

**ALLOCATION ALLOWANCES OF GREENHOUSE
GAS EMISSION**

HEARING
BEFORE THE
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

TO

RECEIVE TESTIMONY ON THE COSTS AND BENEFITS FOR ENERGY CON-
SUMERS AND ENERGY PRICES ASSOCIATED WITH THE ALLOCATION
OF GREENHOUSE GAS EMISSION ALLOWANCES

OCTOBER 21, 2009



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ALLOCATION ALLOWANCES OF GREENHOUSE GAS EMISSION

WEDNESDAY, OCTOBER 21, 2009

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 9:38 a.m. in room SD-366, Dirksen Senate Office Building, Hon. Jeff Bingaman, chairman, presiding.

OPENING STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR FROM NEW MEXICO

The CHAIRMAN. Why don't we go ahead with the hearing. Today the hearing is on allowance allocation and auction impacts on the energy sector in connection with the House-passed legislation on cap and trade. I think it's important we try to have an understanding of this aspect of the cap and trade bill that came from the House and what it would mean for the energy sector, various parts of the energy industry, and consumers, and on prices.

Several basic questions come to mind which I hope we can address today. First and foremost, we need to have a good understanding of what the appropriate level of free allocation should be if there is an appropriate level. Obviously, there's an inherent question, threshold question, as to whether, if we're trying to send a price signal in order to provide an incentive for folks not to use energy from carbon-emitting sources, to what extent do we want to mitigate that price signal. I guess that's what we wind up doing with free allocation of allowances.

Many market-based programs in the past have freely allocated emission permits. The experience with the first phase of the European Union's emissions trading program has shown that this is not necessarily the preferred approach with the greenhouse gas trading market.

We also need a better understanding of the uses of free allowances. For example, many bills before Congress propose to distribute allowances not only to entities that need to comply with the program, but also to advance additional objectives and goals. That is the same for auction revenue, which in many cases is also divided among a variety of different purposes.

So I hope witnesses today can help educate us on the value of using allowances for different purposes other than the simple purpose of complying with the program, if that's appropriate. Over the course of the debate on climate change, many have become more and more persuaded that the main priority for allowance alloca-

tions auctions should be to return revenue to ratepayers and consumers. I guess again that raises a question of to what extent do we want to mitigate any signal, price signal that is embedded in a cap and trade system.

So that's some overview of some of the issues. I'm sure that the witnesses can enlighten us on others. Let me turn to Senator Murkowski.

[The prepared statement of Senator Bunning follows:]

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

Thank you Mr. Chairman. I look forward to the hearing today to discuss the policies of allocations and allowances under a cap and trade program.

Ultimately, this will decide who will bear the greatest costs of paying for this bill.

While I believe that all Americans will pay for this bill, the costs will be disproportionately shouldered by the states that have more carbon based resources than other states.

In my home state of Kentucky over 95% of electricity is generated by coal. Estimates show that if passed Kentucky will be one of the highest impacted states by cap and trade legislation.

Kentucky families will have to pay more than their fair share under this bill. They will feel it when they go to fill up their gas tanks, heat and cool their homes and use electricity as well as the costs of practically all goods and services.

What's even more disturbing is the solution that the Administration and the authors of the American Clean Energy Act propose to solve this problem.

They create a type of "green" welfare to help low income households affected by an increase in consumer energy prices. At a time when our Supplemental Nutrition Assistance Program is rife with fraud, we do not need to be expanding the funding we give to recipients.

I also do not believe that an expansion of the Earned Income Tax Credit is an effective way to target low income households.

Instead of expanding government welfare and taxing energy consumers, Congress should focus on providing pro growth policies that can achieve our environmental goals without bankrupting our industries.

I thank the witnesses for appearing before the committee today and appreciate their comments. I look forward to continuing the conversation on this issue and discussing the entire scope of the cost of enacting climate change legislation.

Thank you Mr. Chairman.

**STATEMENT OF HON. LISA MURKOWSKI, U.S. SENATOR
FROM ALASKA**

Senator MURKOWSKI. Thank you, Mr. Chairman. I appreciate our third in the ongoing series of educational opportunities on the issue of climate and what you have afforded the committee members. I think it has been exceptionally important, very helpful, and very constructive.

I think it is important that our focus stays broad. I think as we address the issue of climate change and climate policy, I think we recognize that it's not just about finding something quick; it's about doing something right. I think we're taking the time in this committee to really learn and understand.

The legislation that we've been focused on as we've had these panels, the House-passed energy and climate bill, I don't believe was a product of that type of debate. There was only one piece of legislation considered and the members and the stakeholders that were involved were more concerned about who was going to receive these free permits under the bill than the program's overall direction and design. While this approach did lead to the bill's passage, it's now created a situation where our Nation's energy producers

are battling one another over policy decisions worth hundreds of billions of dollars in coming decades.

That is not my statement. That was a quote from last Sunday's New York Times.

Now, some may view division within the energy industry as useful, but I think we should view it as a warning sign. By picking winners and losers within a cap and trade system, as the House did, they didn't necessarily develop a better bill. It advantaged some energy resources and it disadvantaged others. This has become particularly clear over the past several months. We've had a wide range of groups that have formed with hopes of receiving favorable or at least fair treatment in whatever is to come out of the Senate. Permit allocations, rather than the merits of any given technology, are viewed as the key to keeping entire industries and companies competitive. Of course, this has done little to improve the counterproductive and I think very polarized nature of the climate debate, which is unfortunate.

The House managed to complete its bill by giving permits away to more than 20 categories of recipients. It's like doling out pieces of the pie. But as climate legislation is developed here in the Senate, we're faced with the harsh reality that there's not much pie that is available to satisfy all the groups that are vying for them to repeat this process a second time.

We need to remember that each additional permit that we give away takes us further from the full auction which the President has endorsed and who will ultimately have the final say on any legislation that reaches his desk.

So this morning I hope that we can discuss not only who wants the free permits and how they might be distributed, but whether or not those permits should be given away for free in the first place. I'm committed to finding out which of our options is most economically efficient and environmentally effective, not necessarily which is the most politically expedient, and I intend to approach this entire debate from that perspective. But I think it's particularly important as we have the discussion here this morning.

Our climate policy, no matter what form it takes, is meant to be an environmental program, not an appropriations bill. By imposing cap and trade we're basically creating a new form of currency and any permits given away will hold massive financial value. In this context, you can almost view it as earmarks, decade-long earmarks, and with us in a position of having to make immediate decisions about who should receive them, and that will have lasting consequence.

Accordingly, we should view attempts to secure free permits with a healthy dose of skepticism and I think some concern.

We should also ask ourselves if certain permit distribution schemes expose us to a proliferation of middlemen, and if we determine that there is a more transparent and efficient way to ease the impacts of cap and trade. The reality of free permits will phase out over time and should allow us to have this conversation now instead of postponing it to some future date.

In the end, I suspect that our witnesses will tell us that no matter how we approach permit allocation, American consumers will ultimately bear the burden of compliance costs. These costs are sig-

nificant. We had the testimony of the panel last week; some of the Federal agencies put the cost per household as high as \$1,870 per year beginning in the year 2030. So we've got to acknowledge these costs rather than pretending that they don't exist or trying to hide them.

We need to admit that the impacts of climate policies are as real as the consequences of climate change itself. I think this is how we get to the open and honest debate that is best to move this forward.

I look forward to the comments from the witnesses this morning, and again, Mr. Chairman, I thank you very sincerely for the very good conversations that we've been able to have within this committee on this issue.

The CHAIRMAN. Thank you very much.

Let me introduce our distinguished panel of witnesses. Dr. Denny Ellerman is the Senior Lecturer with the Center for Energy and Environmental Policy Research at MIT. Thank you very much for being here. He's consulted with us before and we appreciate that.

Dr. Gilbert Metcalf is Professor of Economics at Tufts University. Thank you very much for being here.

Dr. Karen Palmer is Senior Fellow with Resources for the Future, and we appreciate you being here.

Dr. Chad Stone, the Chief Economist with the Center on Budget and Policy Priorities. Thank you for being here.

Dr. Ellerman, why don't each of you take 6 to 8 minutes and give us the main points that you think we need to understand about this whole issue of allowance allocation, and then we'll have some questions.

STATEMENT OF A. DENNY ELLERMAN, PH.D., SENIOR LECTURER (RETIRED), CENTER FOR ENERGY AND ENVIRONMENTAL POLICY RESEARCH, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Mr. ELLERMAN. Thank you, Mr. Chairman, Senator Murkowski, and members of the committee. Good morning. My name is Denny Ellerman. I am an economist and recently retired Senior Lecturer at MIT. My research focus for the past 15 years has been the evaluation of cap and trade systems as they've been implemented in the United States and Europe. I want to thank you for this opportunity to testify and to congratulate you for convening this hearing on one of the most difficult and least well understood aspects of cap and trade systems, namely the allocation of the allowances that are the essential mechanism by which these systems operate.

I would ask that my written testimony be included in the record. My oral remarks summarize that testimony, which makes three points.

The CHAIRMAN. Yes, we will include each witness's full statement in the record.

Mr. ELLERMAN. Thank you.

First, allocation is a distinctive feature of cap and trade systems, but it is unique when compared with a tax or command and control approach only in being explicit and transparent with respect to identifying the recipients of the scarcity rent that is created by all

of these alternatives. Any effective constraint on emissions will make the right to emit valuable and it will create this scarcity rent. The rent takes the form of allowance value in a cap and trade system. In a tax alternative it takes the form of tax revenues.

There is no name for the rent in the command and control approach because it is so well hidden. Still, it exists and it is determined by the differential effect of the regulation and its implementation on affected facilities. In neither of the alternatives to cap and trade is the assignment of the scarcity value as explicit and transparent as it is in a cap and trade system. That does not make it any easier to enact one, but it exists and it is one of its merits.

My second point is that the familiar dichotomy between auctioning and free allocation is incomplete and I would suggest even misleading in confusing the means of distributing allowances with the ultimate beneficiaries of allowance value. It makes little difference whether a recipient receives \$1,000 in free allowances or \$1,000 in auction revenues, and we have experience with both forms of distribution.

For instance, allowances can be auctioned and the proceeds returned to regulated entities, as is done for the 3 percent annual auction in the U.S. SO₂ trading program. They can as easily be freely allocated to nonregulated entities, such as is proposed in the Waxman-Markey or, for that matter of fact, the Kerry-Boxer legislation.

Moreover, neither government nor corporations, who are the usually presumed recipients of allowance value, are the ultimate beneficiaries. They are only legal vessels through which allowance value passes to the various households, who are also the ultimate bearers of the cost of the cap.

When government or unregulated entities receive the allowance value, the ultimate household beneficiaries are those providing labor or capital in the form of their savings for designated public uses, which could be encouraging renewable energy, energy R and D, adaptation, carbon capture and sequestration, or it could be those paying taxes should the revenue be used to reduce taxes or the deficit. The revenue could even be given to directly designated households, such as low-income ones or all households, in a cap and dividend approach.

When corporate entities receive the allowance value, the ultimate recipients are shareholders, the government through increased corporate tax revenues, and even consumers when the corporate entity is regulated on some cost basis, as are many electric utilities.

My third point is that allowance is a deeply political and even philosophical issue that affects not only equity among income classes, regions, and industries, but also the size of government. For any given household, its net benefit will depend upon the carbon content of the goods and services that it uses and for which it will pay and the extent to which that household benefits from the allocation provisions. The split between government and private activity will depend on whether allowances are used to fund government activity that would not otherwise occur or, alternatively, used to reduce taxes or the deficit or perhaps returned directly to households on some basis.

In closing, let me note that the basic issues of allocation are ones with which you are fully familiar. It may not be easy to decide how the allowance value created by a cap should be used, but no set of people is more appropriate to the task than the legislative branch of government, consisting of the elected representatives of the households who will both bear the cost of the cap and ultimately benefit from the allocation of the allowance value created by the cap.

Thank you for your attention. That concludes my testimony.
[The prepared statement of Mr. Ellerman follows:]

PREPARED STATEMENT OF A. DENNY ELLERMAN, PH.D., SENIOR LECTURER (RETIRED),
CENTER FOR ENERGY AND ENVIRONMENTAL POLICY RESEARCH, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

My name is Alfred Denny Ellerman. I am an economist and have recently retired after seventeen years as a Senior Lecturer at the Sloan School of Management at MIT where I have been associated with two research groups, the Center for Energy and Environmental Policy Research and the Joint Program on the Science and Policy of Global Change. My testimony reflects my personal beliefs and should not be taken to represent the positions of MIT or of any of the research groups with which I have been associated.

My field of specialization is energy and environmental economics and for the past fifteen years my research has focused on the use of tradable permits for regulating air emissions. During this time, I have been involved in extensive assessments of the US cap-and-trade programs for regulating SO₂ and NO_x emissions and most recently with the European Union's CO₂ emissions trading program. The results of this research have been reported in numerous articles and other presentations and most prominently in two books presenting ex post evaluations of the US SO₂ trading system and the EU's CO₂ trading system. The appendix to this testimony provides a list of the published results of this research, which is the basis of the testimony that I am presenting today.

More specifically, today's testimony is limited to the allocation of the tradable permits, or allowances, created by these systems. These allowances are the distinctive feature of cap-and-trade systems and their distribution and surrender against emissions provides the essential mechanism by which these systems operate. The specific points that I will make are the following.

- 1) Allowance allocation is unique only in the explicitness and transparency with which the allowance value, or scarcity rent, created by the cap is distributed.
- 2) The dichotomy between auctioning and free allocation is incomplete and misleading in confusing the means of distributing allowances with the recipients of allowance value.
- 3) Allocation is deeply political and, I would suggest, even a philosophical issue concerning the appropriate uses of the newly created allowance value, which is best addressed by the legislative branch.

ALLOCATION IS UNIQUE ONLY IN ITS EXPLICITNESS AND TRANSPARENCY

Any constraint on emissions, whether it be by means of a cap, a tax, or a prescriptive regulation (also known as "command-and-control"), will limit those emissions, thereby giving value to the right to emit and creating what economists call scarcity rent. The most familiar example of scarcity rent is the purchase price or rent paid for the use of land.

When a cap is chosen as the means to limit emissions, the scarcity rent is embodied in the allowances that must be surrendered by regulated entities in an amount equal to their emissions. Allowance value is a more convenient term than scarcity rent, but we should always remember that the value embodied in allowances reflects the scarcity created by the cap.

When a tax is chosen as the means to limit emissions, the scarcity rent takes the familiar form of tax revenues. For a tax that would be expected to have the same effect on emissions as a cap, the tax revenues will be the same as allowance value on an ex ante basis. The ex post result may differ according to the way each of these alternatives operates in response to departures from expectation. As you are well aware, collecting tax revenue is not the end of the process. Those revenues will be used (or we might say in this context, "allocated") in some manner. In this sense,

the tax alternative to cap-and-trade shares the explicitness and transparency of allocation in cap-and-trade. In fact, if it is decided that all allowances will be distributed entirely through auctioning, the allocation issue is identical, namely, deciding what to do with the tax or auction revenue. In this limiting case, the difference in the nature of allocation between the cap-and-trade and tax alternatives is very slight. In both cases, the government is the immediate recipient of the scarcity rent and it must decide what to do with it.

When prescriptive regulation is chosen as the means to limit emissions, the scarcity rent is equally present but very well-hidden. This may make the enactment of prescriptive regulation easier, but there should be no mistaking that a scarcity rent is created and allocated, usually through the subsequent regulatory process. A familiar form of creating and distributing this rent is the imposition of more demanding standards on new facilities than on those existing at the time the legislation or regulation is imposed. A perfect example is the new source performance standard under the existing Clean Air Act, which has increased the value and extended the useful lives of existing facilities to the benefit of the owners of those facilities. More generally, any difference in regulatory treatment between new and existing facilities, or among existing facilities (as often occurs in the regulatory process), will make the favored facilities the effective recipients of the scarcity rent created by this form of regulation.

And, if the prescriptive regulation has the same effect on emissions as a cap, the rents thereby created and received by the favored facilities will be equal in value to that embodied in allowances. Thus, when a cap-and-trade system distributes allowances entirely through free allocation, the result is very similar to that resulting from an equivalent set of prescriptive regulations. The main differences, setting aside efficiency and effectiveness, are that the allocation is neither explicit nor transparent and the scarcity rent is attached to the favored facilities instead of being separable and tradable as allowances.

THE AUCTION/FREE ALLOCATION DICHOTOMY IS INCOMPLETE AND MISLEADING

Allocation debates are often framed as a choice between auctioning and free allocation. This dichotomy is incomplete and misleading in focusing on the means of distributing allowances instead of the recipients of the newly created allowance value. Either means of distributing allowances can be and have been used to benefit any desired recipient.

