.75 million had filed as of March 29.

5. ***Adjust for family size.*** Larger households should receive more help than smaller households because they have higher expenses. Families with several children will generally consume more energy, and consequently face larger burdens from increased energy costs, than individuals living alone. Many other forms of assistance vary by household size; this one should as well.

FIGURE 2

Impact on Low-Income Households Goes Well Beyond Home Energy

Share of Loss in Purchasing Power for Poorest 20 Percent of People by Product Category



Source: CBPP calculations based on Consumer Expenditure Survey data and CBO methodology.

A "Climate Rebate" That Meets These Principles

A combination of an increase in the Earned Income Tax Credit and a rebate delivered through state electronic benefit transfer systems would reach the vast majority of low-income households, and would do so without creating the need for a new bureaucracy or large administrative costs.

The **Earned Income Tax Credit** is a powerful tool for reaching millions of low-income working families; this committee (and Congress and the relevant administrations) relied on EITC expansions in both 1990 and 1993 to offset the impacts on low-income working families of the increases enacted in those years in gasoline and (in 1990) other regressive excise taxes. Under cap-and-trade legislation, the EITC's parameters could be designed to adjust automatically over time to reflect the increasing consumer costs that result from the steady tightening of the emissions caps. (This could be done through a formula that ties the adjustments in the annual EITC parameters to government calculations of the loss in consumer purchasing power resulting from the emissions caps.)

If such EITC increases were all that was done, however, the result would still be a substantial increase in poverty and hardship. About half of those in the bottom fifth of the population do not qualify for the EITC in any given year, in most cases because they are elderly, have a serious disability, were unemployed in the prior year due to a weak labor market, or are raising young children and are temporarily out of the labor force. The group left out includes some of the poorest children in the country. A tax-based strategy such as the EITC consequently needs to be coupled with a form of assistance that is available to other low-income households.

The best such mechanism is the **Electronic Benefit Transfer** system that all state human service agencies use to provide food stamp assistance — and in most states, other benefits (such as child care or TANF assistance) as well — to a broad array of very low income households. A climate rebate administered through existing state EBT systems would be much less expensive to set up and administer than virtually any alternative, because states already have the EBT system in place. States could fairly easily issue a monthly rebate to the millions of low-income households that are already enrolled in either the Food Stamp Program or in the low-income subsidy for the Medicare prescription drug benefit (which reaches a large share of the low-income elderly and disabled

population). Poor households that do not receive either of those benefits but that meet the eligibility criteria for food stamps (income below 130 percent of the poverty line and limited assets) and wished to receive the climate-change rebate could apply for the rebate through their state human services agency.

The rebate delivered through the state EBT systems could be designed to mesh with the EITC so that for working-poor households, the amount provided through the EBT mechanism would phase down as income increased and the amount provided through the EITC phased up.[7]

These two delivery mechanisms — an EBT climate-change rebate and an expanded EITC — could be supplemented with a smaller but still significant increase in the Low-Income Home Energy Assistance Program (LIHEAP) to help low-income households that faced particular hardship because of extremely high energy costs even after the EBT rebate or EITC boost was provided, and to provide weatherization assistance and assistance with home energy efficiency to low-income households. LIHEAP also would be a backstop that could provide another way to help reach low-income elderly people not picked up through the other mechanisms, since it disproportionately serves the elderly.

By building off existing, effective programs, this approach would succeed in reaching most low-income households. About *three-fourths* of all households in the bottom fifth of the income spectrum would be reached with little additional paperwork because they already participate in the Food Stamp program, the EITC, or the low-income subsidy under the Medicare prescription drug benefit. (An estimated 28 million low- and moderate-income households would receive assistance automatically because they already have an EBT account through the Food Stamp Program or receive the EITC. Another 7 million households receive the Medicare low-income subsidy and do *not* receive food stamps; they could be enrolled in the rebate program either automatically or with little additional paperwork.)

We estimate that 14 percent of the value of emissions allowances in a cap-and-trade system would fund this proposal.

Providing Relief to Middle-Income Consumers

Efficient climate change policies also will reduce purchasing power for middle-income consumers. While middle-income households will face smaller purchasing power losses (measured as a share of income) than low-income households and should be better positioned to deal with them, they will still incur meaningful costs.

Policymakers may conclude that a portion of the value of the emissions allowances should be used to provide relief for middle-income consumers. As just noted, a policy that fully offset the purchasing power losses of low-income households would require about 14 percent of the value of the allowances if it were efficiently designed. Providing full relief to households in the bottom 60

[7] Very low income households would receive their climate rebate through the EBT mechanism. Low-income working families with incomes in the EITC phase-in range would receive part of their rebate through the EBT mechanism and part through the EITC. Most low-income working families would receive their rebate entirely through the EITC.

percent of the income scale and partial relief to the next 20 percent of households would require about *half* of the value of the emissions allowances.

Designing Relief for Middle-Income Consumers

The tax system is a good mechanism for delivering help to middle-income households, as well as to low- and moderate-income working families. These households already file income tax returns, and benefits provided through the tax system will reach them. In addition, a "climate change tax credit" could be designed so it adds little complexity to the filing process either for filers or for the IRS.

There are two important points to keep in mind in designing tax relief for middle-income consumers.

First, tax benefits intended to reach middle-income households should be provided in the form of tax credits, not tax deductions. The value of a deduction depends on the taxpayer's marginal tax bracket. A $1,000 deduction is worth $350 to a household in the 35 percent tax bracket ($1,000 x 35%), but only $150 to a household in the 15 percent bracket, and $100 to a household in the 10 percent bracket.

In contrast, credits are worth the same amount to all taxpayers. This makes them a much more appropriate mechanism for providing energy-cost relief to middle-income families, the large majority of whom are in the 15 percent tax bracket.

Second, middle-income relief could easily be integrated with the low-income relief proposal described above. I described above a proposal to deliver relief to low-income households primarily through two mechanisms: the EITC and state EBT systems. If the goal were to provide relief to middle-income households as well, a refundable "climate change tax credit" that is available to both low- and middle-income households (and phases out above specified income levels) could be substituted for the EITC component of that proposal.

Like the EITC and EBT proposals described above, a climate change tax credit should include adjustment for family size. Since the effects of climate change legislation on households' purchasing power will vary by household size, it would make sense for tax benefits intended to relieve purchasing power losses to vary by family size as well. Also like the EITC proposal, the size of the tax credit would be based on government estimates of the loss in purchasing power caused by the limitation on carbon emissions.

Reductions in Income Tax Rates Would Not Target Relief Effectively to Middle-Income Families

Some have proposed using revenue raised by auctioning emissions allowances to reduce personal income tax rates. Such a proposal would not target relief to middle-income households effectively and would do next to nothing for households with incomes just a little too high to qualify for assistance provided through an EITC expansion. Instead, reductions in personal income tax rates would provide the largest tax benefits to upper-income households, the group least in need of assistance.

The reason, of course, is that the benefits of any marginal rate cut rise with income. For example, if all marginal income tax rates were cut by 1 percentage point, the climate relief for a married couple with two children and income of $45,000 would be $201. For a similar family with income of $200,000, the rate cut would provide a benefit of $1,751. And for a family with income of $1 million or more, the rate cut would be worth $9,757.

Table 1 shows the effects of a 1 percentage-point reduction in all income tax rates. Those who least need help in coping with higher energy costs would receive the biggest tax benefits.[8]

Even an approach that reduced only the bottom two tax rates would be problematic. This is because the benefits of any reduction in personal income tax rates phases in slowly with income. Among families of four, only those with incomes of *more than $90,000* — that is, only those who are at or above the top of the 15 percent income tax bracket — would benefit in full from a reduction in the bottom two tax rates.

Table 1: Value of a 1 Percentage Point Cut in All Individual Income Tax Rates to a Married Couple With Two Children at Various Income Levels (2008)

Income	Tax Cut
$45,000	$201
$60,000	$351
$75,000	$501
$100,000	$751
$200,000	$1,751
$500,000	$4,751
$1,000,000	$9,751

Source: CBPP calculations. Assumes households do not itemize deductions and do not owe the Alternative Minimum Tax.