For example, three percent of the allowances in the US Acid Rain or SO₂ trading program are auctioned, but the revenues are returned to the regulated entities from whose free allocations the auctioned allowances had been withheld. Conversely, allowances could be allocated directly and freely to various entities that do not have an obligation to surrender allowances equal to emissions, such as is proposed in the House-passed Waxman-Markey legislation. These recipients will receive the allowance value by selling the allowances freely allocated to them to regulated entities facing a requirement to surrender allowances equal to emissions.

From the standpoint of allocation, what matters is not so much the means by which the allowances are distributed as it is the identity of the ultimate recipient. The most that can be said of the auctioning/free allocation dichotomy is that there is a presumption concerning the immediate recipient of the allowance value, namely, the government for auctioning and regulated entities, usually corporations, for free allocation. However, this need not be the case and it has not always been so.

The ultimate and real recipient of allowance value depends on a number of conditioning factors. When allowances are auctioned by the government, the funds so produced can be used for any number of public purposes, such as reducing taxes on labor or capital, encouraging certain activities (energy R&D, energy conservation, faster deployment of renewable energy, carbon capture and sequestration, or nuclear energy), paying for other government programs (health care, social security), reducing government deficits, or compensating incumbent emitters or even households. All of these alternative uses imply different recipients for the newly created allowance value.

Some examples can be cited. In the only cap-and-trade program for which complete auctioning has been adopted, the Regional Greenhouse Gas Initiative in the northeastern US, most participating states have chosen to dedicate auction revenue to funding renewable energy and energy conservation programs. In the few auctions that have occurred in the European CO₂ emissions trading system, auction revenues have been used for defraying the government expense of administering the program (Ireland), as a general revenue (Denmark), and for climate related purposes (Germany and the UK).

Whatever the public purposes being served, all of the allowance value will flow ultimately to households in proportion to the extent that particular households provide labor or capital services to favored activities or that particular households are beneficiaries of the designated public purposes. Even deficit reduction, which would have no direct impact, will have a differential effect on households in that the borrowing needs of government will be thereby reduced leading to lower interest rates, which will benefit borrowers and disadvantage savers.

It is also possible to by-pass all of these public purposes and distribute the allowance value directly to households in what could be seen as compensation for the increased costs that households will inevitably bear. Although this could be done by free allocation, in which case households would sell the allowances to regulated entities, a far simpler and more efficient means of distributing allowance value to households would be to auction the allowances and distribute the proceeds directly to households.

When allowances are freely allocated to regulated entities, typically corporations, whether those entities will benefit depends first on whether the entity is price-regulated. If the regulated entity is subject to some form of cost-based price regulation, as are many electric utilities, the allowance value would, in theory, pass through entirely to the rate payers of that utility, who would receive the allowance value in reduced electricity rates. Since no cost is incurred for the freely allocated allowances, there is no cost to recover in retail rates. If the corporate entity is not price regulated, as are some power generation companies and most other corporations, free allocation results in higher profits for those corporate entities. These profits may offset other losses that the corporation may incur as a result of incorporating the cost of carbon in the prices of the products produced by these entities, but the profits will still be higher by the value of the free allocation than they would be in its absence.

In this case of corporate recipients that are not price regulated, it is important to note that the corporations receiving the free allocation are only the immediate recipients of the allowance value, and not the ultimate recipients, in the same manner as the government in the case of auctioned allowances. Any increase in profits will be subject to federal and state corporate income taxes so that somewhat more than a third of the allowance value will be returned to government. The remainder will accrue to shareholders as dividends or increases in equity value, whether the shares are held directly or through mutual funds or pension funds.

Thus, it is not enough to simply say that allowances should be auctioned or allocated freely. The real issue is the use to which the newly created value will be directed and the households that will thereby ultimately receive the benefit of the allowance value.

ALLOCATION IS A DEEPLY POLITICAL AND EVEN PHILOSOPHICAL ISSUE

The eventual and inevitable trickling down of allowance value to households, along with that of carbon cost, makes allocation an issue of equity, with all that that term implies of immediate political pressure and broad philosophical concerns, as well as one of deciding the share of society's resources that will be subject to public direction. The equity implications are principally regional and by income and others are better qualified than I to address these issues.

As for the mix of publicly and privately directed activity, a clear distinction must be made between the reallocation of resources occasioned by the cap and the reallocation associated with allocation. The decision to limit greenhouse gas emissions necessarily implies a reallocation of society's resources towards reducing these emissions and that decision will itself create winners and losers. In both the market-based means of accomplishing this objective—cap-and-trade or a carbon tax—the exact reallocation of resources is determined by consumers and producers as they adjust to the new price on greenhouse gas emissions.

However, as previously noted, the cap also creates a scarcity rent and the allocation of that rent has additional implications for the allocation of society's resources. The diagram* attached to this testimony illustrates the relative magnitudes of the resources required for abatement and those associated with the scarcity rent. In this diagram, the horizontal axis reflects emissions with business-as-usual emissions given a value of 100 and the vertical axis represents the marginal or incremental cost of an additional unit of emission reduction. The units depicted here are without denomination and are purely illustrative. The diagonal line reflects the relationship between the two when abatement is efficient, namely, that the cost of the next ton of abatement is always higher than the last one. The two shaded areas reflect the

*Attachments have been retained in committee files.

total resources associated with abatement (the triangle labeled cost) and the scarcity rent (the rectangle) when a 25% emissions reduction is contemplated. As can be easily visualized, the relation between these two areas will vary depending on the emission reduction being chosen, as well as the slope and curvature of the line representing the marginal cost of abatement.

Two limiting cases can illustrate the effect of allocation on the mix of public and private endeavor. First, imagine a case in which the allowance value is completely auctioned and the all the proceeds are used to fund additional expenditure programs. In this limiting case, the mix of publicly and privately funded activity would shift to the public sector by an amount equal to the scarcity rent.

For the opposite limiting case, imagine that the proceeds from the auctioning of allowances—the rectangle—are distributed entirely and directly to households. Government expenditure would be no greater in this case than it was before the limit on greenhouse gas emissions was enacted. Households would still pay whatever they are going to pay for the carbon content of the goods and services they use, but they will also receive a compensating payment of their share of the scarcity rent that is created by the cap. If the distribution to households was per capita, those consuming products with a higher than average carbon content would face a net cost, while those with a lower carbon footprint would receive a net benefit.

One could argue for either of these polar cases on grounds of public policy or philosophical preference, or for any mix of the two, and this mix might change over time. Equally valid public policy arguments can be made for allocating resources to particular public purposes and for directly compensating consumers for the increased carbon costs that they will bear. Philosophical preferences enter the discussion not only concerning the equity implications of different uses but also concerning the appropriate mix between public and private endeavor.

In setting forth these two limiting cases, I do not suggest that either is per se desirable or not. As legislators, you recognize that consensus lies somewhere in the middle: that some of society's resources should and will be dedicated to public uses and equally that government need not, and indeed cannot, determine the use of all of society's resources. My closing observation is that no one is better qualified than you, the elected representatives of all the people, to weigh the pros and cons of all the competing uses and to decide the appropriate use of the scarcity rent that is created by any constraint on emissions.

The CHAIRMAN. Thank you very much.
Dr. Metcalf, go right ahead.

**STATEMENT OF GILBERT E. METCALF, PH.D., PROFESSOR OF
ECONOMICS, TUFTS UNIVERSITY, MEDFORD, MA**

Mr. METCALF. Chairman Bingaman, Senator Murkowski, and members of the committee, thank you for this invitation to testify this morning.

I'm going to refer to a couple of figures in my written testimony, so I assume and hope you all have copies of that in front of you.

I wish to make the following points this morning. Past cap and trade programs have freely allocated permits, the two big ones, but this does not mean that Congress has to freely allocate permits in this legislation. There's no lock-in in that regard.

The second point I want to make is that allowance mechanisms differ on the basis of simplicity, transparency, efficiency, and distribution. All things equal, the more simple and transparent the better.

Third, a cap and trade system is likely to disproportionately impact low-income households. Addressing impacts on these households should be an important element of any allowance allocation scheme.

Finally, allocation to natural gas and electricity customers through local distribution companies, LDCs, can blunt some of the impact of carbon pricing, but if it is not done carefully it can raise the cost of achieving targets significantly.

So as background, cap and trade legislation acts like a tax in raising the price of carbon-based fuels and other carbon inputs that release greenhouse gases. Higher prices serve as the tool in Adam Smith's invisible hand to guide the economy to more productive and socially efficient outcomes. But it is important at the outset to distinguish between the cost of reducing emissions and the revenues that could be raised if permits are fully auctioned.

Figure 1 in my testimony illustrates that distinction. In that figure, the costs of reducing emissions rise with the stringency of the program, and this upward-sloping curve shows permit prices for different levels of emission reductions going from the least stringent at zero to the most stringent, 100 percent reduction.

If we consider a cap and trade system that mandates a 25 percent reduction in emissions, say, the price of permits would equal P as shown in that figure. The value of the permits created in the program is the product of the permit price times the number of permits allocated or auctioned, and this is shown in the figure as the area of rectangle A .

The key point is that this is a transfer rather than a social cost. The cost of the reduction, of the emission reductions, is shown in the figure by the triangle labeled B . This is the actual cost to society of reducing greenhouse gas emissions.

As this figure makes clear, the value of permits is not the same as costs of reducing emissions. Also note that the value of permits dwarfs the initial costs of emission reductions.

Allowance systems can be assessed on a number of dimensions. Four stand out, as I mentioned before: simplicity, transparency, efficiency, and distribution. Simplicity and transparency help engender public trust that the government is being a good steward of the rents created through the cap and trade program.

One particularly transparent and simple approach, allocation approach, would be a cap and dividend scheme, where permits are auctioned and the revenue is then returned to households through an equal carbon dividend check. This approach is similar in spirit to the economic stimulus checks provided to taxpayers in 2008.

Another approach that I discuss elsewhere is to provide a capped credit of payroll taxes from auction revenue along with an adjustment to social security and transfer benefits for nonworkers.

While a cap and dividend approach is both highly transparent and simple, it foregoes the opportunity to achieve important efficiency benefits by using the revenue to lower existing tax rates. A recent analysis I did with colleagues at the MIT Joint Program on the Science and Policy of Global Change illustrates the tradeoffs. Figure 2 in my testimony shows the distributional impacts of two allocation schemes.

The first is a cap and dividend approach, while the second uses the revenue to reduce marginal income tax rates and thereby increase efficiency of the income tax system. The cap and dividend approach is distinctly progressive. This is the dashed line in that figure. Lower income households, which are at the left end of this figure, benefit on balance from the combination of carbon pricing and the carbon dividend.

The solid line in this figure shows the net distributional impact of the income tax cut with carbon pricing. This policy is modestly

regressive. More to the point, it blunts the sharp regressivity of carbon pricing, but it can't undo it altogether.

While less progressive, cutting the income tax reduces the efficiency loss of the cap and trade system by over 12 percent in the modeling results that we did. These are but two of many possible allocation mechanisms.

The next point is that allocation design can also have significant impacts on the overall efficiency of the program. Here a clear example is the design of mechanisms to provide benefits to electricity and natural gas consumers through local distribution companies. If poorly designed, the LDC rate relief may lead to consumer misperception that electricity and natural gas prices have fallen when in fact at the margin they're going up.

We ran two different simulations of permit allocations for LDCs. In the first one we assumed that the LDCs are able to design the program to pass on the value of the permits that is correctly perceived by households that this is not lowering the price of energy, either electricity or natural gas. In other words, we're giving it back in a lump sum fashion unrelated to energy consumption.

The second simulation treats the allocation as lowering the price of electricity or natural gas and thereby undoing this price signal that we want to send households.

Finally, we report a simulation in which permits are freely allocated to covered sectors, as has been done in the European Union emission trading scheme and the acid rain program for SO₂ trading in this country. Results are shown in figure 3 in my written testimony.

The first thing to note is that free allocation of permits to covered sectors, as was done in the emission trading scheme in Europe, is sharply regressive. That is that solid line that's upward sloping, showing more benefits are accruing to high income households.

If we carve out permits for LDCs to use for rate relief, this eliminates the regressivity in the lower half of the income distribution and blunts it in the upper half. If, however, the LDC program is misperceived to reduce electricity and natural gas prices for consumers, then every household is made worse off than when the policy is designed to avoid this misperception. The efficiency loss from consumer misperception of energy prices raises the costs of the cap and trade program by over 30 percent. So this speaks to the importance of policy design in writing the rules carefully to avoid this problem.

Ideally, any allocation mechanism should address the regressivity of carbon pricing in a way that does not forego opportunities for gains in economic efficiency. However the balance between efficiency and equity is struck, it is important to avoid diluting the price signal required to achieve maximal emission reductions at minimal cost.

Thank you very much.

[The prepared statement of Mr. Metcalf follows:]

PREPARED STATEMENT OF GILBERT E. METCALF, PH.D., PROFESSOR OF ECONOMICS,
TUFTS UNIVERSITY, MEDFORD, MA

Chairman Bingaman, Senator Murkowski, and Members of the Committee, thank you for the invitation to testify this morning on the issue of permit allocation in cap and trade systems. I wish to make the following points in my testimony today.

- The allocation of carbon revenues is a distinct question from the choice of policy instrument (cap and trade, carbon fee, hybrid systems). No particular approach constrains Congress in any way from choosing different schemes and goals for allocation of the scarcity value created by the cap (analogous to the revenue from a carbon fee). In this regard, past cap and trade programs provide too limiting a view of the possible design choices.
- Allocation mechanisms differ on the basis of simplicity, transparency, efficiency and distributional outcomes. All things equal more simplicity and transparency is generally better. While allocation rules have clear distributional implications they can also have important efficiency consequences.
- A cap and trade system acts much like a broad based energy tax in raising the price of energy intensive commodities and reducing returns to factors of production (labor, capital and natural resource owners). Like a broad based energy tax, a cap and trade system is likely to disproportionately impact low-income households. Addressing impacts on low-income households should be an important element of any allowance allocation scheme.
- Allocation design matters for efficiency as well as distribution. Allocations to natural gas and electricity customers through LDCs can blunt some of the impact of carbon pricing but if not done carefully can raise the costs of achieving targets significantly.

I. BACKGROUND

The United States has taken important steps towards enacting comprehensive climate change policy. President Obama campaigned in 2008 in part on a platform of reengaging in the international negotiations on climate policy and supported a U.S. cap and trade policy with 100 percent auctioning of permits. Congress has moved rapidly in 2009 with the House of Representatives voting favorably on the American Clean Energy and Security Act of 2009 (H.R. 2454) in late June. Earlier this month Sens. Boxer and Kerry filed S. 1733, the Clean Energy Jobs and American Power Act. This bill also proposes a cap and trade system for greenhouse gases.

Cap and trade legislation acts like a tax in raising the price of carbon based fuels and other covered inputs that release greenhouse gases. Raising the price of carbon based fuels is an essential component of a greenhouse gas control program. Higher prices send the appropriate market signals to consumers to reduce consumption of carbon-intensive products and to firms to adjust production processes to reduce greenhouse gas emissions. Higher prices serve as the tool in Adam Smith's invisible hand to guide the economy to more productive and socially efficient outcomes.

The monies involved in a cap and trade program can be significant. The Congressional Budget Office estimated last June that H.R. 2454 would increase federal revenues by nearly \$850 billion between 2010 and 2019. Since the bulk of permits are freely allocated in early years of the program, spending would also increase over that period by roughly \$820 billion.¹

It is important at the outset to distinguish between the costs of reducing greenhouse gas emissions and the revenues that could be raised if permits are fully auctioned. Figure 1* illustrates the distinction.

This graph shows how the cost of reducing greenhouse gas emissions rises as a program is made increasingly stringent. The curve labeled MAC shows the cost of abatement as emissions reductions rise measured in dollars per ton of carbon dioxide equivalent. For small cuts in emissions the cost of reducing emissions—and the resultant price for an emissions permit—is low. But as the required reductions rise so do the costs and the resultant permit price.

Consider a cap and trade system that mandates a 25 percent reduction in emissions. The price of permits would equal p as shown in Figure 1. The value of the

¹ See Congressional Budget Office, "H.R. 2454 American Clean Energy and Security Act of 2009 Cost Estimate," (Washington, DC: Congressional Budget Office, 2009) The CBO treats freely allocated permits as both revenue and spending. Ignoring impacts on other tax revenues the free allocation of \$100 of permits would be scored as \$100 of revenue and \$100 of spending. CBO's scoring approach is described in Congressional Budget Office, "Assessment of Potential Budgetary Impacts from the Introduction of Carbon Dioxide Cap-and-Trade Policies," (Washington, DC: Congressional Budget Office, 2009).

* Figures 1–3 have been retained in committee files.

permits created in this program is the product of the permit price times the number of permits allocated or auctioned. This is shown in Figure 1 as the area of the rectangle A. This value would be received by the government if it were to auction all of the permits. It would be received by households and/or firms to the extent that the permits are freely allocated. Regardless of how the permits are allocated, they have a value equal to the area of this rectangle. Allocation rules simply determine who receives this permit value.

The cost of the reduction in this figure is shown by the triangle labeled B. This is the actual cost to society of reducing greenhouse gas emissions. It includes the cost of using higher priced electricity generating sources that emit fewer greenhouse gas emissions per kWh of electricity, the costs of carbon capture and storage and the cost of improving vehicle efficiency in the transport system among other things.

As Figure 1 makes clear the value of permits is quite different than the costs of reducing greenhouse gas emissions. The figure also makes a conceptual point that is borne out by a number of analyses of greenhouse gas control programs: the value of permits dwarfs the initial costs of greenhouse gas reductions. This simply reiterates the point that permit allocation is a very important topic for Congressional consideration.

II. POLICY CHOICE AND ALLOCATION

Much debate has ensued both in academic circles and in policy circles over the relative merits of cap and trade systems and carbon taxes for controlling greenhouse gas emissions.² This is not a hearing about instrument design but it is worth making the following point: the choice of instruments is entirely distinct from the decision about allocation of the value of permits in a cap and trade system. This value—technically known as the scarcity value of emissions—can be allocated in exactly equivalent ways regardless of the choice of instrument used to impose a carbon price.³

Conversely no particular approach constrains Congress in any way from choosing different schemes and goals for allocation of the scarcity value created by the cap (analogous to the revenue from a carbon fee). A decision by Congress to use a cap and trade system to control greenhouse gas emissions in no way limits Congress from allocating permits to achieve any desired policy goals. In this regard, past cap and trade programs provide too limiting a view of the possible design choices. The two major cap and trade systems in place are the U.S. Acid Rain Program and the European Union Emission Trading Scheme. The Acid Rain Program requires permits for sulfur dioxide emissions from all significant electric generators. The EU Emission Trading Scheme requires permits from electricity generators and certain energy intensive industries. In both systems permits are allocated to the covered sectors at essentially no cost.

That the two extant major cap and trade systems do not auction permits to any significant degree does not preclude Congress from auctioning permits for greenhouse gas emissions. Indeed the stakes for auctioning are much larger. The scarcity rents for either of these two existing systems are dwarfed by the projected rents from a U.S. cap and trade system. The real question before Congress is the best use of these scarcity rents. While the focus on revenue use is clear if permits are auctioned, the question is no less relevant if permits are freely allocated.

III. CRITERIA FOR EVALUATING ALLOCATION SYSTEMS

Allocation systems can be assessed on a number of important policy dimensions. Four dimensions of particular importance are simplicity, transparency, efficiency and distributional outcomes. All things equal more simple and transparent systems are generally better. In its effort to achieve a variety of goals H.R. 2454 has designed an exceedingly complex allocation scheme that is far from transparent. Simplicity and transparency help engender public trust in a program that the government is being a good steward of the rents created through the cap and trade program.

²A recent symposium in the *Review of Environmental Economics and Policy* is but one example of this discussion. See the papers by Nathaniel Keohane, “Cap and Trade, Rehabilitated: Using Tradable Permits to Control U.S. Greenhouse Gases” *Review of Environmental Economics and Policy* 3, no. 1 (2009), Gilbert E. Metcalf, “Designing a Carbon Tax to Reduce U.S. Greenhouse Gas Emissions,” *Review of Environmental Economics and Policy* 3, no. 1 (2009), and Brian C. Murray, Richard G. Newell, and William A. Pizer, “Balancing Cost and Emissions Certainty: An Allowance Reserve for Cap-and-Trade,” *Review of Environmental Economics and Policy* 3, no. 1 (2009).

³See David Weisbach, “Instrument Choice Is Instrument Design,” (Washington, DC: American Tax Policy Institute, 2009) for discussion of this point.

One particularly transparent and simple allocation scheme is a Cap and Dividend scheme whereby every U.S. household receives an equal carbon dividend check. This approach is similar in spirit to the economic stimulus checks provided to taxpayers in 2008. Payments could be made on an annual or quarterly basis to all individuals with a valid Social Security Number. Filing for the payment could be made quite easy as part of the income tax form 1040 and a simple one-page form for non-income tax filers. Another approach that I discuss elsewhere is to provide a capped credit of payroll taxes along with an adjustment to Social Security and transfer benefits for non-workers.⁴

While a cap and dividend policy is both highly transparent and simple, it foregoes the opportunity to achieve important efficiency benefits by using the revenue to lower existing tax rates. The efficiency losses from taxes, referred to by economists as deadweight loss, rise with the square of the tax rate. So modest reductions in tax rates can have significant efficiency benefits. A large literature in Economics consistently demonstrates the efficiency benefits of using carbon revenue to lower existing tax rates.

The trade-off between a cap and dividend approach and tax rate reduction approach illustrates a tension between achieving distributional and efficiency goals.

While recycling greenhouse gas revenues through tax rate reductions has efficiency benefits, it may not fully offset the regressivity of carbon pricing. Carbon pricing, whether through a carbon tax or a cap and trade system, has similar distributional impacts as broad-based energy taxes. It disproportionately impacts lower income households for whom energy expenditures constitute a higher share of income than occurs for higher income households.

A recent analysis I did with colleagues at the MIT Joint Program on the Science and Policy of Global Change illustrates the trade-offs.⁵ In our analysis we consider a variety of allocation schemes for a \$15 per ton of carbon dioxide equivalent (CO₂e) cap and trade system covering all greenhouse gases. The model takes into account income sources for households of different income groups as well as spending patterns. A cap and trade system—like any greenhouse gas pricing system—will affect households by raising the prices of carbon-intensive products and also potentially lower wages, resource rents and returns to capital. We model all of these impacts and trace income and spending changes to individual households sorted by income.

Table 1 shows the income groups that we considered in the model. Our model is able to trace income and spending changes for the lowest income groups with household income less than \$10,000 to the richest groups with household income in excess of \$150,000. The model is calibrated to 2006 and all dollar amounts are reported in real 2006 dollars.

TABLE 1.—INCOME GROUPS IN US-REP MODEL

Income class	Description	Cumulative Population for whole US (in %)
hh1	Less than \$10,000	7.3
hh10	\$10,000 to \$15,000	11.7
hh15	\$15,000 to \$25,000	21.2
hh25	\$25,000 to \$30,000	31.0
hh30	\$30,000 to \$50,000	45.3
hh50	\$50,000 to \$75,000	65.2
hh75	\$75,000 to \$100,000	78.7
hh100	\$100,000 to \$150,000	91.5
hh150	\$150,000 plus	100.0

Figure 2 shows the distributional impacts of two allocation schemes. The first is a cap and dividend scheme where revenue from a fully auctioned cap and trade permit system is given back to households in a lump-sum fashion. Impacts are measured in dollars as a percentage of household income and include both the changes in costs of purchasing goods and services, changes in factor incomes and any deadweight loss from behavioral responses to pricing greenhouse gas emissions.⁶ Income

⁴This is described in Gilbert E. Metcalf, “A Proposal for a U.S. Carbon Tax Swap: An Equitable Tax Reform to Address Global Climate Change,” (The Hamilton Project, 2007).

⁵Sebastian Rausch et al., “Distributional Impacts of a U.S. Greenhouse Gas Policy: A General Equilibrium Analysis of Carbon Pricing,” (Washington, DC: American Tax Policy Institute, 2009)

⁶Technically we measure equivalent variation, a dollar based measure of the change in household wellbeing arising from the program. We divide this by a measure of full household income including the value of leisure and housing services.

changes include the check each household receives as its share of the permit revenue net of permit revenue kept by government to replace reductions in other taxes to maintain overall revenue neutrality in the U.S. government budget. The second uses the revenue to reduce marginal income tax rates.

The cap and dividend approach is distinctly progressive (dashed line). Lower income households benefit on balance from the combination of carbon pricing and the carbon dividend. Net benefits as a percentage of annual income are between 0.1 and 0.2 percent for the lowest income households and fall to between -0.2 and -0.3 percent of income for the highest income households.

While the cap and dividend allocation approach may be appealing on distributional grounds it foregoes any efficiency benefits resulting from lowering tax rates. The solid line in Figure 2 shows the net distributional impact of the income tax cut. This policy is modestly regressive. More precisely, the rebate of income tax revenue cannot undo the sharp regressivity of carbon pricing. Low income households lose between 0.15 and 0.25 percent of income while the loss for the highest income groups approaches zero. While less progressive, cutting the income tax reduces the efficiency loss of the cap and trade system by over twelve percent.

These are but two of many possible allocation mechanisms. It is certainly possible to construct allocation schemes that combine tax rate reductions with allocations that address the regressivity of carbon pricing. However this is done it would be preferable to design as simple and transparent an allocation formula as possible.

IV. POLICY DESIGN AND EFFICIENCY

Allocation design can also have significant impacts on the overall efficiency of the cap and trade policy. A clear example here is the design of mechanisms to provide benefits to electricity and natural gas consumers through local distribution companies (LDCs). The American Clean Energy and Security Act of 2009 allocates roughly one-third of the permits to LDCs between 2012 and 2030 for consumer relief. The bill is clear that it does not intend this permit value to be used to lower electricity and natural gas rates. But it is less clear on how this value is to be distributed and how we avoid consumers misperceiving this value as a reduction in energy prices.

If the value of the permits allocated to LDCs is returned to customers on their monthly bill it is quite likely that many consumers will misperceive this as a reduction in the price of consuming electricity and natural gas. To explore the consequences of a poorly designed program that energy consumers misunderstand, we ran two different simulations of allocations to LDCs. In the first one we assume that LDCs design a program to pass on the value of LDC permits that is correctly perceived not to lower the price of a kWh of electricity (or therm of natural gas). Rather the allocation is a lump sum allocation unrelated to individual household energy consumption. The second simulation treats the LDC allocation as lowering the price of electricity or natural gas. This leads to a smaller decline in energy consumption by LDC customers thereby leading to more expensive emission reductions elsewhere. Finally we also report a simulation in which permits are freely allocated to the covered sectors on the basis of historic emissions with no permits set aside for customer relief through LDCs. Results are shown in Figure 3.

The first thing to note is that free allocation of permits to covered sectors on the basis of historic emissions is sharply regressive. This policy simulates permit allocations under the Acid Rain Program in the United States and the EU's Emission Trading Scheme. It is regressive because the free permit allocation conveys a wind-fall gain to owners of firms receiving those permits. Since capital is disproportionately held by higher income households the regressive outcome occurs.

Carving out one-third of the permits for LDCs to use for rate relief eliminates the regressivity in the lower half of the income distribution and blunts it in the upper half. If, however, the LDC program is misperceived to reduce electricity and natural gas rates for consumers then every household is made worse off than when the policy is designed to avoid this misperception. This is a clear case where policy design matters in the details. The efficiency loss from consumer misperception of energy prices raises the costs of the cap and trade program by over thirty percent.⁷

Another area of concern is regional distribution. Here one must tread more cautiously. While it is tempting to allocate a portion of permits to different regions based on the costs those regions will face due to prior investment in carbon intensive technologies, we risk enshrining older carbon intensive technologies through subsidies offered to provide rate relief to customers in those regions.

⁷This understates the incremental efficiency loss as our simulations held permit prices fixed rather than emissions. Holding emissions fixed would have required increased costly reductions elsewhere to achieve the emissions target driving up the cost of the program further.

If regional allocation adjustments are considered they should pass a number of tests. First, they should be temporary and short lived to provide the incentive to make a rapid transition to newer and cleaner technologies. Second, it would be preferable to provide benefits in the form of support for new technology substitution rather than customer rate relief. This would further speed the transition to a less carbon-intensive regional economy. Third, any regional reallocations should take into account the fact that certain regions have become less carbon intensive as a result of past investments. Those investments have often led to higher energy prices now being borne by regional ratepayers. According to the Energy Information Administration, for example, Connecticut, New York and Massachusetts are ranked in the top five states for high residential electricity prices. These states receive a higher than average share of electricity from nuclear power plants.

V. SUMMARY

Enacting a carbon price through a greenhouse gas emissions cap and trade system will help the United States move to a carbon free economy in the most efficient manner possible. Passing cap and trade legislation, therefore, should be at the top of the political agenda for Congress and the Administration. Thus it is laudable that the Senate Energy and Natural Resources Committee is holding these hearings on allocation.

Key to thinking about allocations is that this is fundamentally a decision over the rights to the scarcity rents from restricting greenhouse gas emissions. These rents dwarf rents from any previous cap and trade program and so the allocation mechanism deserves careful study.

I have argued in this testimony that past allocation decisions in those cap and trade programs should in no way constrain Congress as it designs allocation mechanisms in greenhouse gas legislation. Moreover it should strive to develop a simple and transparent mechanism that engenders public trust in the stewardship of these public atmospheric rents.

Any allocation mechanism should address the regressivity of carbon pricing ideally in a way that does not forego the opportunity for gains in economic efficiency through the possibility of tax rate reduction. However the balance between efficiency and equity is struck, it is important to design the mechanism carefully to avoid customer misperceptions that any return of allowance value is diluting the price signal required to achieve maximal emission reductions at minimal cost.

I would be happy to answer any questions members of the Committee may have. Thank you for the opportunity to testify today.

The CHAIRMAN. Thank you very much.
Dr. Palmer.

STATEMENT OF KAREN PALMER, DARIUS GASKINS SENIOR FELLOW, RESOURCES FOR THE FUTURE

Mr. PALMER. Thank you, Senator Bingaman and Senator Murkowski and distinguished members of the panel, for this opportunity to testify today. I am a Senior Fellow at Resources for the Future. RFF neither lobbies nor takes positions on specific proposals, so the views I present today are my own.

I'm going to focus on the effects of allocating CO₂ emission allowances on the price of electricity and the overall cost of a CO₂ cap and trade program. I want to make three points:

First, the traditional approach that was used in title 4 for SO₂ allowances of allocating emission allowances for free to electricity generators will result in regional disparities in the electricity price effects of climate regulation. These disparities are the result of differences across States in how electricity markets are regulated.

Second, allocating allowances to local distribution companies is one way to reduce regional disparities in electricity costs. However, this approach raises the overall cost of a climate policy relative to an allowance auction and tends to make households worse off.

Third, a cap and dividend approach that grants some portion of the allowance value directly to households deserves serious atten-

tion. Such an approach can offset costs to households without raising overall costs of a climate policy and can be implemented in combination with other allowance approaches.

Now I want to briefly explore each of these three points in a bit more detail. First, the regional disparity in price effects occur because utility regulators set electricity prices that do not reflect the value of allowances that a utility obtained free of charge in those States where prices are regulated. However, in States with deregulated electricity markets the value of emission allowances that are used to produce electricity will be reflected in electricity prices even if they were obtained for free. Thus a disparity arises across States.

One approach to eliminating this disparity is to sell a larger share of allowances in an auction. This has the political disadvantage of raising electricity prices in States with regulated electricity generation markets.

Allocating allowances to local distribution companies is another approach that overcomes regional differences due to regulation and is the option incorporated in H.R. 2454. Local distribution companies are the entities that distribute energy to households and businesses and they are regulated in all States, and there are also analogous entities for natural gas. As regulated entities, distribution companies are expected to return the value of the free allowances that they receive to their customers. As a result, in all States electricity costs to consumers are lower under this approach than with an auction.

However, if these lower costs are perceived as lower prices they're going to come at a cost in terms of economic efficiency. This is best illustrated by comparing to an allowance auction. With an allowance auction, consumers face the full cost of more CO₂-intensive forms of electricity generation in the price they pay for electricity. As a result, an auction provides stronger signals for consumers to conserve energy, albeit at a political cost of higher electricity prices.

Allocation to local distribution companies mutes the electricity price effects of cap and trade across the country. While this has political appeal, unfortunately it raises the overall cost of the policy relative to an allowance auction. To achieve the same level of domestic CO₂ reductions, the CO₂ allowance price could be as much as 12 to 15 percent higher without allocation to local distribution companies as it would be with an allowance auction.

Consumers will not be insulated from this higher overall cost. The smaller increases that they see in their electricity bills will be offset by higher increases in the price of gasoline and other goods and services. On average, households across the country are worse off as a result.

Greater reliance on a cap and dividend approach can improve this situation for households and lower the overall cost of the policy. A cap and dividend approach distributes some portion of the allowance value directly to households through a mechanism other than the electric bill. This approach avoids the pitfalls of lowering electric bills and adversely affecting conservation incentives for consumers.

Research at Resources for the Future suggests that narrowing the scope of allocation to both electric and natural gas distribution

companies that's found in H.R. 2454 to focus exclusively on households and substituting a cap and dividend approach for those allowances currently apportioned on behalf of commercial and industrial customers to local distribution companies, as well as the allowance to low income households and to States for home heating oil distribution, could improve the efficiency of the policy and its effects on households.

Such a reform of the H.R. 2454 allocation policy would reduce the CO₂ allowance price in 2015 by roughly 14 percent and lower the annual cost to households by nearly \$80, which is roughly half the annual cost to households incurred under allocation to local distribution companies as currently specified in the legislation and that we find in our research.

Thank you for the opportunity to testify today. I look forward to the discussion.