Deficit Reduction Would Likely Be Better for the Economy Than Rate Cuts

Part of the motivation behind proposals to use revenues from climate-change legislation to reduce individual income tax rates is the hope that this approach would benefit the economy and perhaps mitigate any economic costs that climate-change policies might have.

Given current budget conditions, however, the most effective means of promoting long-term economic growth is probably deficit reduction. The large, sustained budget deficits and high levels of federal debt projected under current policies are a significant threat to the economy over the long term. As Federal Reserve Chair Ben Bernanke has noted, persistent budget shortfalls like those projected for future decades "reduce national saving and therefore imperil, to some extent, the future prosperity of our country."[9] Some experts also have warned that there is some risk that the large, sustained deficits projected under current policies could lead to a more sudden financial crisis.[10]

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[8] The disparate nature of the tax benefits that would be provided would be even greater under a flat percentage across-the-board reduction in income tax rates. For example, if all rates were reduced by 5 percent (so that the 10 percent rate was lowered to 9.5 percent, the 15 percent rate was lowered to 14.25 percent, and so on), a married family with two children and income of $45,000 would receive a $111 tax benefit, while a family making $200,000 would receive a $1,889 benefit and a family making $1 million would receive a $15,643 benefit.

[9] Hearing before the House Financial Services Committee, February 15, 2006.

[10] Robert E. Rubin, Peter R. Orszag, and Allen Sinai, "Sustained Budget Deficits: Longer-Run U.S. Economic Performance and the Risk of Financial and Fiscal Disarray," January 4, 2004.

Under these circumstances, the economic benefits of measures that reduce deficits and move the nation toward a more sustainable fiscal path are large. Comparing these gains with the economic gains from maintaining lower marginal income tax rates, the Congressional Budget Office observed that the economic benefits associated with lower marginal rates "are small compared with the economic benefits of moving the budget onto a sustainable track."[11]

While any deficit reduction included in climate-change legislation would not be large enough by itself to move the nation onto a sustainable fiscal course, studies by the Joint Committee on Taxation and by economists at the Brookings Institution and the University of California at Berkeley all have found that — dollar for dollar — the economic effects of deficits are larger than the economic effects of changes in personal income tax rates.[12] These studies find that the economy would be better off in the long run with current marginal rates and lower deficits than with reduced marginal rates and higher deficits. (This is CBO's conclusion as well.) This implies that the economic benefits of deficit-reduction measures should exceed the economic benefits of reductions in marginal income tax rates.

In short, if the purpose of a proposed reduction in personal income tax rates is to provide some relief to middle-income consumers who will face higher energy costs, then a climate tax credit would be far superior. If the purpose of a proposed rate cut is to boost economic growth, then devoting the funds to deficit reduction instead would yield stronger results.

Conclusion

Well-designed climate-change policy that auctions most or all of the permits can generate resources that can be used to avoid regressive outcomes and address other legitimate budgetary claims arising from the new policy. Policymakers should recognize the importance both of generating adequate revenue and of addressing concerns regarding equity and fiscal responsibility so that they do not up with a policy that increases poverty and further widens gaps between rich and poor, increases deficits and debt, or both.

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[11] Congressional Budget Office, "The Long-Term Budget Outlook," December 2005.

[12] Joint Committee on Taxation, "Macroeconomic Analysis of Various Proposals to Provide $500 Billion in Tax Relief," JCX-4-05, March 1, 2005; William G. Gale and Peter R. Orszag, "Bush Administration Tax Policy: Effects on Long-Term Growth," *Tax Notes*, October 18, 2004; Alan J. Auerbach, "The Bush Tax Cut and National Saving," *National Tax Journal*, September 2002.

Congressional Budget Office

Testimony

Statement of
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Implications of a Cap-and-Trade Program for Carbon Dioxide Emissions

before the
Committee on Finance
United States Senate

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Chairman Baucus, Senator Grassley, and Members of the Committee, thank you for the invitation to discuss the implications of cap-and-trade programs that are designed to reduce U.S. emissions of greenhouse gases, most prominently carbon dioxide (CO_2).

Global climate change is one of the nation's most significant long-term policy challenges. Human activities are producing increasingly large quantities of greenhouse gases, particularly CO_2. The accumulation of those gases in the atmosphere is expected to have potentially serious and costly effects on regional climates throughout the world. The magnitude of such damage remains highly uncertain, but there is growing recognition of the risk that the damage may be extensive and perhaps even catastrophic.

The risk of potentially catastrophic damage associated with climate change can justify actions to reduce that possible harm in much the same way that the hazards we all face as individuals motivate us to buy insurance. Reducing greenhouse-gas emissions would help limit the degree of damage associated with climate change, especially the risk of significant damage. However, decreasing those emissions would also impose costs on the economy—in the case of CO_2, because much economic activity is based on fossil fuels, which release carbon in the form of carbon dioxide when they are burned. Most analyses suggest that a carefully designed program to begin lowering CO_2 emissions would produce greater benefits than costs.

One option for reducing emissions is to establish a "cap-and-trade" program. Under such a program, policymakers would set a limit on emissions and allow entities to buy and sell rights (referred to as allowances) to emit CO_2. In designing a cap-and-trade program to achieve emission reductions, policymakers would face a number of critical decisions, including whether to limit fluctuations in the price of allowances and whether to sell the allowances or give them away. If the government chose to sell them, decisions would also have to be made about whether to use the resulting revenue to offset other taxes, to assist workers or low-income households that might be adversely affected by the emission cap, to support other legislative priorities, or to reduce the deficit. My testimony makes the following key points about those issues:

- Market-oriented approaches to reducing carbon emissions (such as a cap-and-trade program or a carbon tax) are much more efficient than command-and-control approaches (such as regulations that require across-the-board reductions by all firms). The reason is that the market-oriented approaches create incentives and flexibility for emissions reductions to occur where and how they are least expensive to accomplish.

- Within the relatively efficient category of approaches that rely on the power of markets, a tax on emissions is generally more efficient than a cap-and-trade system. The reason is that although both a tax and a cap-and-trade system

encourage firms to find the lowest-cost reductions at a particular point in time, a tax provides greater flexibility over time, allowing firms to achieve reductions when they are least expensive. In particular, a tax encourages firms to make greater reductions in emissions at times when the cost of doing so is low and allows them leeway to lessen their efforts when the cost is high. A cap-and-trade program can be designed to capture many of those time-related efficiencies by incorporating design features that prevent large fluctuations in the price of allowances (for example, a floor and a ceiling on allowance prices).

- A cap-and-trade program, like a tax on CO_2 emissions, could raise a significant amount of revenue because the value of the allowances created under such a program would probably be substantial. For example, in 2012, the value of the emission allowances that would be issued under S. 2191 would be roughly $145 billion, CBO estimates. As the cap that is included in that legislation became more stringent over time, the value of the allowances would grow. A key decision for policymakers is whether to sell emission allowances, thereby capturing their value in the form of federal revenue, or give them away.

- Under a cap-and-trade program, firms would *not* ultimately bear most of the costs of the allowances but instead would pass them along to their customers in the form of higher prices. Such price increases would stem from the restriction on emissions and would occur regardless of whether the government sold emission allowances or gave them away. Indeed, the price increases would be essential to the success of a cap-and-trade program because they would be the most important mechanism through which businesses and households would be encouraged to make investments and behavioral changes that reduced CO_2 emissions.

- Policymakers' decisions about whether to sell or give away the allowances could significantly affect the overall economic cost of capping CO_2 emissions and the way gains and losses from such a program were distributed among U.S. households. A policy of giving away rather than selling a large share of the allowances could be more costly to the economy and impose disproportionately large burdens on low-income households.

  - Evidence suggests that the cost to the economy of a 15 percent cut in U.S. emissions (not counting any benefits from mitigating climate change) might be more than twice as large if policymakers gave allowances away than if they sold them and used the revenue to lower current taxes on capital that discourage economic activity.

  - In addition, providing allowances free of charge to energy producers and energy-intensive firms could create "windfall profits" for relatively high-income shareholders of those companies, even though the emission cap would be likely to cause price increases that would disproportionately affect

people at the lower end of the income scale. Further, allocating allowances without charge would not prevent the loss of jobs in affected industries because such firms would probably reduce their output in response to higher prices for carbon-intensive goods and services. Those job losses, in turn, would impose concentrated income losses in some households and communities. In contrast, if the government chose to sell emission allowances, it could use some of the revenue from those sales to offset the disproportionate economic burden that higher prices would impose on low-income households and to provide transitional assistance to dislocated workers.

- CBO has concluded that the federal budget should record the value of allowances that are given away by the government if the recipients of the allowances could readily convert them into cash. In particular, the budget should record the value of those allowances, when they are distributed, as both revenues and outlays. That procedure, which CBO has already applied in its estimates for S. 2191, underscores that giving away allowances is economically equivalent to auctioning the allowances and then dedicating the proceeds to the recipients.

Flexibility in the Timing of Emission Reductions

Incentive-based approaches, which create financial incentives for firms and households to cut their greenhouse-gas emissions, are a lower-cost approach to reducing emissions than more restrictive command-and-control approaches, which would mandate how much such entities could emit or what emission-reduction technologies they should use. The lower cost of incentive-based approaches stems from the flexibility they provide as to where and how emission reductions are to be achieved. Either a tax or a cap-and-trade program would offer such flexibility at a given point in time:

- Under a tax, policymakers would levy a fee for each ton of CO_2 emitted or for each ton of carbon contained in fossil fuels. The tax would motivate entities to cut back on their emissions if the cost of doing so was less than the cost of paying the tax. As a result, the tax would place an upper limit on the cost of reducing emissions, but the total amount of CO_2 that would be emitted in any given year would be uncertain.

- Under a cap-and-trade program, policymakers would set a limit on total emissions during some period and would require regulated entities to hold rights, or allowances, to the emissions permitted under that cap. (Each allowance would entitle companies to emit one ton of CO_2 or to have one ton of carbon in the fuel that they sold.) After the allowances for a given period were distributed, entities would be free to buy and sell the allowances. The trading aspect of the program could lead to substantial cost savings relative to command-and-control approaches: Firms that were able to reduce emissions most cheaply could profit from selling allowances to firms that had relatively high abatement costs.

Cap-and-trade programs can vary substantially in the amount of leeway that they provide regulated entities in the timing of emission reductions. Designs that allow for more timing flexibility are generally more cost-effective.

Potential Savings in Costs as a Result of Timing Flexibility

In its most inflexible form, a cap-and-trade program would require that a specified cap on emissions be met each year. That lack of flexibility would boost the cost of achieving any long-term goal because it would prevent firms from responding to year-to-year differences in conditions that affected emission reduction costs, such as fluctuations in economic activity, energy markets, the weather (for example, an exceptionally cold winter would increase the demand for energy and make meeting a cap more expensive), and the technologies available for reducing emissions. In contrast, the benefits of meeting inflexible annual emission targets are unlikely to be significantly different from the benefits of achieving the same long-term reductions but allowing firms to reduce their emissions by more than a given target in some years and by less in others. That insensitivity of benefits to patterns of annual emissions is a result of the long-term nature of climate change. Limiting global temperature increases would entail making substantial reductions in the amount of greenhouse gases that accumulate in the atmosphere over the next several decades. However, the benefits of doing so are largely independent of the annual pattern of those reductions.[1]

Available research suggests that a tax on CO_2 emissions (which would provide firms with maximum flexibility in how they undertook emission reductions over time and could keep the cost of reductions in line with anticipated benefits) could achieve a long-term target at roughly one-fifth the cost of the most inflexible type of cap-and-trade program (that is, one with no leeway in the timing of emission reductions). No existing policy proposals envision such an inflexible cap, however. Among recent proposals for a cap-and-trade program, the amount of timing flexibility that firms are allowed would vary depending on the program's specific design features.

1. Although costs and benefits are difficult to measure, the long-term cumulative nature of climate change implies that the *benefit* of emitting one less ton of CO_2 in a given year—referred to as the marginal benefit—is roughly constant. In other words, the benefit in terms of averted climate damage from each additional ton of emissions reduced is roughly the same as the benefit from the previous ton of emissions reduced, and shifting the reductions from one year to another does not materially affect the ultimate impact on the climate. In contrast, the *cost* of emitting one less ton of CO_2 in a given year—the marginal cost—tends to increase with successive emission reductions. The reason is that the least expensive reductions are made first and progressively more-expensive cuts would then have to be made to meet increasingly ambitious targets for emission reductions.

Design Features That Provide Firms with Timing Flexibility

When combined, some design features could allow a cap-and-trade program to achieve many of the advantages in efficiency associated with a tax on emissions. One simple way of evaluating how close a cap-and-trade system would come to the efficiency of a carbon tax is to consider how much the price of allowances would fluctuate over time; the less fluctuation, the closer the cap-and-trade system would come to achieving the timing flexibility that is central to the efficiency of a tax. Minimizing price fluctuations requires measures to limit both unintended price increases and unintended price declines.

Keeping Costs from Climbing Too High. Setting a ceiling—typically referred to as a safety valve—on the price of allowances could make a cap-and-trade program more efficient than an inflexible cap. Such a policy could prevent the cost of reducing emissions from exceeding either the best available estimate of the environmental benefits that would result from those reductions or the cost that policymakers consider acceptable. The government could maintain a price ceiling by selling companies as many allowances as they would like to buy at the safety-valve price.

Alternatively, policymakers could allow companies to defer emission reductions to later years by allowing them to "borrow" future allowances for use in an earlier year. Borrowing allowances from future years would tend to reduce allowance prices in the current year but then raise prices in the future (because borrowing would allow smaller reductions now but require greater reductions later). Firms would want to borrow allowances only if they expected the price of allowances in the future to be sufficiently below the current price as to make deferring reductions profitable. That is, borrowing could help deal with temporary spikes in allowance prices but not circumstances in which allowance prices were expected to remain high over the long term. As a result, borrowing is likely to be less effective than a price ceiling in preventing higher-than-anticipated allowance prices.

Keeping Costs from Falling Too Low. Policymakers could prevent the price of allowances from falling too low by setting a price floor. If the government chose to auction a significant share of the allowances, it could specify a so-called reserve price and withhold allowances from the auction as needed to maintain that price. The efficiency advantage that a price floor offers stems from the fact that it can prevent the cost of emission reductions from falling below the benefits that they were expected to produce—or below the level of effort that policymakers intend that emitters should maintain.

Alternatively, policymakers could help keep the price of allowances from falling too low by allowing companies to exceed their required emission reductions in low-cost years in order to "bank" allowances for use in future high-cost years. The additional emission reductions motivated by banking in low-cost years would put upward pressure on the price of allowances in those years. Similar to borrowing,

banking would be most effective in addressing short-term lows in allowance prices rather than in circumstances in which allowance prices were expected to remain low over the long term. As a result, banking is likely to be less effective than a price floor in preventing lower-than-anticipated allowance prices.

The effects of a cap-and-trade system would also depend substantially on whether the allowances were sold or issued at no cost, as discussed below.