[The prepared statement of Ms. Palmer follows:]

PREPARED STATEMENT OF KAREN PALMER, DARIUS GASKINS SENIOR FELLOW,
RESOURCES FOR THE FUTURE

SUMMARY OF TESTIMONY

This testimony focuses on the effects of different methods of allocating carbon dioxide (CO₂) allowances on the price of electricity paid by consumers and the cost of a cap-and-trade program. The traditional approach of allocating emissions allowances to electricity generators will result in regional disparities in the electricity price effects of a climate policy, in part because of different regulatory frameworks across states. In those states where prices are set by regulators, the price of electricity will not reflect the value of emissions allowances that the utility obtained free of charge. However, in regions with deregulated generation markets, the value of emissions allowances used to produce electricity will be reflected in the electricity price even if they were received for free. Two ways to reduce this disparity are to auction a greater share of allowances or to allocate allowances to local distribution companies instead of to generators. As regulated entities, local distribution companies are expected to pass the value of the free allocation on to their customers, thus reducing the impact of a cap-and-trade policy on electricity consumers. However, this approach is likely to result in higher allowance prices and thus could ultimately leave households worse off than they would be if more allowances were auctioned. Greater reliance on a cap-and-dividend approach, under which a portion of the value of emission allowances is distributed to households on a per capita basis, could improve the delivery of compensation to households and lower the overall cost of the policy.

TESTIMONY

Mr. Chairman, thank you for the opportunity to testify before the Senate Committee on Energy and Natural Resources. My name is Karen Palmer, and I am a senior fellow at Resources for the Future (RFF), a 57-year-old research institution based in Washington, DC, that focuses on energy, environmental, and natural resource issues. RFF is independent and nonpartisan, and shares the results of its economic and policy analyses with environmental and business advocates, academics, government agencies and legislative staff, members of the press, and interested citizens. RFF neither lobbies nor takes positions on specific legislative or regulatory proposals. I emphasize that the views I present today are my own.

From both scholarly and practical perspectives, I have studied the performance of emissions cap-and-trade programs, including evaluation of the sulfur dioxide (SO₂) emissions allowance trading program created by the 1990 Clean Air Act Amendments. I have conducted analysis and modeling to support both state and regional efforts to design trading programs, including the Regional Greenhouse Gas Initiative in the Northeast and the California carbon dioxide (CO₂) cap-and-trade program under AB32. Currently I serve on the New York State RGGI Advisory Committee, advising the New York State Energy Research and Development Authority on how to use the RGGI allowance auction revenue, and on the New York State Independent System Operator Environmental Advisory Council. Additionally, I serve on the EPA Science Advisory Board's Environmental Economics Advisory

Council. Recently, with colleagues at RFF, I have conducted economic analysis of mechanisms to contain the costs and the variability of costs of implementing climate policy.

Today I will focus on the effects of different methods of allocating CO₂ allowances on the price of electricity paid by consumers and the cost of a cap-and-trade program. The electricity sector is responsible for 40 percent of U.S. CO₂ emissions, but, according to the recent EIA analysis of the Waxman Markey cap-and-trade bill, it will be responsible for over 80 percent of total domestic CO₂ emissions reductions from energy use during the early years of the program.

I want to highlight four main points about cap and trade and allowance allocation within the electricity sector:

- The traditional approach of allocating emissions allowances to electricity generators will result in regional disparities in the electricity price effects of a climate policy, in part because of different regulatory frameworks across the states.
- There are different approaches to dealing with these disparities that have different consequences for economic efficiency.
- Allocating allowances to local distribution companies, the approach included in the American Clean Energy and Security Act (H.R. 2454), addresses this issue, but in a way that increases cost for the economy as a whole. The particulars of the approach outlined in the legislation may be difficult to implement in practice.
- Greater reliance on a cap-and-dividend approach, under which a portion of the value of emission allowances is distributed to households on a per capita basis, will achieve the goal of compensating consumers and do so at a lower cost.

The allowances created by an emissions cap-and-trade program could be allocated in several different ways. Historically, under most cap-and-trade programs, including the Title IV SO₂ program and the first and second phases of the EU Emissions Trading Scheme, allowances have been primarily distributed for free to electricity generators based on some fixed measure of historic fuel use or emissions levels. One notable exception to this practice is the Regional Greenhouse Gas Initiative (RGGI), a program to cap emissions of CO₂ from electricity generators in ten northeastern states that took effect in the beginning of this year. Nearly 90 percent of the CO₂ allowances created by RGGI are sold in a series of quarterly auctions. The auction approach will also be used to distribute a majority of the allowances in the next phase of the EU Emissions Trading Scheme.

ADDRESSING REGIONAL DISPARITIES IN ELECTRICITY PRICE EFFECTS OF CLIMATE POLICY

Allocating allowances for free to generators will have differential impacts on electricity prices across states depending on how electricity generation markets are regulated. In those states where prices are set by regulators based on average cost of supply, the price of electricity will not reflect the value of emissions allowances that the utility obtained free of charge. Regulated utilities are only allowed to recover costs that they actually incurred (plus an allowed regulated rate of return on investments) from utility customers. However, in regions with deregulated generation markets, the value of emissions allowances used to produce electricity will be reflected in the electricity price even if they were received for free. Thus, a federal cap-and-trade policy with free allocation to generators will have an uneven effect on electricity prices across states. The effect would be striking. The change in electricity prices around the country would depend more on regulation and market structure than on the CO₂ emissions associated with electricity generation and consumption.

One way to reduce the differences in price effects across states would be to auction a greater share of the allowances. Auctioning and free allocation have similar effects on electricity prices in states with deregulated electricity markets. There, electricity producers will charge a price for electricity that makes it worthwhile to use an allowance to produce electricity instead of selling the allowance to another firm for its full value. In regulated regions, when generators have to pay for the allowances that they require to produce electricity, the costs of those allowances also will be reflected in the prices consumers pay for electricity. So, the disparity across states in price effects will be reduced, but it will lead to higher prices for consumers in regulated regions.

Note that moving from free allocation to generators to greater use of an auction will reduce differences across states in the effect of the CO₂ regulation on electricity price, but it will not eliminate those differences. Price impacts will vary across re-

gions depending importantly on the mix of fuels used to supply electricity in the state. Generally the states with the most CO₂-intensive generation—those that rely largely on coal—tend to be the states with lower costs. Research that I've conducted with colleagues at RFF indicates that even when 100 percent of the allowances are sold in an auction, consumers in those coal-intensive states continue to have electricity prices that are well below the national average as shown in Exhibit 1.* This figure displays the anticipated regional electricity price impacts of a cap-and-trade program like Waxman Markey, but assuming that 100 percent of the allowances are sold in an auction. Regions are arrayed according to the emissions intensity of electricity generation. Not surprisingly, those regions with the greatest CO₂ intensity have the largest price effects, but it is worth noting that they continue to have electricity prices well below the national average.

Allocating allowances to local distribution companies is another approach that overcomes regional differences due to regulation and is the option incorporated in H.R. 2454. Local distribution companies are the regulated entities that distribute electricity to households and analogous entities exist for natural gas. These companies are regulated everywhere, even in states where electricity generation markets have been deregulated. As regulated entities, the distribution companies are expected to act in the public interest and thus to return the value of any emissions allowances that they receive for free to the customers that they serve. This approach will cushion the price impacts of a climate policy for electricity consumers in both deregulated and competitive regions, and can eliminate regional disparities in the price effects of a cap-and-trade regulation.

Exhibit 2 illustrates the distribution of price impacts of a cap-and-trade program according to the size of the market subject to a price effect of the magnitude indicated in the categories on the horizontal axis. The top panel shows that under the auction the price impacts are largest, but they are fairly similar between regulated regions (indicated by blue) and deregulated regions (indicated by yellow and labeled as competitive). The middle panel shows how allocating allowances for free to generators helps consumers in regulated regions, but not in deregulated regions. The last panel shows how allocation to local distribution companies can lower the electricity price effects and restore symmetry in impacts between regulated and deregulated regions.

EFFICIENCY EFFECTS OF ALLOWANCE ALLOCATION

So far I have focused on the distributional effects of allocation on electricity prices across regions, but there are important economic efficiency consequences that should not be overlooked. An auction approach to allocation will yield the most efficient outcome because it ensures that the full costs of more CO₂-intensive forms of electricity generation are passed along to electricity consumers. Under this approach, consumers have a sense of the true costs of the electricity they use and thus have the appropriate incentives to reduce their consumption. However, this alignment of incentives is achievable only at the political cost of higher electricity prices.

Allocation to local distribution companies mutes the electricity price effects of cap and trade across all regions of the country and while this has political appeal, unfortunately it raises the cost of a cap-and-trade policy overall relative to an auction approach. This increase in overall cost occurs because when consumers see lower electricity prices, they have less incentive to conserve electricity and generators will use more CO₂ allowances. Greater emissions reductions will have to come from other sectors and this will raise the cost of emissions allowances. As indicated in the bottom panel of Exhibit 2, in order to achieve the same level of domestic reductions, the CO₂ allowance price could be as much as 12 percent to 15 percent higher with allocation to local distribution companies as it is with an allowance auction. Consumers will not be insulated from this higher overall cost. The smaller increases that they see in their electricity bills as a result of allocation to distribution companies will come at the cost of higher increases in the price of gasoline and goods and services that have a high transportation cost component.

Hence, it is important to ask the question: Are households better off because of the effort to subsidize their electricity prices? In fact, on average, they are worse off because the value of other goods and services will be higher as a result and households will face a greater overall cost from climate policy.

IMPORTANT ISSUES RELATED TO ALLOCATION TO LOCAL DISTRIBUTION COMPANIES

Despite these efficiency concerns, allocation to local distribution companies has many proponents, especially as a transition strategy to soften the impact on house-

*All exhibits have been retained in committee files.

hold electricity costs in the near term and give consumers an opportunity to adopt more efficient appliances as existing ones wear out. In that spirit, H.R. 2454, which initially allocates 30 percent of the allowances to electric distribution companies and another 9 percent to natural gas distributors, calls for allocation to local distribution companies to last until 2026, when it begins to phase out, and it will be completely phased out by 2030. The logic of a transition period has appeal, but the twenty-year horizon is much longer than necessary to provide the opportunity for households and businesses to make a transition to more efficient capital investments. H.R. 2454 also includes some provisions that seek to limit the extent to which this approach to allocation mutes incentives for conservation. The details of these provisions and other aspects of how the policy is implemented have important implications for consumers.

One important feature of allocation to local distribution companies is the basis for apportionment of the allowances among companies. How this approach to allocation affects consumers in different regions will depend on the basis for the apportionment. A variety of different metrics are available. For example, if allowances are apportioned based on the share of the national population within a distribution company's service territory, then consumers in more populous states will benefit relative to those in other parts of the country. If allowances are apportioned based on the emissions intensity of electricity consumed within a distribution company's territory, the coal-intensive states will see more of the benefit. In H.R. 2454, apportionment to local distribution companies is based on a combination of two criteria: electricity consumption and CO₂ emissions, with each having a 50 percent share. Our research suggests that this approach results in higher effective per kWh subsidies to utilities in the Midwest and the lowest subsidies to utilities in the Northeast and on the west coast.

The second important feature is related to how allowance values appear on monthly electricity bills. The goal of allocation to local distribution companies is to compensate households for the costs imposed by climate policy. If this compensation could be distributed in a form that is independent of the amount of electricity that a consumer purchases—in other words as a fixed amount of money per month—then, in theory, it would not diminish consumers' incentives to conserve electricity relative to an auction approach. H.R. 2454 seeks to make this happen by directing that the allowance value be used to reduce the fixed part of the electricity bill “to the maximum extent possible.”

In practice, however, this approach is nearly unworkable. The organization and presentation of electricity bills are the prerogative of the local distribution companies with oversight from state public utility commissions. Electricity bills typically do not separate the fixed and variable portions of the charge in this way, especially for residential class customers. Exhibit 3 provides an example of a recent residential bill from Maryland. In order to see how the total bill breaks down into different categories of cost, we have to go to the second page of the bill. What we find is very little in the way of fixed charges. Even the parts of the bill for arguably fixed costs (those that don't vary with the amount of electricity consumed) such as distribution tend to be expressed in volumetric terms. The two exceptions to this are the small monthly customer charge of \$6.65 and the \$2.75 RGGI credit, which is a distribution of a portion of the RGGI CO₂ allowance auction revenue back to Maryland electricity consumers. This leaves a net of just under \$4.00 per month in fixed charges, roughly 2.5 percent of the total \$161 bill. This suggests little room for a fixed charge refund and little reason to believe that the customer would be able to find it if it were there.

Moreover, arguably, most customers don't read page two when they pay their electric bills. As a busy soccer mom and professional woman I can tell you that customers do not tend to distinguish between the fixed and variable components of the bill. Instead they focus on the total bill or, perhaps, the average charge per kWh if that information is presented. If either of those goes down, customers probably figure that electricity got cheaper and their consumption would be likely to increase based on these simple measures of electricity cost.

The problem is compounded further if one appreciates the incentives that a fixed-charge rebate creates for a proliferation of customer accounts. Property owners may have an incentive to open new accounts to earn additional rebates. In addition, households vary substantially in size and composition. A rebate that is fixed on a per-account basis will not match any criteria of equity with respect to household composition. Finally, we cannot ignore the enormous numbers of families in multi-unit residential buildings. While economists would argue the benefits of separate metering for these buildings, it is often not done. A rebate per account would invite controversy and strategic behavior as a consequence.

One might expect more sophisticated behavior from commercial-and industrial-class customers, who might recognize their true marginal production costs. The implementation of the rebates to consumers, however, will require oversight of state-level public utility commissions to determine, for example, how much of a rebate to the fixed portion of a bill a large customer should receive compared to a small customer. If they were to receive the same size rebate it would seem unfair, or even potentially absurd if they were of very different size. But, if they receive different rebates, then those rebates would actually hinge on the volume of electricity they consume, so we are right back at the beginning. H.R. 2454 acknowledges this complication for industrial customers, and the final version of the proposed legislation allows for rebates to industrial customers to be placed in the variable portion of the bill. In any case, the final outcome of this particular feature of implementation actually will be decided in 50 different ways across the states, where Public Utility Commissions interpret their missions to protect the public in different ways. The outcome is beyond the reach and determination of the legislation as currently specified.

CAP AND DIVIDEND AND OTHER USES OF ALLOWANCE REVENUE

If, as noted above, the ultimate goal of allocation to local distribution companies is to compensate residential electricity consumers for the costs imposed by a climate policy, then another way to achieve that compensation would be to distribute some portion of the value of the allowances directly to households through a mechanism other than the electric bill. Such an approach, known as cap and dividend, would avoid the pitfalls of lowering electric bills and incentives to conserve and yet would help to offset higher costs of electricity and other energy-intensive goods and services that households consume.

Research at RFF suggests that narrowing the scope of allocation to local energy distribution companies and substituting a cap-and-dividend approach for it could improve both the efficiency and effects on households of the policy. Such an approach redirects the portion of the allowance value going to local distribution companies (both electric and gas) intended for ultimate distribution to commercial and industrial electricity consumers, as well as the portion scheduled to go to home heating and low-income households, to a cap-and-dividend allocation, leaving only the residential portion of allocation to local distribution companies intact. Such a reform of the H.R. 2454 policy would improve its efficiency, reducing the CO₂ allowance price by roughly 14 percent in 2015, and lowering the annual cost to households by nearly \$80, roughly half of the cost they incur under allowance allocation to local distribution companies as specified in the legislation.

Allowance revenues could also be used for a host of other purposes. One approach that is popular with economists would be to use allowance revenue to lower income taxes. This would bring economic efficiency benefits because it reduces the disincentives for work and productive activity associated with income taxation. Another option would be to use some portion of allowance revenue to promote program goals through direct investment in research and development in clean energy technologies or by providing tax breaks for private research and development as well as direct investment in new technologies for particularly vulnerable industries. In several of the RGGI states, a large portion of the CO₂ allowance revenue is being directed toward investment in energy efficiency programs and this policy experiment should provide important lessons for federal initiatives in this regard.

The CHAIRMAN. Thank you very much.
Dr. Stone, go right ahead.

STATEMENT OF CHAD STONE, CHIEF ECONOMIST, CENTER ON BUDGET AND POLICY PRIORITIES

Mr. STONE. Thank you. Chairman Bingaman, Senator Murkowski, and other members of the committee, thank you for the opportunity to testify on this important topic. I am Chief Economist at the Center on Budget and Policy Priorities, a public policy organization working on budget and policy issues at the Federal and State level with a special emphasis on low-income programs.

One of the key messages you've heard today is that there are two important aspects to how a cost-effective climate policy like cap and trade affects consumers. The first is the effect due to putting a price on carbon, i.e., making it more expensive to continue to use

dirty energy. The second is the effect due to how the emissions allowances that are the instrument for enforcing the cap on emissions are allocated or how the revenue arising from auctioning them is used. Trying to judge the effect of the policy on consumers by focusing on just one or the other side of this equation will give an incomplete and misleading picture.