The Distributional Consequences of a Cap-and-Trade Program

In establishing a cap-and-trade program, policymakers would create a new commodity: the right to emit CO_2. The emission allowances—each of which would represent the right to emit, say, one ton of CO_2—would have substantial value. On the basis of a review of the existing literature and the range of CO_2 policies now being debated, CBO estimated that by 2020, the value of those allowances could total between $50 billion and $300 billion annually (in 2006 dollars). The actual value would depend on various factors, including the stringency of the cap (which would need to grow tighter over the years to keep CO_2 from continuing to accumulate), the possibility of offsetting CO_2 emissions through carbon sequestration or international allowance trading, and other features of the specific policy that was selected.[2] On April 10, 2008, CBO estimated that the value of the allowances created under S. 2191 would be roughly $145 billion once the proposed program took effect in 2012; in subsequent years, the aggregate value of the allowances would be even greater. (See Box 1 for a short description of CBO's cost estimate for S. 2191.)

Policymakers would need to decide how to allocate the allowances that corresponded to each year's CO_2 cap. One option would be to have the government capture their value by selling the allowances, as it does with licenses to use the electromagnetic spectrum. Another possibility would be to give the allowances to energy producers or some energy users at no charge. The European Union has used that second approach in its 2-year-old cap-and-trade program for CO_2 emissions, and nearly all of the allowances issued under the 13-year-old U.S. cap-and-trade program for sulfur dioxide emissions (which contribute to acid rain) are distributed in that way. Whether policymakers decided to sell the allowances or give them away would have significant implications for the distribution of gains and losses among U.S. households and for the overall cost of the policy.

The ultimate distributional impact of a cap-and-trade program would be the net effect of two distinct components: the distribution of the costs of the program

2. Carbon sequestration is the capture and long-term storage of CO_2 emissions underground (geological sequestration) or in vegetation or soil (biological sequestration). For more information, see Congressional Budget Office, *The Potential for Carbon Sequestration in the United States* (September 2007).

(including the cost of paying for the allowances) and the distribution of the allowances' value. (Because someone will pay for them, someone will benefit from their value.) Market forces would determine who bore the costs of a cap-and-trade program, but policymakers would determine who received the value of the allowances. The ultimate effect could be either progressive or regressive, imposing disproportionately large burdens on high-income or low-income households, respectively.

Market Forces Would Determine Who Bore the Costs of a Cap

Obtaining allowances—or taking steps to cut emissions to avoid the need for such allowances—would become a cost of doing business for firms that were subject to the CO_2 cap. However, those firms would not ultimately bear most of the costs of the allowances. Instead, they would pass them along to their customers (and their customers' customers) in the form of higher prices. By attaching a cost to CO_2 emissions, a cap-and-trade program would thus lead to price increases for energy and energy-intensive goods and services, the production of which contributes the most to those emissions. Such price increases would stem from the restriction on emissions and would occur regardless of whether the government sold emission allowances or gave them away. Indeed, the price increases would be essential to the success of a cap-and-trade program because they would be the most important mechanism through which businesses and households would be encouraged to make investments and behavioral changes that reduced CO_2 emissions.

The rise in prices for energy and energy-intensive goods and services would impose a larger burden, relative to income, on low-income households than on high-income households. For example, without incorporating any benefits to households from lessening climate change, CBO estimated that the price increases resulting from a 15 percent cut in CO_2 emissions would cost the average household in the lowest one-fifth (quintile) of all households arrayed by income slightly more than 3 percent of its income; such increases would cost the average household in the top quintile just under 2 percent of its income (see Table 1).[3]

The higher prices that would result from a cap on CO_2 emissions would reduce demand for energy and energy-intensive goods and services and thus create losses for some current investors and workers in the sectors of the economy that supply such products. Investors might see the value of their stock decline, and workers could face the risk of unemployment as jobs in those sectors were cut. Stock losses would tend to be widely dispersed among investors, because shareholders typically diversify their portfolios. In contrast, the costs borne by existing workers

3. Those numbers are based on an analysis that CBO conducted using 1998 data; see Congressional Budget Office, *Who Gains and Who Pays Under Carbon-Allowance Trading? The Distributional Effects of Alternative Policy Designs* (June 2000). CBO is in the process of updating those figures, using recent data on households' expenditures and income.

Box 1.

CBO's Cost Estimate for S. 2191

On April 10, 2008, the Congressional Budget Office (CBO) issued a cost estimate for S. 2191, the America's Climate Security Act of 2007, as ordered reported by the Senate Committee on Environment and Public Works in December 2007. CBO also issued a cost estimate for a slightly amended version of the legislation that was transmitted by the committee on April 9.

The legislation would create a cap-and-trade system for carbon dioxide and other greenhouse gases. (The bill actually calls for two separate cap-and-trade programs—a bigger one covering most types of greenhouse gases and a smaller one covering hydrofluorocarbons.) Some of the emission allowances would be auctioned—through a new entity, the Climate Change Credit Corporation; the remaining allowances would be distributed at no charge to states and other recipients. Over the roughly 40 years that the proposed cap-and-trade programs would be in effect, the number of allowances—and thus the emissions of relevant gases—would be reduced each year.

On the basis of an analysis of the results of several economic models, CBO estimates that if the legislation was enacted, the auction price of emission allowances for those gases would rise from about $23 per metric ton of carbon-dioxide-equivalent (mt CO_2e) emissions in 2009 to about $44 per mt CO_2e in 2018.[1] (In 2006 dollars, the auction price per metric

1. A carbon dioxide equivalent is defined for each greenhouse gas as the quantity of that gas that makes the same contribution to global warming as one metric ton of carbon dioxide, as determined by the Environmental Protection Agency.

would probably be concentrated among relatively few households and, by extension, their communities.

Policymakers Would Determine Who Received the Value of the Allowances

Although the price increases triggered by a cap-and-trade program for CO_2 emissions would be regressive, the program's ultimate distributional effect would depend on policymakers' decisions about how to allocate the emission allowances. As noted above, those allowances would be worth tens or hundreds of billions of dollars per year. Who received that value would depend on how the allowances were distributed.

Box 1. Continued

CBO's Cost Estimate for S. 2191

ton of CO_2e would rise from about $21 in 2009 to $35 in 2018.) Measured relative to base-case emissions (that is, those that would occur under current law), emissions of the main greenhouse gases covered by the programs would decline by 7 percent in 2012 and by 17 percent in 2018; over the 2012–2050 period, emissions would decline by a total of 42 percent relative to the base case.

Enacting S. 2191 as it was ordered reported would increase revenues by about $1.19 trillion over the 2009–2018 period, CBO estimates. Direct spending from distributing those proceeds would total about $1.21 trillion over the period. The net effect of the original legislation (as ordered reported) would be to increase the deficit (excluding any effects on future discretionary spending) by an estimated $15 billion over the next 10 years. The effect of the amended version, in contrast, would be to reduce the deficit (again excluding any effects on future discretionary spending) by roughly $80 billion over the same period. In addition, if policymakers appropriated the amounts necessary to implement S. 2191, discretionary spending would increase over the 2009–2018 period, CBO estimates, by about $4 billion under the original legislation and by about $80 billion under the amended version.

The cost estimates for the two versions of the bill differ because the amendment would increase the proportion of allowances that would be auctioned, deposit some of the auction proceeds in a Climate Change Deficit Reduction Fund, and make spending from that fund subject to appropriation.

Lawmakers could more than offset the price increases experienced by low-income households or the costs imposed on workers in particular industrial sectors by providing for the sale of some or all of the allowances and using the revenue to pay compensation. For example, CBO examined the ultimate distributional effects of a cap-and-trade program that would reduce CO_2 emissions in the United States by 15 percent, and it concluded that lower-income households could be better off (even without including any benefits from reducing climate change) as a result of the policy if the government chose to sell the allowances and use the revenue to pay an equal lump-sum rebate to every household in the United States. In that case, the size of the rebate would be larger than the average increase in low-

Table 1.

Effects on U.S. Households of the Higher Prices Resulting from a 15 Percent Cut in CO_2 Emissions

	Average for Income Quintile				
	Lowest	Second	Middle	Fourth	Highest
Annual Cost Increase in 2006 Dollars	680	880	1,160	1,500	2,180
Annual Cost Increase as a Percentage of Income[a]	3.3	2.9	2.8	2.7	1.7

Source: Congressional Budget Office, *Who Gains and Who Pays Under Carbon-Allowance Trading? The Distributional Effects of Alternative Policy Designs* (June 2000).

Notes: These numbers do not reflect any of the benefits from reducing climate change.

The policy examined here is a cap-and-trade program designed to lower U.S. carbon dioxide (CO_2) emissions by 15 percent from 1998 levels. (CBO performed the analysis in 2000 and used 1998 emission levels so that the distributional effects could be based on actual, rather than projected, data on consumer spending and taxes.) CBO assumed that the full cost of cutting emissions would be passed along to consumers in the form of higher prices and that the price increase for a given product would be proportional to the amount of CO_2 emitted from the fossil fuels used in its production.

These numbers reflect data on each quintile's cash consumption and estimates of cash income. (A quintile contains one-fifth of U.S. households arrayed by income.) Because of data limitations, the numbers should be viewed as illustrative and broadly supportive of the conclusions in this analysis rather than as precise estimates.

a. The cost increases are equivalent to percentage declines in households' after-tax income.

income households' spending on energy and energy-intensive goods.[4] Such a strategy would increase average income for households in the lowest income quintile by about 2 percent (see the top panel of Figure 1). At the same time, average income for households in the top quintile would fall by less than 1 percent, CBO estimates.

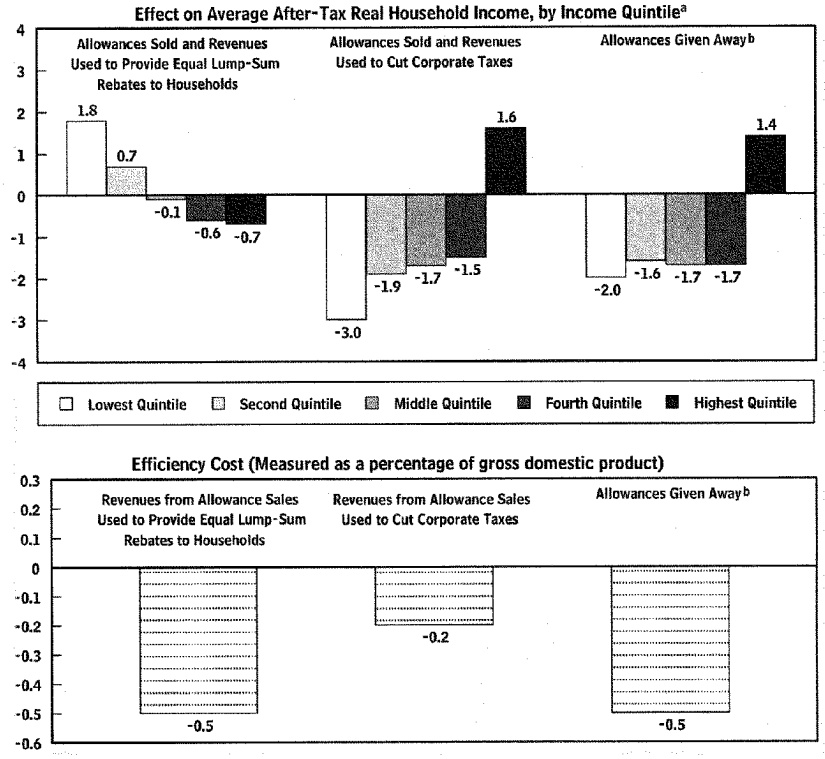
In contrast, if lawmakers chose to use the allowances to decrease corporate income taxes, the effect would be significantly more regressive than the initial price increases. Because low-income households pay relatively little in corporate taxes, the cut in corporate tax rates would not offset their increased spending on energy and energy-intensive goods. Households in the top income quintile, however, would experience an increase in after-tax income as a result of the policy. Should policymakers decide to use the revenue from selling allowances to decrease

4. One researcher has suggested that an environmental tax credit based on earnings could offer another means of reducing the regressive effects of the price increases that would result from a tax or cap on CO_2 emissions. See Gilbert E. Metcalf, *A Proposal for a U.S. Carbon Tax Swap* (Washington, D.C.: Brookings Institution, October 2007).

Figure 1.

Effects of a 15 Percent Cut in CO_2 Emissions, with the Allowances' Value Used in Various Ways

(Percentage change)



Sources: Congressional Budget Office (top panel); Terry M. Dinan and Diane Lim Rogers (bottom panel), "Distributional Effects of Carbon Allowance Trading: How Government Decisions Determine Winners and Losers," *National Tax Journal*, vol. 55, no. 2 (June 2002).

Notes: These figures do not reflect any of the benefits from reducing climate change.

The policy examined here is a cap-and-trade program designed to reduce carbon dioxide (CO_2) emissions by 15 percent from 1998 levels. (CBO performed the analysis in 2000 and used 1998 emission levels so the distributional effects could be based on actual, rather than projected, data on consumer spending and taxes.) In the top panel, the costs of the cap-and-trade policy are shown as decreases in real household income, measured as a percentage of after-tax income before the policy change. Those numbers reflect data on each quintile's cash consumption and estimates of cash income. (A quintile contains one-fifth of U.S. households arrayed by income.) Because of data limitations, those numbers should be viewed as illustrative and broadly supportive of the conclusions in this analysis rather than as precise estimates.

a. Indicates the net effect of households' increased expenditures because of cap-induced price increases and the income that households would receive as a result of the allowance-allocation strategy.

b. These estimates assume that the government would use any positive net revenue remaining after accounting for ways in which the policy affected the federal budget to provide equal lump-sum rebates to households. The results would be more regressive if the government used any positive net revenue to decrease corporate taxes or payroll taxes.

payroll taxes, the effect (not shown in the figure) would be regressive as well, although less so than for a cut in corporate taxes.[5]

Giving all or most of the allowances to energy producers to offset the potential losses of investors in those industries—as was done in the cap-and-trade program for sulfur dioxide emissions—would also exacerbate the regressivity of the price increases. On average, the value of the CO_2 allowances that producers would receive would more than compensate them for any decline in profits caused by a drop in demand for energy and energy-intensive goods and services whose production causes emissions. As a result, the companies that received allowances could experience windfall profits.

For example, in 2000, CBO estimated that if emissions were reduced by 15 percent, as in the scenario discussed above, and all of the allowances were distributed free of charge to producers in the oil, natural gas, and coal sectors, the value of the allowances would be 10 times as large as coal, oil, and natural gas producers' combined profits in 1998. Profits for those industries have climbed substantially since then, yet the value of the allowances associated with the policy that CBO analyzed would still be large relative to those producers' profits.[6] Because the additional profits from the allowances' value would not depend on how much a company produced, such profits would be unlikely to prevent the declines in production and resulting job losses that the price increases (and resulting drop in demand) would engender.

In addition, those profits would accrue to shareholders, who are primarily from higher-income households, and would more than offset those households' increased spending on energy and energy-intensive goods and services. Low-income households, by contrast, would benefit little if allowances were given to energy producers for free, and they would still bear a disproportionate burden from the price increases that would nonetheless occur. Thus, giving away allowances would be significantly regressive, making higher-income households better off as a result of the cap-and-trade policy while making lower-income households worse off.

Reducing the Overall Economic Impact of a CO_2 Cap

The ways in which lawmakers could allocate the revenue from selling emission allowances would affect not only the distributional consequences of a cap-and-

5. For those results, see Congressional Budget Office, *Trade-Offs in Allocating Allowances for CO_2 Emissions* (April 25, 2007).