My testimony focuses on how these two effects play out, with a special emphasis on low income households. The essential points of my testimony can be summarized as follows. They're elaborated on in my complete statement, my written statement.

First, low income households bear a disproportionate burden of the costs associated with effective policies to reduce the use of carbon-based energy because they spend a higher proportion of their budgets on energy and energy-intensive goods and services than higher income households do. That's the cost from putting a price on carbon's side of the equation.

The bad news is there without well-designed policies to offset the impact of these costs on low income households' budgets, policies that are effective at controlling greenhouse gas emissions and achieving the benefits of fighting global warming could push more families into poverty and make many of those who are already poor still poorer.

The good news—and this is important—is that this dire outcome is preventable. There are effective ways to use a portion of the revenue that can be captured through the auctioning of emissions allowance to protect low income households. That's the “how do you use emissions allowances” side of the equation. So you have the costs, but you can offset the impact of those costs on vulnerable populations through the wise use of emissions allowance value.

The Waxman-Markey bill passed by the House contains provisions to do just that, using existing mechanisms with widespread reach to deliver benefits efficiently to the most vulnerable households. My written testimony contains a detailed discussion of the principles for effective low income relief that we at the Center on Budget Policy Priorities have developed based on our experience over the years in designing and evaluating low income policies.

In the House bill, low income households receive their share of the benefits from the free allocation of allowances to utilities that is the main form of broad-based consumer relief in the bill. But that falls far short of filling the gap in the budgets of low income households from putting a price on carbon.

The main policy in the House bill that helps low income households is the direct energy refund delivered through the existing electronic benefit transfer systems, or EBT, that States use to deliver food stamp benefits and a variety of other cash assistance. Together with the utility-based relief, this direct refund provision ensures that the average person in the poorest fifth of the population does not incur financial loss as a result of climate change legislation.

I would add as an aside that it's important to ensure that States have adequate resources to administer programs that will fall under their responsibility.

Special attention to protecting low income households remains essential when policymakers consider broad-based consumer relief

that extends farther up the income scale to middle income households. As I have just described, for example, the House recognized that the utility-based relief it relied on to provide broad-based consumer relief was insufficient by itself to fully protect low income households.

It is also essential to have an effective delivery mechanism for reaching low income households. Tax-based policies alone, for example, would fail to reach the millions of low income households that do not file tax returns. Similarly, making sure that you have the right delivery mechanism is one of the most important challenges in a cap and dividend approach also for reaching those populations that are generally not easy to reach in the low income group.

My written testimony elaborates on a number of these points, and in wrapping up I would like to point to a couple of other things. First, last week you heard testimony about the effects of climate policy on the economy generally. My reading of the evidence is that the net cost per household on an economy-wide basis is relatively modest, especially in early years. But it is important to remember that that relatively modest net cost—that's the triangle in Dr. Metcalf's testimony; we economists are big on sophisticated mathematics, like triangles and rectangles.

But it is important to remember that the relatively modest net cost is composed of a gross cost from putting a price on carbon and a gross financial benefit from how the allowance value is used. How the allowance value is used will determine the distribution of costs and benefits, and that can differ greatly among different policies, also as Dr. Metcalf's testimony pointed out.

Second, my testimony contains a more detailed discussion of the policy advantages of direct refunds to consumers over other approaches to providing consumer relief and in particular echoes some of the concerns you have heard about the utility-based relief that's in the House bill, the LDC allocation.

Finally, as the Senate moves forward with its deliberations I hope that they will build on the solid foundation of low income assistance that is in the House bill. I discuss things in my testimony that can be done to improve on that policy and to extend relief farther up the income scale to moderate income households. But the basic structure of providing a benefit to all eligible households that is adequate to offset their average loss of purchasing power and to use a portion of the allowance value to fund that benefit is critical to meeting the key goal of ensuring that the policies necessary to reduce greenhouse gas emissions do not add to the hardship of people who are already experiencing substantial hardship and are already struggling to get by.

Thank you and I look forward to the questions.

[The prepared statement of Mr. Stone follows:]

PREPARED STATEMENT OF CHAD STONE, CHIEF ECONOMIST, CENTER ON BUDGET AND POLICY PRIORITIES

Chairman Bingaman, Ranking Member Murkowski, and other members of the Committee, thank you for the opportunity to testify on this important topic. The focus of my testimony will be on how low-income households will be affected by climate change policy and the allocation of greenhouse gas emissions allowances.

The essential points of my testimony can be summarized as follows:

- Low-income households bear a disproportionate burden of the costs associated with effective policies to reduce the use of carbon-based energy because they spend a higher proportion of their budgets on energy and energy-intensive goods and services than higher-income households do.
- The bad news is that without well-designed policies to offset the impact of those costs on low-income households' budgets, policies that are effective at controlling greenhouse gas emissions and achieving the benefits of fighting global warming could push more families into poverty and make many of those who already are poor still poorer.
- The good news is that this dire outcome is preventable. There are effective ways to use a portion of the revenue that can be captured through the auctioning of emissions allowances to protect low-income households.
- The Waxman-Markey bill passed by the House contains provisions that do just that, using existing mechanisms with widespread reach to deliver benefits efficiently to the most vulnerable households. The House provisions ensure that the average person in the poorest fifth of the population does not incur a financial loss as a result of climate change legislation.
- Special attention to protecting low-income households remains essential when policymakers consider broad-based consumer relief that extends to middle-income households. The House, for example, recognized that the utility-based relief it relied on to provide broad-based consumer relief was insufficient by itself to fully protect low-income households.

Similarly, tax-based policies alone would fail to reach the millions of low-income households that do not file tax returns. The challenge in a cap-and-dividend approach is how to design a delivery mechanism that reaches low-income households.

In the rest of my testimony, I elaborate on these points with further discussion of the impact of cap-and-trade on households. I then describe the principles the Center on Budget and Policy Priorities has developed for designing concrete proposals for low-income relief and how those principles are implemented in the House climate bill. Finally, I discuss the advantages that direct refunds, like those in the low-income provisions of the House bill, have over other ways of delivering consumer assistance.

THE IMPACT OF CAP-AND-TRADE ON HOUSEHOLDS

The key points I want to make about the impact of cap-and-trade on households are illustrated by the information in the chart* above. The data in the chart come from the Congressional Budget Office's analysis of the House bill and were part of CBO Director Elmendorf's testimony before this committee last week.¹ The yellow lighter-shaded negative bars show the hit as a percentage of household income to the average household in different parts of the income distribution from putting a price on carbon. The blue darker-shaded positive bars show CBO's estimate of the financial benefits flowing to the average household in different parts of the income distribution as a result of how the House bill allocates emissions allowances and uses the revenue from auctioned allowances. The markers on the line identify the net costs or benefits in different parts of the income distribution, which are the proper measure of the distributional impact of the complete policy. As always in these kinds of analyses it is important to remember that these estimates do not include the benefits that are the *raison d'être* of the whole policy—the economic, environmental, and security benefits that derive from encouraging the transition to a clean energy economy.

The bars at the extreme right of the chart show that, on average, across all households, the costs associated with capping emissions are somewhat larger than the financial benefits that are available to be distributed through the use of emissions allowance value. Thus, there is a modest net cost to the economy (before accounting for the economic and environmental benefits of capping emissions) over and above what can be recycled back to households through the use of allowance value. This net cost, not the gross cost due to the cap, is the right measure of the average cost per household of the policy, because it takes into account the financial benefits from the use of allowance value to offset much of the costs due to higher energy prices. However, the fact that the net costs per household are modest on an economy-wide basis is not sufficient to conclude that the costs to vulnerable populations would be small without explicit policies to protect them.

*Graphic has been retained in committee files.

¹Statement of Douglas W. Elmendorf, Director, "The Economic Effects of Legislation to Reduce Greenhouse-Gas Emissions," before the Committee on Energy and Natural Resources, United States Senate, October 14, 2001, Table 2, page 26.

As the chart illustrates, low-income households experience the gross costs of the policies necessary to reduce greenhouse gas emissions more acutely than higher-income households do. In dollar terms, the impact is smaller for these households because their income and consumption are smaller. But as a share of their income, as the chart shows, the impact is substantially greater.

Without any compensating financial relief to low-income households, the burden of these costs would increase poverty and hardship. Fortunately, the House bill delivers sufficient financial benefits to the poorest 20 percent of the population, that, on average, these households do not incur a net financial loss, but rather receive a small net financial gain. (Even with this positive average net benefit for the bottom quintile, however, there inevitably still will be many low-income households whose individual costs are not fully offset by the benefits they receive.)

The net distributional impacts shown in the chart depend heavily on the specific emissions allocation decisions made in the House bill. Under that bill, 15 percent of emissions allowance value is set aside explicitly for low-income energy refunds. These refunds are the principal reason that the average low-income household does not suffer a net financial loss. If, for example, this allowance value had been used instead for additional utility-based relief spread uniformly across the population, low-income households would have been net losers on average. Similarly, if a smaller percentage of allowance value were devoted to low-income relief and the average low-income refund were smaller, more low-income households would incur net losses and the size of the losses for those who incur them would be larger.

Decisions about how to use allowance value involve trade-offs. For example, analysis indicates that the net economy-wide costs of limiting emissions can be lowered some by using allowance value to reduce marginal income tax rates. However, the benefits from reducing tax rates are skewed toward high-income taxpayers, and low-income households will be worse off than shown in the chart (and very likely net losers) because they do not benefit from the lower costs to the economy. Conversely, if most of the allowance value is used for per capita rebates or direct tax credits and refunds based on household size rather than income, the benefits flowing to low- and moderate-income households will be even larger than those shown in the chart, and the benefits to upper income households will be smaller.

PRINCIPLES OF LOW-INCOME RELIEF IMPLEMENTED IN THE HOUSE BILL

Much of the Center on Budget and Policy Priorities' work on climate change policy has focused on developing concrete proposals to shield low-income households from increased poverty and hardship in a way that is effective in reaching them, efficient (with low administrative costs), and consistent with energy conservation goals.² Our work has been guided by the following six 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 refunds should be designed to fully offset higher energy-related costs for low- and moderate-income families.
2. Use mechanisms that reach all or nearly all eligible households.—Eligible working households could receive a climate refund through the tax code, via a refundable tax credit. But many other households are elderly, unemployed (especially during recessions), or have serious disabilities and are not in the tax system. Climate refunds need to reach these households as well. Hence, the primary mechanism for reaching low-income households should be a broad mechanism that does not rely on the tax code.
3. Minimize red tape. Funds set aside for consumer relief should go to intended beneficiaries, not to excessive administrative costs or profits.—Accordingly, policymakers should provide assistance to the greatest degree possible through existing, proven delivery mechanisms rather than new public or private bureaucracies.
4. 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. Various other tax benefits and means-tested assistance vary by household size; this one should as well.
5. Do not focus solely on utility bills.—For low- and middle-income households, higher home energy prices will account for less than half of the total hit on

²See Sharon Parrott, Dottie Rosenbaum and Chad Stone, "How to Use Existing Tax and Benefit Systems to Offset Consumers' Higher Energy Costs Under an Emissions Cap," Center on Budget and Policy Priorities, April 20, 2009.

their budgets from a cap-and-trade system. This is because goods and services across the economy use energy as an input or for transportation to market. Furthermore, about 20 percent of the households in the bottom quintile of the income spectrum have their utility costs reflected in their rent, rather than paying utilities directly. Policymakers should structure climate refunds so they can help such families with the rent increases they will face as a result of climate policies, as well as with the higher prices that households will incur for gasoline and other products and services that are sensitive to energy costs.

6. Preserve economic incentives to reduce energy use efficiently.—Broad-based consumer relief should provide benefits to consumers to offset higher costs while still ensuring that consumers face the right price incentives in the marketplace and reduce fossil-fuel energy consumption accordingly. A consumer relief policy that suppresses price increases in one sector, such as electricity, would be inefficient, because it would blunt incentives to reduce fossil fuel use in that sector. That would keep electricity demand elevated relative to what it would be if consumers saw electricity prices rise, and it would place a greater burden on other sectors and energy sources to provide the emissions reductions the cap requires. The result would be that emissions reductions would be more costly to achieve overall and allowance prices would be higher. Consumers might pay less for electricity, but prices would rise still more for other items.

With these goals in mind, the Center has designed a “climate refund” that would efficiently offset the average impact of higher energy-related prices on low- and moderate-income households. That refund would be delivered each month to very low-income households through state Electronic Benefit Transfer (EBT) systems, which are essentially debit card systems that states already use to provide food stamps, TANF, and other forms of assistance to low-income families, the elderly, and others. The EBT mechanism is the centerpiece of a climate refund proposal because of its unique ability to reach large numbers of low-income households (including those that are outside the tax system). Proposals to reach low-income working households and others farther up the income scale need to rely on additional mechanisms, particularly refundable tax credits.

The climate bill passed by the House provides robust protection to low-income households consistent with these principles.³ The bill uses proceeds from the sale of 15 percent of the emissions allowances to reimburse low-income households for the higher costs they will face for energy and energy-intensive goods and services under the bill. This low-income assistance is in addition to relief that would be provided to all consumers, regardless of income, by provisions in the bill that give free emissions allowances to retail electric and gas companies (called local distribution companies, or LDCs) for the purpose of providing their customers with relief on their utility bills.

Under the House bill, low-income families with children, seniors, people with disabilities, and other low-income individuals would be eligible for a monthly federal benefit, administered through their state’s human services agency, to offset the loss in purchasing power caused by the other provisions of the bill. This benefit would be delivered electronically onto the same debit cards that states now use to deliver food stamps and other benefits. The bill also uses a portion of the proceeds from auctioning 15 percent of the allowances to finance an expansion in the now-very-small component of the Earned Income Tax Credit (EITC) for low-income workers who do not live with children, the one low-income group most likely to be missed by the benefit provided through the state human services agencies. This EITC expansion would help offset the rising costs those workers would face as a result of the climate legislation. It also would reduce taxes for the one group of Americans who must pay federal income taxes despite living below the poverty line and who thus are taxed deeper into poverty.

Under the bill, households with incomes under roughly 160 percent of the poverty line—about \$35,000 a year for a family of four in 2009—would qualify for a monthly energy refund that would be delivered through the EBT system that state human service agencies operate. Households with incomes below 150 percent of the poverty line would qualify for a full benefit; the benefit would begin to phase down for households with incomes above this income level and phase out at roughly 160 percent of the poverty line. Based on Congressional Budget Office (CBO) cost estimates and estimated average refund amounts, approximately 70 million individuals would participate in the refund program.

³ See, Dottie Rosenbaum, Sharon Parrott, and Chad Stone, “How Low-Income Consumers Fare in the House Climate Bill,” Center on Budget and Policy Priorities, October 7, 2009.

The Energy Information Administration (EIA, the statistical agency of the Energy Department) would calculate each year how much, on average, the higher energy prices resulting from the climate policies would reduce the purchasing power of households with incomes at 150 percent of the poverty line. The EIA would make this calculation for households of different sizes, since energy consumption—and, thus, the loss of purchasing power that results from higher energy costs—varies by household size. EIA would base these calculations on the market value of emissions allowances, other economic costs of capping carbon emissions, and the “carbon footprint” of low-income households in this income range, which can be derived from government data on consumer expenditures. A household’s benefit would equal the amount that EIA calculated that energy prices would rise that year for a household of that size as a result of the legislation, after taking into account the relief the household would receive through the free allocation of permits to local utility companies. The benefit would be delivered on a monthly basis.

The legislation directs state human service agencies to automatically enroll certain groups of individuals into the refund program. This includes food stamp households, and low-income seniors and people with disabilities who participate in the Supplemental Security Income (SSI) program or receive the low-income subsidy for the Medicare prescription drug program. (All low-income seniors and people with disabilities who participate in both the Medicare and Medicaid programs are automatically enrolled in the low-income subsidy for the prescription drug program and, thus, would automatically receive the energy refund benefit.)

While the Food Stamp Program (now called the Supplemental Nutrition Assistance Program) reaches most very poor families with children, some people have incomes below 150 percent of the poverty line but do not participate in the Food Stamp Program, SSI, or the low-income subsidy program for the Medicare prescription drug benefit. These households would be permitted to apply for the refund. Recognizing the importance of ensuring that those who are eligible know about and can easily enroll in the program, the bill includes several additional provisions to facilitate participation by eligible low-income households.

While the Energy Refund Program delivered through state human service agencies’ EBT systems is likely to reach a large share of eligible seniors, people with disabilities, and families with children, one group is unlikely to have high participation in the program—non-elderly adult workers who do not live with children. Only about one in four eligible working adults without children in the home participates in the Food Stamp Program. The bill provides consumer relief to these individuals by expanding the Earned Income Tax Credit for workers without children.