6. Specifically, CBO estimated that the value in 1998 of the allowances stemming from the 15 percent reduction in U.S. emissions would total $155 billion (in 2006 dollars). By comparison, profits for U.S. producers of oil, natural gas, and coal totaled $13.5 billion in 1998 (in 2006 dollars). Those companies' total profits have grown substantially—for example, in 2006, they totaled $174 billion.

trade policy but also its total economic cost. For instance, the government could use the revenue from auctioning allowances to reduce existing taxes that tend to dampen economic activity—primarily, taxes on labor, capital, or personal income. As research indicates, a CO_2 cap would exacerbate the economic effects of such taxes: The higher prices caused by the cap would lower real (inflation-adjusted) wages and real returns on capital, which would be equivalent to raising marginal tax rates on those sources of income. Using the value of the allowances to reduce such taxes could help mitigate that adverse effect of the cap. Alternatively, policymakers could choose to use the revenue from auctioning allowances to reduce the federal deficit. If that reduction lessened the need for future tax increases, the end result could be similar to dedicating the revenue to cuts in existing taxes.

The decision about whether or not to sell the allowances and use the proceeds in ways that would benefit the economy could have a significant impact. For example, researchers have estimated that the efficiency cost (discussed below) of a 15 percent cut in emissions could be reduced by more than half if the government sold allowances and used the revenue to lower corporate income taxes, rather than devoting the revenue to providing lump-sum rebates to households or giving the allowances away (see the bottom panel of Figure 1). The efficiency cost of a policy reflects the economic losses that occur because prices in the economy are distorted so that they do not reflect the (nonenvironmental) resources used in their production. That cost includes decreases in the productive use of labor and capital as well as costs (both monetary and nonmonetary) associated with reducing emissions. To provide perspective on the magnitude of such efficiency costs, they are depicted as a share of gross domestic product.

Cap-and-Trade Programs and the Federal Budget

A final topic involves the budgetary treatment of cap-and-trade programs. The auctioning of allowances would clearly generate receipts for the federal government, and those amounts would be recorded as revenues.

In some cases, cap-and-trade allowances that are given away by the government should also be reflected in the federal budget, in CBO's view, and the agency used that approach in its treatment of most of the allowances that, under S. 2191, would be distributed at no charge. Specifically, the budget should show, as both revenues and outlays, the value of those allowances distributed at no cost to the recipients. That treatment stems from the fact that the government is essential to the existence of the allowances and is responsible for their readily realizable monetary value through its enforcement of the cap on emissions; it also derives from the fact that once created, the allowances would trade in a liquid secondary market—because firms or households could buy and sell them—and thus would be similar to cash. CBO therefore considers the distribution of such allowances at no charge to be functionally equivalent to the distribution of cash. (In contrast, the proceeds associated with the allowances allocated free of charge to producers and importers

under smaller, more constrained cap-and-trade programs—such as the cap-and-trade program for hydrofluorocarbons proposed under S. 2191—should not be recorded in the budget, CBO believes, primarily because the market created for such allowances would be relatively illiquid and thus the allowances would be less like cash.)

In CBO's view, an approach that reflects the value of free emission allowances in the federal budget best illuminates the trade-offs between different policy choices. Distributing allowances at no charge to specific firms or individuals is, in effect, equivalent to collecting revenue from an auction of the allowances and then distributing the auction proceeds to those firms or individuals. In other words, the government could either raise $100 by selling allowances and then give that amount in cash to particular businesses and individuals, or it could simply give $100 worth of allowances to those businesses and individuals, who could immediately and easily transform the allowances into cash through the secondary market. Treating allowances issued at no charge as both revenues and outlays reflects the equivalency of those two options.

Another cost-estimating issue involves the long-standing methodology used to hold overall economic activity (gross domestic product, or GDP) constant when estimating the effect of legislation on the federal budget. Under such estimating assumptions, higher amounts of indirect business charges reduce other income in the economy. (For example, if firms that must purchase allowances were unable to pass those costs along, their profits would fall. More likely, some substantial portion of those costs would be passed along to others in the economy, such as consumers, in the form of higher prices, and employees, in the form of lower wages. Lower wages would reduce federal revenues from income and payroll taxes. An increase in the price level would reduce income taxes—because the tax system is indexed to prices—and increase expenditures for indexed benefits, such as Social Security. Those changes would offset some of the revenues from the allowances.) The tradition in such estimating is to assume that 25 percent of any change in indirect business charges will be offset by changes in income and payroll taxes (25 percent is an approximate marginal tax rate). In preparing cost estimates for cap-and-trade proposals, CBO does not apply the 25 percent reduction to all of the gross revenues that would be generated but instead applies it on the basis of how those revenues would be used:

- To the extent that revenues would be used in ways that generated new taxable income, those uses would offset the loss of income and payroll taxes resulting from the initial purchase of allowances. Therefore, CBO does not apply the 25 percent reduction to any revenues that would go toward making transfer payments to taxable entities if the policy would impose no conditions on recipients' use of the payments. Although such payments do not directly affect GDP (because they are not made in exchange for goods or services), they are typically taxable. Thus, providing transfers to taxable entities would generate additional federal revenues that would essentially offset the 25 percent reduction applied to revenues from the issuance of allowances.

- In contrast, CBO does apply the 25 percent reduction to any revenues that would be spent by the government on goods and services (for example, on research and development activities). That treatment is used because such government spending would substitute for other economic activity (under the assumption that GDP is unchanged). As a result, revenues used in that way would not generate any new taxable income.

Questions for the Record from Dr. Peter Orszag
April 24, 2008

From Chairman Baucus

Question. At the Committee hearing April 24th, I asked you about the proposals by USCAP and the National Commission on Energy Policy and the Nicholas Institute on cost containment. Attached are both proposals. Could you please provide your assessment of how each proposal would contain costs under a cap-and-trade system?

Answer. Either proposal would offer some cost containment and could reduce fluctuations in allowance prices relative to an inflexible cap, which did not allow firms to transfer over time their efforts to reduce emissions. However, neither proposal would be as effective at containing costs or preventing price volatility as would the combination of a floor and ceiling on the price of allowances.

The USCAP Proposal. This proposal would limit price flexibility by allowing compliance through allowances from other countries' cap-and-trade programs, project-based domestic or international offsets, offsets from international forest agreements, or unlimited banking and limited borrowing.

Allowing firms to comply by using offsets (domestic or international) could provide a way of reducing the cost of meeting a cap; however, allowing offsets could undermine the integrity of the cap if the emission reductions could not be verified as additional (that is, as reductions above and beyond what firms would have made in the absence of a policy). Correspondingly, allowing firms to comply by using international allowances could lower the cost of meeting a given cap but could undermine the integrity of the cap unless all of the countries involved in international trading had comparable enforcement and monitoring.

Allowing companies to borrow future allowances in high-cost years—thereby deferring emission reductions to later years—or to exceed their required emission reductions in low-cost years in order to bank allowances for use in future high-cost years could help reduce short-term highs and lows in allowances prices.

Borrowing allowances from future years would tend to reduce allowance prices in the current year but then raise prices in the future (because borrowing would allow smaller reductions now but require greater reductions later). Firms would want to borrow allowances only if they expected the price of allowances in the future to be sufficiently below the current price as to make deferring reductions profitable. Furthermore, most proposals (including the USCAP proposal) would impose limits on borrowing, in part because of concerns about enforcement and questions about who would be liable if the firm that borrowed future allowances was unable to pay them back (if it declared bankruptcy, for example).

The USCAP proposal would allow unlimited banking. The additional emission reductions motivated by banking in low-cost years would put upward pressure on the price of allowances in those years.

The proposal would address sustained low allowance prices in one of two ways: by tightening the cap in the relatively near future or by instituting a reserve price in an auction. The latter approach offers a more straightforward method of ensuring that prices do not fall below a desired level.

The proposal would address sustained high allowance prices by allowing an administrative carbon market board to transfer future allowances to the current period. This can be viewed as a form of forced borrowing—that is, it would require firms to exchange lower reductions today for higher reductions in the future even if they would not have done so voluntarily. Transferring future allowances to the present time would reduce current allowance prices and raise future prices. That action could ultimately increase or decrease the aggregate cost of meeting a long-run emissions target depending on how the relative price of allowances changed over time. For example, if a low-cost, low-carbon energy technology became available in the future, borrowing would have successfully shifted emission reductions to a time when the cost of achieving them was lower. Alternatively, if policymakers borrowed future allowances on the expectation that such a technology would become available, but it did not, then the allowance transfer could cause even more reductions to be made at a time when the cost of achieving them might be relatively high. In that case, borrowing would ultimately raise the overall cost of achieving a long-run emissions target.