Currently, the EITC for this group is very small—the maximum benefit in 2009 is just \$457, far below the maximum benefit of \$3,043 for a family with one child. Moreover, the EITC for adults who do not live with children is too small to ensure even that single workers living below the poverty line are not taxed deeper into poverty. In addition, the current EITC for workers without children has such a low eligibility limit that a full-time minimum wage worker is wholly ineligible for the credit.

The House bill provides consumer relief to these workers through an expansion of the childless workers’ EITC. The maximum benefit would remain very modest compared with the EITC benefit for families with children—in 2012, the maximum EITC credit for a single worker without children would be \$932, or less than one-third the benefit for a parent with one child. In addition, the bill would raise the income level at which the credit begins to phase out, from \$7,620 in 2012 dollars (69 percent of the poverty line) to \$11,640 in 2012 dollars (about 105 percent of the poverty line); the end of the phase-out range would be raised to about 160 percent of the poverty line). Much of the increased EITC would offset the loss of purchasing power these workers will face as a result of the climate legislation. The remainder of the EITC increase would go to reducing the tax bills of these poor and near-poor workers.

The low-income provisions of the House bill provide a sound foundation for the Senate to build on in its climate deliberations. While the House bill would provide enough consumer relief to fully offset most low-income families’ increased energy costs, some households—such as those that rent poorly-insulated apartments or have inefficient appliances—will face increased costs that exceed the amount of relief they receive. These households could have difficulty making ends meet even with the consumer assistance provided in the bill. For that reason, as the legislation moves forward, it could be strengthened by providing additional funds for the Low-Income Home Energy Assistance Program (LIHEAP), a program that provides energy assistance to low-income consumers and often targets aid on those who face utility shut-offs or other hardships. The consumer relief provisions also could be strengthened by extending the consumer relief either through the EBT mechanism,

or more likely through an income tax credit, to families with incomes somewhat above the eligibility cut-off for the House bill's relief provisions. As I discuss in the next section of this testimony, providing direct refunds based on household size using the EBT mechanism and a refundable tax credit has much to recommend it as a model for providing consumer relief farther up the income scale as well.

THE ADVANTAGES OF DIRECT REFUNDS OVER OTHER FORMS OF CONSUMER RELIEF

Refunds are an effective way to deliver consumer relief. They can be provided easily through the federal tax system and state EBT systems, with no need for new agencies or bureaucracy at the state or federal level. Also, refunds protect households against the loss of purchasing power from higher energy-related prices without blunting consumers' incentives to respond to those higher prices by conserving energy and investing in energy efficiency improvements. Because energy-related products will cost more, households with the flexibility to conserve energy or invest more in energy efficiency will get more value for their budget dollar by taking these steps than by using their rebate to maintain their old ways of consumption. At the same time, refunds help households that cannot easily reduce their energy consumption to avoid a reduction in their standard of living.

Other proposals for consumer relief generally lack one or more of these advantages, pose other serious problems, or lack crucial details needed to know how they would work in practice.

UNIVERSAL "CAP AND DIVIDEND"

The proposal closest in spirit to refunds is the universal "cap-and-dividend," approach often associated with energy entrepreneur Peter Barnes.⁴ Under this proposal, all emissions allowances in a cap-and-trade system would be auctioned and the proceeds divided evenly among all Americans on a per capita basis, mirroring the concept that all Americans have an equal stake in the planet's future.

The dividend would equal the average per capita loss of purchasing power that results from climate-change legislation. Therefore, the dividend would be smaller than the actual losses that high-income individuals would experience due to higher energy-related costs, because they have above-average per capita energy expenditures. It would be somewhat larger than the actual losses of low-income individuals.

There are a number of similarities between cap and dividend and the Center's refund approach. Both focus on consumer relief. The cap-and-dividend approach has the advantage of simplicity: everyone would secure a share of the revenues while still facing an incentive to reduce their carbon emissions. Nevertheless, cap and dividend raises several concerns.

- The primary issue is that distributing all revenues from the auction of emissions allowances as dividends would leave no money for other climate-related priorities, which would have to be funded from other sources.
- On a more technical front, cap and dividend would require an implementation mechanism. Barnes has suggested that households would receive monthly payments, preferably into their bank accounts (as is done with Social Security). This would entail a significant expansion of the Social Security infrastructure or the creation of a similar administrative system. It would also require ensuring that all Americans are signed up with appropriate banking services or that a more universal system of debit cards than currently exists is created. While these are not necessarily insurmountable barriers, developing such a system would be a considerable undertaking.
- Finally, under a per capita dividend, the size of a family's dividend would be tied strictly to the number of people in the family. The evidence suggests, however, that energy expenditures increase less than in proportion to family size. (In other words a family twice as large as another consumes less than twice as much energy.) Refunds are better suited to providing a more appropriate family-size adjustment.⁵

⁴ See Testimony of Peter Barnes, before the Committee on Ways and Means, U.S. House of Representatives, September 18, 2008, <http://waysandmeans.house.gov/media/pdf/110/barnes.pdf>.

⁵ CBPP's proposed refund, and the one in the House bill, would adjust for family size but would take into account "economies of scale" in meeting families' needs. In other words, a family of four would get a larger refund than a family of two, but not one that was twice as large, as would be the case under a per-capita cap-and-dividend approach.

PAYROLL OR INCOME TAX CUTS

Some have proposed using climate change revenues to cut payroll tax rates or individual or corporate income tax rates. Such options would be less effective than a refundable tax credit in preserving the purchasing power of low-and middle-income consumers.

For example, in its analysis of trade-offs in the design of cap-and-trade legislation, CBO found that if all the revenue from auctioning emissions allowances were used to reduce payroll tax rates, households in the bottom 60 percent of the distribution would get a smaller benefit from the tax cut, on average, than they would lose from higher energy prices.⁶ Those in the next 20 percent would come out even and the top 20 percent of the population would get a tax cut that exceeded their increase in energy costs. Using all the auction revenues to cut corporate taxes would be even more regressive, since the benefits of corporate tax cuts are concentrated still higher up the income scale. Using auction revenues to provide households refunds that vary by family size but do not increase as income climbs would not have these regressive effects.

The main argument for using climate change revenues to cut tax rates rests on the concept of economic efficiency. Economic analysis suggests that charging firms for emitting pollutants (as under a cap-and-trade system) could dampen economic activity. By cutting tax rates at the same time, policymakers could reduce these economic efficiency losses. But, as the CBO analysis emphasizes, policymakers face a trade-off between achieving efficiency gains and achieving distributional goals. Moreover, the economic efficiency gains CBO identifies are relatively modest, and the effect of the tax rate cuts that produce those modest gains would almost surely be to leave low-and middle-income consumers worse off and to cause inequality in the United States to widen further.⁷

Distributional analysis by Resources for the Future reinforces the CBO analysis.⁸ The RFF analysis finds that the benefits of cutting marginal tax rates would mainly go to upper-income individuals. In contrast, providing refunds to low-and middle-income consumers would result in the best outcome for those consumers.

A reduction in payroll tax rates does not fare as well as a flat refund on distributional grounds: the size of the benefit from a payroll tax cut is higher for those with higher earnings, and seniors and others without earnings would receive no rebate. The first concern can be partially addressed by switching from a cut in payroll tax rates to a rebate of payroll taxes paid up to a fixed cap. Workers above a certain modest level of earnings would all receive the same size rebate. Workers with very low earnings, however, would receive only a partial rebate, and people with no earnings would still be left out.

Those problems can partly addressed by switching to a refundable income tax credit based on the amount of payroll taxes paid (up to a maximum amount) and making seniors and people receiving federal disability benefits eligible for a similar size tax credit.⁹ At that point, the modified payroll tax proposal would look a lot like low-and-middle-income refunds.

⁶Congressional Budget Office, "Tradeoffs in Allocating Allowances for CO₂ Emissions," April 25, 2007, http://cbo.gov/ftpdocs/89xx/doc8946/04-25-Cap_Trade.pdf; and "Options for Offsetting the Economic Impact on Low-and Moderate-Income Households of a Cap-and-Trade Program for Carbon Dioxide Emissions," letter to the Honorable Jeff Bingaman, Chairman, Committee on Energy and Natural Resources, United States Senate, June 17, 2008, <http://www.cbo.gov/ftpdocs/93xx/doc9319/06-17-ClimateChangeCosts.pdf>.

⁷For low-and moderate-income consumers not to be worse off under a proposal that uses all of the auction proceeds to lower tax rates, the additional economic activity generated by the tax cut would have to be so great that it raised workers' incomes by enough to increase their after-tax income by more than what they lose due to higher energy prices. Credible estimates of the economic efficiency gains from using climate change revenues for tax-rate reductions show those gains to be very small, however, compared with what would be needed to produce such a result. For example, in the analysis that CBO has relied upon to estimate the efficiency gains under an approach that uses all of the auction proceeds to cut tax rates, the efficiency gains would be equal to only 0.3 percent of GDP. That is far too small to offset the net loss that low-and middle-income consumers would bear as a result of losing more from higher energy prices than they would gain from the reduction in tax rates.

⁸Dallas Burtraw, Rich Sweeney, and Margaret Walls, "The Incidence of U.S. Climate Change Policy: Where You Stand Depends on Where You Sit," Resources for the Future, September 2008, <http://www.rff.org/News/Features/Pages/ClimatePolicyOptions.aspx>.

⁹Gilbert E. Metcalf, "A Proposal for a U.S. Carbon Tax Swap: An Equitable Tax Reform to Address Global Climate Change," The Brookings Institution (Hamilton Project), October 2007.

ENERGY EFFICIENCY PROGRAMS

Measures to encourage or require investments in economic efficiency can reduce the overall demand for energy, thereby limiting the size of the hit to consumers' pocketbooks from increased energy-related prices under an emissions cap. But energy efficiency programs should not be viewed as a substitute for rebates as a means of addressing the impact of climate change legislation on consumers' budgets. Cost-effective investments in energy efficiency can contain cap-and-trade costs but the need for consumer assistance will remain.

Recent analyses offer an encouraging assessment of the potential of energy efficiency to reduce energy use and contain cap-and-trade costs, but they also point to the challenge of finding ways to achieve those efficiencies.¹⁰ For example, Resources for the Future researchers examining the efficiency and distributional effects on households of a range of climate policy options concluded that a policy that would invest in energy efficiency "is one of the most progressive we examined and would lead to lower allowance prices... however, the implementation of this kind of policy is one of the most problematic of any that we consider."¹¹ That is because, according to RFF, it is "unclear" whether the direct investment of emissions allowance value could overcome the persistent barriers that now impede the adoption of cost-effective energy efficiency improvements, "and indeed what institutions could be employed to achieve this result."¹² In other words, both the promise of energy efficiency and the challenge of achieving that promise on a very large scale are great.

To the extent that measures to encourage or require cost-effective investments in economic efficiency can reduce the overall demand for energy, they can lower the costs of meeting the emissions cap and hold down the allowance price, thereby limiting the size of the hit to consumers' pocketbooks. But as long as emissions allowances have a significant value, that hit will not be eliminated and direct consumer relief will be warranted.

If the gains from efficiency investments are broad-based throughout the economy, the aggregate hit to consumers will be lower than it would be without those efficiency gains, but the low-income share of the hit would not necessarily change much. In other words, if a certain percentage of the allowance value would be appropriate for offsetting the hit to low-income consumers when the allowance price is \$30 per ton of carbon-dioxide, the same percentage would be appropriate if broad-based efficiency investments lowered the price to \$20 per ton for the same aggregate emissions reductions. The hit to consumers' budgets would be smaller across-the-board, but the low-income share would be the same.

Energy efficiency efforts that achieve across-the-board reductions thus do not change the percentage of allowances needed to provide relief to low-and moderate-income households. But what about efficiency investments like weatherization assistance targeted specifically at that group?

In principle, such investments could over time reduce the aggregate carbon footprint of the low-income population relative to the population in general and reduce the percentage of allowances that would be required to provide adequate low-income protection. In practice, however, there are two significant problems.

First, existing weatherization and other energy efficiency programs have traditionally operated on a very small scale and would likely take many years to scale up to reach a substantial portion of the low-and moderate-income population. For example, until this year the Weatherization Assistance Program, which helps low-income households make their homes more energy efficient through measures such as better insulation, served only a few hundred thousand homes a year.¹³ The American Recovery and Reinvestment Act of 2009 (ARRA) provided a temporary injection of funds aimed at increasing the pace of weatherization to a million homes per year. But even if it is possible to ramp up to that pace cost-effectively and sustain it over many years, it would still take decades just to reach the 37 million low-income households that are eligible for LIHEAP assistance. In the meantime, many eligible households would continue to face high costs while waiting for their homes to be weatherized. Direct refunds, in contrast, can reach tens of millions of low-and moderate-income people immediately.

¹⁰ See McKinsey Global Energy and Materials, "Unlocking Energy Efficiency in the U.S. Economy, July 2009, http://www.mckinsey.com/client/service/electricpowernaturalgas/downloads/US_energy_efficiency_full_report.pdf;

¹¹ Dallas Burtraw, Rich Sweeney, and Margaret Walls, "The Incidence of U.S. Climate Policy: Where You Stand Depends on Where You Sit," RFF Discussion Paper 08-28, September 2008. <http://www.rff.org/rff/documents/rffdp-08-28.pdf>

¹² *Ibid.*

¹³ See the LIHEAP Annual Report to Congress for Federal Fiscal Year 2005.

Second, the energy efficiency programs most often discussed as a substitute for rebates are generally limited to home energy efficiency. Yet higher home energy costs account for less than half of the loss in household purchasing power that would be caused by an emissions cap. To provide full relief to households, the energy efficiency measures would have to be so effective as to compensate not only for the increased costs in home energy but also for the increase in the cost of gasoline and other products.

As a complement to direct refunds, energy efficiency investments can play a very valuable role in reducing the energy costs of those low-income households that have particularly high costs because they live in old poorly insulated houses or have old energy-inefficient appliances. That would reduce the percentage of households whose budget hit from climate legislation exceeds the amount of the relief they receive through the legislation. But energy efficiency investments would not reduce the need for direct refunds to offset the remaining costs for these households and for all the other low-income households who would still face higher costs for their home energy, gasoline, and the array of goods and services that use energy in their production or transportation to market.

USING UTILITY COMPANIES TO PROVIDE CONSUMER RELIEF

The most straightforward way to offset the impacts of a cap-and-trade system on consumers' budgets is for the government to sell the emissions allowances to the electricity generators, petroleum refiners, and other entities that are required to hold them in a cap-and-trade system and to refund the proceeds to consumers, or at least to refund enough of the proceeds to offset the increased costs that consumers up to certain income levels would bear.

The utility company approach embodied in the House bill and in the Kerry-Boxer bill just introduced takes a different tack and allocates a portion of the emissions allowances free to local utility companies. The local utilities, or LDCs, would not have a direct use for the allowances they were given, because they do not generate the electricity they distribute and thus don't themselves emit greenhouse gases. Instead, the utility companies would sell the allowances and use the proceeds to offset the higher prices they would have to pay under a cap-and-trade system for the electricity generated by their affiliates or that they purchase in the competitive wholesale market. State utility regulators would then have the task of making sure that LDCs used their valuable emissions allowances as intended to keep higher prices for fossil fuels from translating into higher utility bills.

Several considerations militate against using an LDC approach that is aimed at keeping customers' bills from increasing as the primary vehicle for consumer relief in climate change policy. Four concerns in particular, stand out.¹⁴

Such an approach would not offset the bulk of consumers' increased costs. As noted earlier in this testimony, increased utility bills would account for less than half of the impact of higher energy-related prices on consumers' budgets. Therefore, having LDCs suppress increases in utility bills would fall well short of restoring consumers' lost purchasing power due to the higher energy prices. This is even more true for middle-income households than it is for low-income ones. As one moves up the income scale, increases in costs for items other than home utility bills make up an increasing share of the impact of higher energy prices on families' budgets.

- State regulation of LDCs is uneven. Proponents of the LDC approach argue that LDCs are regulated utilities and will be required to use the allowances they are given to benefit consumers. In fact, the quality of state utility regulation is uneven across the country. The mere fact that utilities are regulated is not a guarantee that free allowances to LDCs will produce well-targeted and effective consumer relief everywhere. LDCs' ideas of what would be the best use of the allowances would not necessarily align with policymakers' goals. This problem would be lessened if Congress sets rules for how the LDCs are to use these funds, and the House bill and Kerry-Boxer dictate that they should be used for the benefit of ratepayers. Depending on the strength of the regulators in a state, however, some of the funds still might not be used in optimal fashion or might go for overhead or turn up in utility companies' bottom lines.
- This approach would cause prices for other forms of energy and energy-related products to rise more and would raise the overall cost of meeting the cap. Keep-

¹⁴ See Chad Stone, "Holding Down Increases in Utility Bills Is a Flawed Way to Protect Consumers While Fighting Global Warming," Center on Budget and Policy Priorities, June 3, 2009, and Chad Stone and Hannah Shaw, "Senate Can Strengthen Climate Legislation by Reducing Corporate Welfare and Boosting True Consumer Relief," Center on Budget and Policy Priorities, July 10, 2009.

ing utility bills low under a cap-and-trade system would blunt the “price signal” that an emissions cap is designed to send in order to encourage more efficient home (and other) energy consumption. It thus would keep electric and gas consumption higher than it otherwise would be. (This effect might be lessened by certain federal rules specifying how the LDCs are to deliver the consumer relief, but it would not be eliminated.¹⁵) Reductions in the use of other forms of energy would then have to be greater in order to produce total emissions reductions sufficiently large to comply with the overall emissions cap. The result would be a less cost-effective pattern of emissions reductions, higher allowance prices, and higher economy-wide costs.

A substantial share of the resources going to utilities to provide their customers relief from higher energy prices would instead go to business profits. The House bill and Kerry-Boxer stipulate that LDC relief should be delivered to ratepayer classes (residential, commercial, and industrial) in proportion to their energy use. That means that over 60 percent of the relief the bill would distribute through utilities would go to utilities’ business customers, not individual households. A Congressional Budget Office analysis concludes that businesses would retain this relief as added profit rather than pass it on to their customers in the form of lower prices for their products. The profits from lower utility bills for businesses would primarily benefit the high-income households who own or hold stock in the firms. About 63 percent of the allowance value given to utilities to benefit their business customers would ultimately go to the highest-income 20 percent of households, according to CBO.

From a distributional standpoint, the last concern is particularly serious. It is the main reason why the net hit to households in the richest 20 percent of the population shown in Figure 1 above is so modest compared with the hit to the middle 60 percent of the population. A different possibility is that business customers will in fact pass the relief they receive on to their customers. But this outcome is no better because it leads to the third problem identified above: a serious weakening of the price signal that raises allowance prices and the cost of meeting the cap.

The bottom line is that seeking to benefit consumers by giving emissions allowances free to LDCs to keep down their customers’ bills puts policymakers on the horns of a dilemma. If they structure the LDC relief for businesses so it focuses on the fixed part of firms’ utility bills as the House bill analyzed by CBO does, they will essentially be providing windfall profits—or corporate welfare—on a wide scale, with highly regressive results. If, instead, they try to require LDCs to provide relief on the variable portion of the bill (or if businesses respond only to their bottom-line utility costs), they will be blunting the incentive to reduce consumption, thereby causing prices for other energy-related products to climb further and raising the economic costs of combating global warming.

A better alternative exists. The Senate would be well-advised to scale back the LDC portion of the House bill—especially the large amount of the LDC relief earmarked for commercial and industrial users—and to devote the freed-up funds to direct consumer relief for moderate- and middle-income households to supplement the relief that the bill provides to low-income households. The LDC relief and other business protections in the House bill are scheduled to phase out between 2026 and 2030 but there are benefits to starting with a smaller allocation to begin with and phasing it out more quickly.

CONCLUSION

One of the key goals of an effective but fair climate policy is to ensure that the policies necessary to reduce greenhouse gas emissions do not increase the depth and extent of poverty by reducing the purchasing power of low-income households. The Waxman-Markley House bill provides that insurance with strong low-income protections. Together, the LDC relief and low-income refund ensure that the average low-income household is fully protected against the loss of purchasing power it would otherwise experience as a result of the policies necessary to meet the cap on greenhouse gas emissions. However, low-income households with particularly high energy costs and moderate-income households with incomes too high to qualify for the low-income refund are not fully protected. As the Senate moves forward with its deliberations it can strengthen the protection for those groups by supplementing the low-

¹⁵ Providing relief in the form of reductions in the fixed portion of utility bill charges, which the House bill and Kerry-Boxer encourage to the maximum extent practicable, preserves the price signal of higher rates in the variable portion of the bill to the maximum extent possible, but that effect is largely blunted if consumers look only at the bottom line of their bill, where they would not experience the “sticker shock” that could prompt changes in behavior.

income protection with some additional funding for LIHEAP and by extending eligibility for direct refunds farther up the income scale.

It is critical, however, that the relief provided to low-income households not be diluted. In other words, any direct relief for moderate-income households to supplement their LDC relief will need to come on top of the 15 percent allocation for direct low-income relief the House provides, rather than being taken out of it. Reducing the size of the low-income refund in order to provide direct relief farther up the income scale would mean that a greater portion of low-income households ended up with relief that failed to offset the full increase in energy costs they faced. Moreover, for those low-income people for whom even the current low-income refunds would fall short of offsetting their energy cost increases (because the cost increases they faced were well above the average), diluting the low-income refunds would cause their budgets to be squeezed even more. The result would be significantly more hardship, with the legislation pushing more families into poverty and making many of those who already are poor still poorer.

The CHAIRMAN. Thank you very much. You all have given us a lot of things to try to understand and ask questions about.

So let me start with a few questions. Dr. Metcalf, in your testimony, and I believe Dr. Ellerman did this too and maybe the others as well, there's a distinction made between the costs of reducing greenhouse gas emissions—that was the triangle in your figure there—and the revenues raised if permits are fully auctioned. There's a chart that—we had this hearing last week with the Congressional Research Service as one of the witnesses, and they presented a chart* as part of theirs, that this reflects. Basically, it's a chart that tries to distinguish between the compliance costs, being the lower sort of yellowish area and the allowance value, being that plus the maroon area there.

I guess what I'd be interested in knowing is where does this cost impact come out with regard to consumers? I mean, if we're saying that the costs of reducing greenhouse gas emissions is represented by the yellowish area on that chart and the total value of the allowances is substantially greater—I think you made reference to the fact that ultimately the burden falls on households of the system. Where do consumers come out in this?

Mr. METCALF. So that's a great question and a really important point. The yellow area there, if we look at the height there in 2012 at the left end, that corresponds to my triangle in the maroon area to my rectangle. So this is all being reflected in higher prices for goods and services, both the combination of the compliance costs and allowance value. It's showing up in higher prices for goods and services, higher prices for gasoline, for home heating oil, for all the adjustments that households make to adjust to the higher prices.

Some of this we capture in the form of the permit revenue, which we can then use to compensate people. But some of these real costs, these are the costs of, say, switching from coal-fired electricity to natural gas-fired electricity, or co-firing biomass with coal, or carbon capture and storage. These are the real costs of reducing carbon emissions that get embedded into the costs along with the permit price.

So the value of the permits can compensate us for some of those costs, but it doesn't compensate us for all. That part that it doesn't, that's the real cost to society.

* Graphic has been retained in committee files.

The CHAIRMAN. Dr. Ellerman, did you have any comment on this distinction between the cost of compliance and the value of the overall permits being generated as part of this system?

Mr. ELLERMAN. Yes. The point I would make, I think the cost, we can think of that as consumers pay both for the resources that will be diverted from other uses, let's say consumption, government, investment for abatement to reduce emissions. That will require some resources. That triangle represents those resources that are not available for other uses, but we've decided to use for reducing emissions.

The remainder, the rectangle, the scarcity rent allowance value, is essentially a transfer. It's not a subtraction from what's available for consumption, investment, and government, but it is a redistribution within that, which will all go to households, and there's some question as to what households. If it's given, for instance, in free allocation to corporations, if they're not cost regulated then it would go to shareholders first, government, others, all of these means of distribution.

If it's done for government expenditure, its savings, whoever works in those industries will derive some benefit from that. So I think one way to think about it is that that larger triangle, which is the subject of allocation, are really transfer payments and we need to pay attention to who the recipients are and who are the appropriate recipients and the appropriate uses of that extra value, which is not a subtraction from resources being used in the economy.

The CHAIRMAN. Am I accurate that—I think you made the point, Dr. Ellerman, that allocating allowances and auctioning allowances and allocating the money is essentially the same thing. Is there some efficiency, though, that is achieved by doing the latter of those, that is auctioning allowances and distributing money, rather than giving allowances itself? Is it a more refined way to achieve policy objectives, or is that not the case?

Mr. ELLERMAN. It depends on what we think corporations do with the allowances they receive and the extent to which they realize the opportunity costs. I realize I'm using some jargon here. But I think as a first approximation I'd say no, I don't think it makes any difference. What matters is who the recipients are, and whether—the usual economic arguments for efficiency have to do with rebating taxes, that Dr. Metcalf explained.

But I don't think there's any greater efficiency associated with auctioning per se than there is with free allowance.

The CHAIRMAN. Dr. Palmer, did you want to comment?

Mr. PALMER. I think it depends on who is receiving the free allocation. When allowances are freely distributed to generators that need them for compliance, then you're going to get this regional disparity in price impacts that I talked about, where folks who live in regions where electricity is sold in a market and it's been essentially deregulated will see the cost of using those allowances as they use them up to generate electricity in the prices they pay, but folks who live in regions where electricity prices are set by regulators won't see that effect. That's an issue both in terms of this regional disparity issue and also in terms of the incentives that folks in different regions are going to have to conserve electricity,

which is an important part of the compliance strategy to achieve our target.

The CHAIRMAN. Dr. Stone, did you want to comment?

Mr. STONE. Yes. I have a chart on the second page of my written testimony which is actually from Director Elmendorf, CBO Director Elmendorf's testimony last week before this committee. It's drawn from that. It's not his chart. What the chart illustrates is this question. The bottom yellow bars are by income group and over on the right for the economy as a whole, the costs imposed on the economy by putting a price on carbon. That's it doesn't matter whether you auction or give them away.

Subject to the qualifications that Dr. Palmer made, that doesn't change very much. The blue are the financial redistributions back to households out of the allowance value, and you have a lot of discretion over how that works. This shows what happens in the House bill according to CBO. But Dr. Metcalf showed some other possible distributional outcomes, which is the net difference between the costs and the benefits. That's the line.

So you have a lot of control over how the blue bars are distributed across income groups, but the costs are pretty much independent of what you do.

The CHAIRMAN. Senator Murkowski.

Senator MURKOWSKI. Thank you, Mr. Chairman.

Dr. Palmer, I want to go back to your discussion about the regional disparity, because I understand that with the House bill the EPA analysis on that basically showed that utilities in the coastal States get most of the free permits. In other portions or States, the Western, Midwest, and Southern States, they get a fraction of the permits that they need.

As we look at the impact throughout the Nation and the regional disparities, to use your terminology, the discussion gets really important. A State like mine, where our cost of living and our energy costs are already through the roof, the threat of something that would cause them to escalate further—when you're paying eight bucks a gallon for gas, you don't know how you're going to be able to go much higher.

One of the informal analyses that we've seen has suggested that the bill's direct cost per household in Alaska could be 22 times higher than that in New York. Many of the impact assistance programs that are contained in the House bill are based on population, so again that's not going to help us in a State like Alaska, where we have such a small population, and wouldn't account for the significant regional differences that we experience with the cost of living.

Is there any precedent out there to structure or some defensible way that we could build climate legislation that would account for this cost of living disparity that we have? How do we address something like that?

Mr. PALMER. That's a very good question. When prices for energy are so high, prices in and of themselves, one of the benefits of that is that the impact of controlling carbon and this price for carbon allowance is going to be the same everywhere. So the percentage increase on the price that you would face is actually probably smaller than in other places where prices are lower.

So therefore the impact is going to be differently felt according to that. But I think an important thing about local distribution company allocation that is talked about in H.R. 2454 is that if you move away from that approach, which really focuses on electricity consumption per se, if you've got, like in a rural State where there's a lot of energy consumption that's related to other activities, such as driving or the cost of getting milk delivered to Alaska, for example, or other products—there's just a lot of transportation costs associated with distant States. I'm familiar with this because I grew up in northern Maine.

Moving away from something that focuses primarily on lowering people's electric bills to something that focuses on using allowance value to compensate households, so a greater shift to a cap and dividend approach, would be helpful in that regard because it would help address this different mix of consumption.

Senator MURKOWSKI. Yet your dividend that goes to each household would be the same in Alaska as New York, and if I'm paying eight bucks a gallon in Alaska and I'm paying two bucks in New York—

Mr. PALMER. Right.

Senator MURKOWSKI [continuing]. My dividend doesn't go as far as the New Yorker's dividend.

Mr. PALMER. That's a good point. You could restructure the dividend allocation to be based on some other metric, similarly to the way it's done in—

Senator MURKOWSKI. Is there precedent for that?

Mr. PALMER. No. That's a good question.

Senator MURKOWSKI. Do any of you have a response or are you aware of anything? Dr. Ellerman? Dr. Stone, I think you were ready to jump in.

Mr. STONE. It's difficult to do. In most Federal programs we don't. Certainly in the tax code we really don't have much in the way of that kind of specialized—we wouldn't have a specialized tax credit for people in different States. That's hard.

But I would harken back to an important point that Dr. Palmer made, which is if you focus on just one piece of the cost, whether it be electricity in some places or transportation in other places, you miss the fact that it's not all—that States don't get hit by all of the parts the same. So the regional disparity is less severe when you focus on the broad impacts than when you focus on any particular piece of the impact.

A lot of the impact is the indirect part, the fact that goods are transported to market and manufactured using energy. That's much more uniform across households and regions. So the extent of the regional variation can be exaggerated in discussions, although I wouldn't tell the Senate not to worry about it.

Senator MURKOWSKI. I don't want to be argumentative, and I want to get Dr. Metcalf's perspective on this. But in a State like mine where we don't have roads and you have one barge, that comes in the spring, and if you're lucky you get one in the fall and you're locked into whatever the fuel prices are in the lower 48 and you have those transportation costs, all things are not even.

Dr. Metcalf?

Mr. METCALF. It's hard to argue the fact that there is some regional disparity, particularly with States like Alaska and Hawaii that have very unique energy systems. The one cautionary note I would say, though, is that when—so one could certainly make regional adjustments. We have regional adjustments to the CPI. There are certainly ways to do this.

One caution, though, is that if you are not careful you begin to, with regional adjustments for the fact that in the Midwest we have more coal-fired electricity and therefore higher electricity prices and a higher impact in those Midwestern States, you run the risk of enshrining the carbon-intensive technology that we are actually trying to move away from.

So you face a real delicate balance here of how you can address fairness issues, regional fairness issues, with providing the right signal. Again, the key point is to provide—not to blunt the market signal by giving adjustments that somehow are reducing that price at the margin. I think that's what you want to try to avoid.

Senator MURKOWSKI. Thank you, Mr. Chairman.

The CHAIRMAN. Senator Dorgan.

Senator DORGAN. My understanding is that Senator Corker has to leave. I'd be happy to yield my time if I could be recognized following.

The CHAIRMAN. Senator Corker.

Senator CORKER. Thank you, and I very much appreciate that, and appreciate much of the thinking that you've brought to this.

Mr. Chairman, I want to tell you this is an excellent panel. I know we're not well attended today, but it's these details that are the essence of trying to figure out what policy will work and will not. I want to thank our witnesses. I think this is an outstanding panel.

Senator Bingaman and I visited the EU in 2007 and ever since that time, in the event we're going to have cap and trade, I have very much focused on cap and dividend, because what you see in these bills is using proceeds from cap and trade to either grow government—not about climate change, but to grow government—or to buy off—I hate to be so crass, but it's just a fact—to buy off various interest groups.

So the whole notion of this dividend is to me essential. Dr. Metcalf, the issue of trying to figure out how do you return the money back to people in an appropriate way is a key issue. In other words, if you're not going to let any of this money grow government and you really don't want to buy off interest groups through earmarks, you want to make sure the money doesn't leave consumers. You still have the price signal because carbon costs more. Then figuring out how to return it is a very, very important thing.

So I know you've talked about 15 percent going to low income groups, and then there's a notion of lowering a payroll tax. Would that combination work, giving 15 percent out to the lower income groups and then at the same time lowering payroll tax? What is an appropriate way of dealing with that?

Mr. METCALF. So the 15 percent referred to some of the LDC proposals and proposals in Waxman-Markey. My view all along has been that we should have 100 percent auctioning, with return of the revenue to make it revenue neutral, so we don't confound cli-

mate policy with debates over the appropriate size of government. I think we want to keep these distinct.

Senator CORKER. I think that is absolutely dead on. I thank you so much for saying that.

Mr. METCALF. A proposal that I describe in a different paper than the one underpinning my testimony today talked about using the revenue, the auction revenue, to lower the payroll tax in a way that provides some incentives for more work effort, for more labor supply, so we get some efficiency benefits, and it also helps to address some of the impacts on low income households, particularly if you combine it with some benefit, some augmenting of benefits.

So I think one of the advantages—one of the virtues of auctioning is that you don't run into this problem that has been described by other members of the committee, that once you have permits to give away in a sense you can start funding programs in a way that doesn't run through the normal appropriations process.

Senator CORKER. Those permits—and again, I wish there were—I hope there are a lot of people listening. Those permits are marketable securities that are equal to cash when one receives them. They can sell them. It's like receiving a share of IBM stock. People talk about—hopefully IBM stock. People talk about those as if they're free, of no value. But when that is received it is a marketable security, is that correct?

Mr. METCALF. Absolutely.

Senator CORKER. I very much appreciate your testimony and would look forward—and certainly, Dr. Stone, if you want to weigh in.