The Joint National Commission on Energy Policy-Nicholas Institute Proposal. This proposal would prevent allowance prices from falling below the level that policymakers found acceptable by establishing a reserve price in a regular allowance action. The approach offers a relatively simple and effective way of setting a lower bound on allowance prices.

The proposal seeks to limit price increases by establishing automatic access to a limited reserve of allowances in the initial phase of the policy (ranging from 2 to 15 years). Following that initial phase, a carbon market board would determine whether or not to transfer future allowances into the current period. As described above, board members would presumably attempt to forecast future conditions in the allowance market to decide whether or not to make that transfer. The transfer could ultimately raise or lower the total cost of achieving a long-run emission target depending on the accuracy of regulators' forecast.

The automatic access to a limited reserve raises several questions. First, it is not clear how the reserve would be established—that is, how many allowances would be reallocated from which future years to the current period? The proposal indicates that a limited reserve would be accessed when a legislated reserve price was met, but it is unclear how that limited supply of allowances would be allocated. Would they be auctioned? In that case, the price at which they were sold could rise well above the reserve price. Would they be sold at the reserve price? In that case, the demand for them could greatly exceed the supply, and an alternative mechanism would need to be established for allocating the scarce supply. Further, this policy is subject to a "free rider" problem. Firms that accessed the reserve would receive the full benefit of borrowing (an extra allowance today) but would not bear the full cost of borrowing (they would not be responsible for paying back the loan). As a result, firms would have strong incentives to use up the reserve once the allowance price exceeded the reserve price. This problem would be amplified if policymakers sold the entire reserve at a fixed price.

Question. The cap-and-trade system that is being proposed to address climate change is modeled after the successful cap-and-trade system under the Clean Air Act Amendments of 1990 to address sulfur dioxide (SO_2) emissions. Under that program, allowances that were given freely to emitters and used for compliance with the Act, are treated as a non-taxable event. If the allowance is sold, then the money would be subject to capital gains. Do you see that allowances under cap-and-trade for climate change would be treated the same? How would allowances that are purchased for compliance be treated under our current tax system?

Answer. If it chooses, the Congress could clarify the tax treatment of CO_2 allowances in cap-and-trade legislation. If the tax regime developed for SO_2 allowances were applied to CO_2 allowances, the recipients of the allowances would take a zero tax basis (cost) in them. Sales generate capital gains equal to the difference between the sales price and tax basis (that is, the entire sales price, in the case of original recipients, because their tax basis is zero). A purchaser of an allowance obtains a cost basis in the allowance equal to the purchase price paid; that amount is deductible (or in some cases capitalizable) in the year applied against SO_2 emissions emitted by the taxpayer. The value of allowances that firms were granted at no cost and used to fulfill their own compliance requirements would be taxed indirectly. Those allowances could generate profits (or reduce losses) because the emission cap itself would raise prices for fossil fuels and energy-intensive goods and services. In essence, firms would be able to pass the opportunity cost of holding the allowance (rather than selling it) on to their consumers in the form of higher prices, and firms' profits would rise. Those profits, in turn, would be taxed. For further details on the tax treatment of SO_2 allowances, see Rev. Proc. 92-91, I.R.B. 1992-46 (Oct. 29, 1992).

Question. Part of the debate surrounding a cap-and-trade system is whether the allowances should be given to emitters at no cost or auctioned. You stated in your testimony that giving away a large share of the allowances rather than selling them would be more costly to the economy. Could you please comment on the impact of a system that would phase out the free allowances over time, as proposed in S. 2191, the Climate Security Act of 2007?

Answer. In general, the bulk of the policy costs would be passed on to households in the form of higher prices. As a result, large free allocations could create profits for the firms that received them, with those gains typically captured by shareholders.

Phasing out the free allocation of allowances would decrease the potential for shareholders to be overcompensated for transitional losses that they might incur as a result of the shifts in demand created by higher prices. In addition, the more rapidly free allocations were phased out, the more quickly allowance revenue would become available for policymakers to use in achieving other competing objectives, such as funding R&D, offsetting costs borne by low-income households or dislocated workers (who would not benefit from free allocations to firms), or reducing macroeconomic costs (by cutting the deficit or by reducing existing taxes on capital and labor income).

Question. Your agency has estimated there will be an increase in federal revenue resulting from the auctioning of allowances of more than $1.2 trillion from 2009 to 2018. The legislation the Senate will be considering in June directs those revenues to various programs. The early auction proceeds would all go to an energy technology deployment

program and in the later years the money will go to funds set up in the Treasury for new programs. What do you think about directing revenues this way and what will the impact be on the economy?

Answer. Policymakers would face significant trade-offs in determining how to use the value of allowances. Funding R&D, offsetting costs borne by low-income households or dislocated workers, and reducing macroeconomic effects (by cutting the deficit or by reducing existing taxes on capital and labor income) would be three possible choices. There would be no "correct" allocation, because they would represent competing policy goals. One approach would be to direct a larger share of the auction proceeds to R&D and to dislocated workers in the early years of the policy than in the later years (when workers would have had a chance to find new jobs and low-carbon technologies would have had more time to be developed). However, the amount and type of funding for R&D should be given careful consideration because the price on CO_2 allowances created by the cap would in itself be a significant incentive for the development and deployment of new technologies. (In general, federal funds for R&D are most fruitfully directed at basic research on technologies that are very early in the development process. Such research is most likely to have significant "spillover" benefits that would not yield profits to the firms undertaking the research but would be beneficial to society as a whole.)

From Ranking Member Grassley

Question. You testified that a CO_2 cap would be equivalent to raising the kinds of taxes that dampen economic activity, namely taxes on labor, capital, or personal income. However, you also testified that using revenue from the sale of allowances to cut corporate income taxes would not offset the increased costs placed on low-income households by a CO_2 cap. Are you implying that Congress should attempt to mitigate both the effect on the economy at large as well as target assistance to low-income households? What are the trade-offs between the two goals?

Answer. The Congress could choose to use revenues from the sale of allowances to provide targeted assistance to low- and moderate-income households, to offset some of the adverse macroeconomic effects of the price increases triggered by a cap-and-trade program for CO_2 emissions, or some combination thereof. The Congressional Budget Office has estimated that using some of the auction proceeds for an equal lump-sum rebate paid to every household in the United States could more than offset the average increase in spending on energy and energy-intensive goods by low-income households but would not offset any of the economic efficiency costs of the program. In contrast, using a portion of the auction proceeds to reduce corporate income tax rates could offset more than half of the economic efficiency costs but would offset only a small part of the increase in energy costs for low-income households. Policies designed to reduce tax rates for lower-income workers could help achieve both outcomes to some degree. For example, lowering payroll tax rates on a portion of earnings or reducing the rate at which the earned income tax credit phases out would target more relief to lower-income families than a reduction in the corporate tax rate would while offsetting more of the economic costs than would a lump-sum rebate.

Question. Your testimony included a figure that a carbon tax would achieve the same long-term goals as an inflexible cap-and-trade program at one-fifth the cost because it

allows flexibility in achieving emissions reductions over time. You then cited the so-called "safety valve" concept as an effective way to give a cap-and-trade system the needed flexibility. Do you have any estimate as to how much less costly a cap-and-trade system with a safety valve would be versus a less flexible system?

Answer. The relative advantage of a tax over a cap-and-trade program would depend on the degree of fluctuation in the price of allowances and the features that were included in the cap-and-trade program to provide firms with the ability to shift their emission reductions over time in response to changing cost conditions. On the basis of estimates of the potential for variation in the price of allowances, researchers have estimated that a tax could achieve five times the net benefits (benefits minus costs) of an inflexible cap-and-trade program (which would not provide firms any leeway to shift abatement efforts over time). Viewed alternatively, a tax could achieve a long-run target at about one-fifth the cost of an inflexible cap (although the tax might need to be adjusted over time to ensure that the target was met).

Including a safety valve would achieve some but not all of the advantages offered by a tax. A cap-and-trade program with a safety valve would allow firms leeway to exceed the cap when costs were exceptionally high, but it would provide no incentive for firms to undertake more reductions than required by the cap when the cost of cutting emissions was low. Thus, a safety valve would reduce costs but would also increase cumulative emissions.

Policymakers could limit fluctuations in the price of allowances, while simultaneously ensuring that a long-term target was met, if they included both a ceiling and a floor for the price of allowances (a floor could be maintained by setting a reserve price in an allowance auction). As with a tax, the rate at which the price ceiling and floor increased might have to be adjusted over time to ensure that the ultimate target was met.

From Senator Bingaman

Question. Your testimony suggests that price-based mechanisms, like a "safety valve" or a price floor on CO_2, could make a cap-and-trade system more efficient than it would otherwise be. Do you have any thoughts about the criteria that one could use to set appropriate price levels for either a ceiling or a floor?

Answer. In theory, the "optimal" price would be one that balanced the benefits of emission reductions against the costs that they imposed. Given the large and pervasive uncertainties associated with climate change, however, determining the price that would achieve that balance is extremely difficult. One widely used peer-reviewed model indicates that the "optimal price" would be modest (starting at roughly $5 per ton of CO_2 in 2004 and rising to $23 in 2050). Some analysts, however, argue that such models set too low a price on emissions because they place too low a value on future generations or because the models are ill-equipped to account for the primary motivation for reducing emissions: to reduce the small, but uncertain, potential of catastrophic damages. In general, starting out with relatively low prices that rose over time would reduce adverse economic effects because it would allow time for carbon-intensive capital equipment to be replaced gradually.

Question. Looking to other mechanisms, what sort of efficiency improvements would one expect from banking and/or borrowing within a cap-and-trade system? In general, how would you compare the expected performance of rule-based mechanisms (including a "safety valve") to more discretionary mechanisms, like the "Carbon Market Efficiency Board" in the Lieberman-Warner bill?

Answer. Banking and borrowing could help to reduce fluctuations in allowance prices under some conditions but would be less effective at doing so than a price floor and a price ceiling (safety valve). Firms would have an incentive to bank or borrow only if they expected the future price of allowances to be sufficiently higher or lower than the current price. Thus, banking and borrowing could help address temporary lows or highs in allowance prices. Banking is allowed in the existing SO_2 cap-and-trade program. Borrowing raises concerns, though, including the issue of who would be liable for paying back the borrowed allowances if the firm that borrowed them was no longer in business.

The Carbon Market Efficiency Board described is S.2191 would provide policymakers with the opportunity to reallocate future allowances to the current period if the price of allowances exceeded a given level. That is, in essence, a form of forced borrowing, in that it would bring allowances forward in time even if firms had not wanted to do so voluntarily. That reallocation would reduce current allowance prices and raise future prices. The action could ultimately lower or raise the aggregate cost of meeting a long-run emission target depending on how the relative price of allowances changed over time. For example, if a low-cost, low-carbon energy technology became available in the future, borrowing would have successfully shifted emission reductions to a time when the cost of achieving them was low. Alternatively, if policymakers borrowed future allowances on the expectation that such a technology would become available, but it did not, then borrowing could ultimately raise the cost of achieving a long-run target.

In contrast, a safety valve or a price floor would automatically keep the price of allowances within the bounds that policymakers determined was appropriate. The rate at which the price floor and ceiling increased over time might need to be adjusted periodically if policymakers wanted to ensure that a long-run target was met.

Question. You have stated that a decision to freely allocate emissions permits could be more costly overall and impose larger burdens on low-income consumers than a policy that auctioned permits and recycled the revenue in other ways. Could you talk about how this was handled in the previous SO_2 trading regime and what sorts of lessons, if any, we might draw from that about allocation, overall cost to consumers and windfall profits?

Answer. In general, prices rise because of a cap itself, which limits the ability of firms to use carbon-based fossil fuels. To our knowledge, there is no available study that indicates the extent to which utilities may have profited from the provision of free allowances under the SO_2 trading program. In cases in which the utilities are subject to cost-of-service regulations, they would have been prohibited from passing the opportunity cost (the price that they could have obtained from selling the allowances rather than using them themselves) of holding allowances that they were given on to their consumers. In competitive markets, firms would be free to pass on that opportunity cost and thus could profit from the free allocation.

It is important to note that preventing firms from passing the opportunity cost of holding allowances on to their customers (as a result of cost-based regulations) raises the overall cost of meeting a cap because it means that those consumers do not have an incentive to undertake low-cost actions to reduce their energy use. As a result, prices will rise more elsewhere, and a greater number of comparatively high-cost actions need be undertaken to meet the cap. Selling allowances in an auction would prevent that inefficient outcome. In that case, even cost-of-service regulated utilities would have an incentive to pass the cost of allowances on to their customers.

From Senator Lincoln

Question. Under the Lieberman-Warner bill, refiners are obligated to account for the emissions from the consumption of the fuels they produce. Yet, they have no way of influencing the efficiency of the utilization of those fuels—a refinery making 30,000 bpd of gasoline and 30,000 bpd of diesel doesn't have a lowered carbon allocation requirement if the fuels are consumed more efficiently. Do you believe that this structure will encourage refiners to invest in projects that will produce lower carbon fuel? Are you aware of another approach that would allow for emissions related to the consumption of fuel to be accounted for under this framework?

Answer. An upstream cap-and-trade program (one in which producers and importers of coal, oil, and natural gas would be required to hold allowances) would provide incentives for reductions in CO_2 emissions throughout the whole economy. The cap on emissions would cause the price of those fuels to rise in rough proportion to their carbon content. Thus, users would have an incentive to reduce their use of fossil fuels (for example, by improving energy efficiency or relying on renewable energy sources) as well as substituting lower-carbon fuels for higher-carbon fuels. As a result, an upstream cap-and-trade program should provide incentives for the production of lower-carbon fuels.

Opening Statement of U.S. Senator Ken Salazar
Committee on Finance
Tax Implications of Cap-and-Trade
April 24, 2008

Thank you Chairman Baucus and Ranking Member Grassley for holding today's hearing on tax implications of a federal cap-and-trade program for greenhouse gas emissions.

As we all know, Leader Reid has indicated that the Lieberman-Warner cap-and-trade bill reported out of the Environment of Public Works Committee last December will likely be on the floor of the Senate in June. Now is an appropriate time to examine closely the implications of this legislation.

I welcome today's hearing to discuss the tax implications of a cap-and-trade program. The effects of cap-and-trade policies on energy prices will likely touch many sectors of the economy. This raises numerous questions for this committee. How can we ensure that consumers are protected if energy costs rise? Would a tax rebate funded from emission allowance auction revenues make sense? Furthermore, how can we avoid recipients of free allowances from taking windfall profits that are never passed back to consumers? Are there tax deductions that we should consider for activities that reduce our carbon footprint, such as verified carbon-negative agricultural practices? How will our non-profit rural electric co-operatives be affected, and what are the tax implications for them, for example, of receiving free transition assistance allowances?

As we design the rules for a cap-and-trade program it is crucial that we keep in mind the goal of motivating and rewarding consumers, farmers, and industrialists to "do the right thing" with regards to embracing a low-carbon footprint. Tax policies are powerful incentives (or disincentives) for action, and we must be cognizant of the implications of our design choices.

Clean, low-carbon energy can be an economic engine for our nation, and I am hopeful that a cap-and-trade system and the right tax policies will stoke our burgeoning transformation into a world-leader in cost-effective solutions to the climate challenge.

I look forward to discussing these issues with our distinguished panel. Thank you, Mr. Chairman.

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