Mr. STONE. If I could. As the proponent of the 15 percent for low income, that actually is on a small scale, for low income folks, a direct refund like cap and dividend. So it's part of a cap and dividend. If you wanted to extend that farther up the income scale, you would build on it with a refundable tax credit of some sort or the payroll tax proposal that Dr. Metcalf has. Then people say what about seniors and vets. Then, you would add in direct payments like we did in the stimulus if you wanted to go the direct income payment route.

So the low income 15 percent allocation is actually in the spirit of cap and dividend.

Senator CORKER. I have numbers of questions and I know Senator Dorgan has given me time, so I'm not going to go over. I very much appreciate his courtesy.

I will say in general that if somehow the American people could trust and that those of us involved in this legislative process could trust that not one penny at the end of the day was going to leave consumers and either go into corporate pockets or government coffers, but 100 percent of that was going to be returned and we knew it was never going to be utilized as a source of funding additional size of government, I think it would go a long ways toward mitigating some of the contentiousness over this.

But when they see bills like we've seen from the House and now it's getting ready to be proposed in the Senate, where they realize, whether it's efficient or not—and I very much appreciate your academic presentation—it's still a tranference of wealth from one person to another that we are deciding. I think it's that huge distrust

that has done more damage to this debate than almost anything else.

With that, I'll stop. Thank you, Mr. Chairman.

The CHAIRMAN. Senator Dorgan.

Senator DORGAN. Mr. Chairman, thank you.

The issue of efficiency is a really interesting concept. Obviously, when you strive to accomplish a goal you wish to do it with the greatest efficiency. On the other hand, the issue of efficiency in many cases would ignore the regional impacts that could be very, very substantial. If you come from a region of the country where a substantial amount of coal is used to produce electricity, you will have a much more significant burden under almost any scenario, than other regions of the country that do not use a large amount of coal. So should we just say efficiency matters and that's the priority and it doesn't matter what the impact is? The answer to that would clearly be no.

I wrote down the phrase "enshrining carbon-based technologies." That's what you said, Dr. Metcalf. The issue here is how do you reduce the emission of CO₂ and do it in a way that doesn't cause chaos in the country. How do you do it from the standpoint of economics or the financial circumstances of a family who is out there purchasing energy?

We in North Dakota, for example, use exactly twice as much fuel as the average New Yorker does. It's not because we just drive around all day just for fun with our arm out the window. It's because we have to drive twice as far to get parts for the combine, or to go to the next town, and so on.

So the impact of somebody saying we're going to increase fuel prices evenly would create twice the burden on the North Dakota citizen than on the citizen of New York. I point that out because I think that this is really critical in trying to construct something, to understand where are the dislocations and whatelse you need to be addressing, in addition to people with low income.

Dr. Metcalf, if you were to construct a system here for reducing carbon, considering all the factors—efficiency and so on—what kind of a system would you construct? Would you construct a cap and trade system or a carbon fee? How would you approach it?

Mr. METCALF. My first preference would be a carbon charge approach, carbon fee. I think it's the simpler approach. It's fairly straightforward, setting a price. I think this is really what we want to focus on. We avoid the risk of fluctuations in price. Price fluctuations are what cause economic uncertainty and costs of adjustment for firms.

As I've said elsewhere, I would use that revenue—I would look at lowering other taxes in a way that provided some distributional benefits as well as efficiency benefits, and cutting the payroll tax with a capped cut in the payroll tax is a way to do that.

Now, just one comment on the regional issue. Work I've done with colleagues has shown that if we look at the increase in prices of goods and services, while it's true that North Dakota drivers drive a lot because it's a big State, a rural State, if you look at the overall impact of carbon pricing, taking into account all the impacts—heating, driving, cost of goods and services—the regional impacts if we look at the spending side are really not that large.

So that you get perhaps bigger impacts in one area, but lower impacts in another.

So I think we need to be careful not to overstate the regional differences. We don't want to understate it, either. But I think that that is perhaps not as large as it appears.

Senator DORGAN. Obviously we'll look at the specifics on the regional impacts of a carbon fee. My understanding is that some of these impacts can be very substantial.

I agree with you that a carbon fee is a much more straightforward approach. It is also true that you probably get less efficiency with a carbon fee. It's also true that with a carbon fee you have more price certainty than with a cap and trade on the, quote, "trade side," unquote. It's very hard to know exactly where a carbon market moves unless you establish a price collar, which itself is an admission that you've got a problem with having this be a cork that floats on the issue of whatever the free market system decides or however much speculators want to be involved.

So I feel that a much more straightforward approach would be a carbon fee and also accompanying that with a dividend. The question then is how would you structure the dividend so that you try to prevent the substantial dislocations that could exist.

The other question then outside of that is, if your dividend moves most of the revenue back to the American people, which I would want to do, then how do you raise the funding that is necessary for the research and technology to decarbonize the use of coal, just as one example, which I think is going to require a lot of money? I'm more inclined to support a very minimal windfall charge, which some have suggested could at a very low percentage, raise a substantial amount of money over a 10-year period or so.

But I do think that we should be appropriating that money. As an appropriator, I would come down favoring this approach.

But let me ask Dr. Ellerman. You heard Dr. Metcalf talk about a carbon fee and then his notion of distribution. Your reaction to that?

Mr. ELLERMAN. With respect to the tax versus the cap and trade, I think these can be made very largely equivalent. There is a difference in where the price is fixed or whether it varies and whether—the alternatives is whether the emissions are fixed and limited or whether they vary, as they do under the tax. That's a well known point.

I am less worried about the variability of the price. I think we face that in all sorts of things, like oil, a variety of commodities, wheat, you name it. We deal with prices and there are mechanisms to deal with those instabilities.

So I think—and there aren't any proposals—the name of the game in town seems to be cap and trade. Fine. We could do a tax system. Let someone come forward and do that, put that forward. We haven't seen it.

I think on the distributional point, I think this is the real essence. It is interesting, I think, to think of a moment of—emphasis here has been very much on going back to households in some manner and then how do you balance these income differences, regional, industry type differences. I think it's worth noting that in the legislation that we have sort of under consideration or that has

been considered in the House, as well, and is fairly similar to that which has been proposed in the Senate by Senators Kerry and Boxer, that there are several ways to try to deal with this.

One, you have the sort of per capita rebate that kicks in at a later period and goes to all households straight. You have the low income one that starts from the beginning, and that is aimed at dealing with the regressivity of energy prices and helping low income. My understanding of the LDC fix, the distribution to local distribution companies, is an attempt to deal with regional inequities. I would agree with the qualifications that Karen Palmer has brought up on that, but I think that—and whether they have the right balance, how you deal with these differential fuel price or gasoline consumption issues, there are many different ways in which you can try to do that.

But the basic notion there is the LDC to deal with regional problems, particularly with respect to coal use, the low income assistance for regressivity, and the rest per capita, all households getting their rebate.

Senator DORGAN. Mr. Chairman, my time has expired. Can I just in 30 seconds say that I appreciate my colleague's forbearance. Despite the fact we're talking about climate change legislation, either by a cap and trade or a carbon fee and climate change, my desire would be—and I've spoken on the floor several times about this—that we take the energy bill that we passed in this committee in June to the floor and pass it before we address climate change legislation. This committee's energy legislation moves significantly in the direction of addressing climate change, maximizing renewables, creating a national RES, building efficiency, all the things you would do to try to address climate change.

It has been reported because of my floor speeches that I don't support addressing climate change. That's not the case at all. I believe we ought to do it in two steps. First, take up the energy bill that has passed this committee, which I think has a lot to commend in the way of addressing climate change, and pass that. Second, the Senate should move to a climate change bill. But I don't think that's going to happen this year in any event. That's my own view. So I hope we don't end the year without taking up the Senate energy bill that we passed out of this committee, which I think addresses climate change in a very significant way.

The CHAIRMAN. Thank you very much.

Senator Bunning.

Senator BUNNING. Thank you, Mr. Chairman.

Dr. Ellerman, the allowance allocation formula in the House-passed Waxman-Markey bill calls for a 50-50 average formulation, based half on retail electricity sales and half on carbon-weighted electricity sales. Do you agree that this puts high carbon intense States, like my home State of Kentucky, at a severe disadvantage?

Mr. ELLERMAN. I hesitate on the severe disadvantage. I think 50-50 strikes me as—

Senator BUNNING. Let's just compare it to New York, California, and other States that would profit.

Mr. ELLERMAN. It will be at a disadvantage compared to what would be a 100 allocation according to emissions or, let's say, the emissions—

Senator BUNNING. If it were one or the other.

Mr. ELLERMAN. Right, if it were one or the other. You can go anywhere from 100 percent one to the other and mix it.

Senator BUNNING. You could just do a carbon tax and that would hit everybody in every State equally, I would hope.

Mr. ELLERMAN. No. Let's say the cost of the allowances is going to hit households equally in all States. The question on the LDC formula is the rebate that comes back to consumers.

Senator BUNNING. That's the big enchilada.

Mr. ELLERMAN. That's right and that could be—whether 50–50 is the right number is—

Senator BUNNING. We happen in Kentucky to think it's not the right number, and I can tell you people from Wyoming and my good friend from South Dakota and Illinois and Indiana and Ohio think that that's the wrong number. We would have a much better chance of passing the energy bill that we passed out of this committee a long time ago and get that done and get on with some type of cap and tax or cap and trade, whatever you want to call it.

The goal of allocating allowances is to help transition carbon-intensive sources under a cap and trade system to this system, while also reducing the impact of increased cost to consumers. Is this correct?

Mr. ELLERMAN. Of the transition assistance—consumers in some form—or let's say households in some form are going to receive all of this money. It's going to come back to households. There's no one else to receive it. They may be shareholders.

Senator BUNNING. Present.

Mr. ELLERMAN. Present and future, and future.

Senator BUNNING. We haven't written the final bill yet.

Mr. ELLERMAN. That's right. No, but I mean whatever the bill and the provisions, my general point would be households will be the recipients of this.

There are legitimate transitional provisions which we see in the currently proposed bills, which are phasing out over time. I think those are intended to deal with that. Now, that grants on the interim additional allowance value to particular industries, particular activities, renewable energy, coal carbon capture and sequestration, energy R&D, whatever happens to be the designated purpose.

I'm a believer that you are the people who need to decide that.

Senator BUNNING. I agree with you, but my biggest problem is singling out individual States that will be so disadvantaged—Utah, Kentucky, South Dakota, and many others—if in fact the Waxman-Markey bill is passed as presently constructed.

Dr. Metcalf, is cap and trade—would you call it a regressive energy tax?

Mr. METCALF. Any form of carbon pricing, whether it's cap and trade or a carbon charge, any of these approaches that raises the price of carbon by itself is going to be regressive. But what's important to consider is the net impact, which takes into account the use of the revenues or the value of the scarcity rent.

Senator BUNNING. If my good friend Senator Corker—if that is the case, in his formula for returning the money and making sure

it doesn't go anywhere but to the consumer, then I don't think it's regressive.

Mr. METCALF. So the two points I'd make, as I demonstrate or discuss in my written testimony, a cap and dividend approach, auction all the permits, 100 percent of the permits, and return them all through a dividend; then that would be quite progressive.

On the other hand, with a free allocation of permits to industry, to the covered sector, as has been done in previous cap and trade programs, that would be sharply regressive, because those benefits would go to the shareholders, who tend to be higher income households.

Senator BUNNING. Thank you.

I'm just at the end, but I have a question for Dr. Stone.

The CHAIRMAN. Go on.

Senator BUNNING. In your testimony you described the relief provision provided to low income households in Markey-Waxman through the supplemental nutrition assistance program and expanding the earned income tax credit. Both of these proposals target a specific segment of low income households; is that correct?

Mr. STONE. Senator, actually the combination very broadly covers low income households.

Senator BUNNING. Let me follow up, then. If that is the goal, if the goal is to provide relief to energy consumers that are most affected by increased energy costs, these proposals will not affect those workers as they are energy consumers, but are not qualified under EITC whether they are part-time employees or whether they're unemployed; is that correct?

Mr. METCALF. The very low income population, the bottom 20 percent of the population that the low income proposal is aimed at, they have incomes that will qualify them to get the benefits through the electronic benefit transfer system. It's not an increase in food stamps. It's using the same mechanism that we use for food stamps to deliver the benefit.

Senator BUNNING. Will it not also affect middle class consumers?

Mr. METCALF. The Waxman-Markey bill does not have provisions for direct refunds to middle class consumers. It does it through the LDC allocation, which we've had some criticism about.

Senator BUNNING. OK. Thank you.

The CHAIRMAN. Senator Bennett.

Senator BENNETT. Thank you very much, Mr. Chairman.

I apologize to the panel for having been required at another committee so that I didn't hear the testimony directly. But I've enjoyed the questioning and the answers. My overall reaction is that Rube Goldberg is still alive and well and dwelling in the House of Representatives.

This is an incredible mess. We're talking about taking money from people in an effort to cure the planet. We're going to spend some of that money, clearly, in ways that produce no new tangible economic benefit, because it costs money to sequester carbon and there's no impact on quality of living, on the standard of living. It costs money to do the kinds of things you're talking about, and that money will be spent, but the standard of living will stay the same.

We say it's worth spending that money because it will save the planet. But somehow there's going to be more money than that that

is spent in the actual costs of remediating carbon, that will be available to be distributed in some way because we're creating this system. Trying to follow the threads of where it will come from and where it will go and who will be disadvantaged and how the government will step in and see that this person is made whole and this entity is made whole and this entity is punished for depending on coal, and this group is benefited for depending on natural gas, becomes an incredible mess.

As I sit here and listen to all of this, it just becomes mind-boggling to figure out how in the world is this all going to work. So it seems to me, Dr. Metcalf, I'm glad to hear your comment. If indeed our whole purpose in doing this is to cause people to emit less carbon, let's put a tax on it that is dependable, that will not turn into credit default swaps, because if you think the speculation that went on in the securitization of mortgages produced a mess, look at the speculation that's going to go on in the securitization of these swaps and these alternatives. These will be sliced and diced and traded all over the world and speculated on.

Why don't you just say, let's put in a tax, let's let the marketplace reward those people who avoid the tax by getting more efficient with respect to carbon, and punish the people who pay the tax by continuing to emit too much carbon, and let the whole problem solve itself?

Now, tell me why I'm off base with that reaction? That's my visceral response as I listen to all of this here this morning, that how in the world are we going to make any of this make any sense? Yes, sir.

Mr. METCALF. You've laid out a number of good points. I have been a forceful advocate over time for a carbon charge approach, as opposed to cap and trade. But let me just speak—as someone who does support that, let me just speak up in defense of cap and trade in the following sense: that you have an opportunity to write a cap and trade legislation that incorporates many of the advantages of a tax-based approach, that is simple and transparent.

It really has to do with what you decide to do with the permits, with the revenue from permits. So step one, by auctioning all of the permits you avoid a lot of the Rube Goldberg structure because you're not giving this group some permits and that group some permits. Then the issue then comes down to what are we going to do with the revenue, which is a distributional question. Then you can do this in as transparent a fashion as you could with a carbon tax.

So if we are locked into the road of cap and trade, then I implore you to construct a system that is simple and transparent, and it can certainly be done.

Senator BENNETT. Dr. Palmer.

Mr. PALMER. Another advantage that folks here have pointed out today of a carbon fee or tax approach is there is more certainty about what the cost is going to be. So it's helpful for planning for corporations. I think you can bring that feature to a cap and trade program as well by introducing a price collar approach, where, for example, if you followed Dr. Metcalf's recommendation that 100 percent of the allowances be auctioned off, and I think that would be ideal, then you could impose the floor part of the price collar, the price, minimum price, through a reservation price or reserve

price in an allowance auction. They have a feature like that in the regional greenhouse gas initiative allowance auctions that they have.

You could also have a price ceiling as well, and that would help to add to the cost certainty.

Senator BENNETT. To the complexity.

Mr. PALMER. It would add to the complexity, but having—

Senator BENNETT. I'm sorry.

Dr. Ellerman.

Mr. ELLERMAN. Yes. I'd make the one point, for the attractions of a tax, which you laid out some of them, it still doesn't address the problem of what do you do with the tax revenues. That problem remains with a tax and it has to be dealt with. It can't be avoided. It is exactly the same problem that you deal with—that is the subject of this hearing, which is what to do with the allowance allocation and the revenues, if you want to put it in those terms, or the value that's created by those allowances. I don't think a tax avoids that problem. You'll have exactly the same problem.

Senator BENNETT. I understand that.

Mr. Stone.

Mr. STONE. If we come to have a 1986 tax reform moment and we all of a sudden say, this is all too complicated, let's revisit, I think a lot of what the revisiting would be about was what Dr. Metcalf was talking about, is simplifying and talking about how you use the allocation. The difference between a carbon tax and cap and trade, especially if you have some limits on the fluctuations in the price in the cap and trade system, really turn out not to be that important. What really matters is what you do with the allowance value or the tax revenue that you collect.

Senator BENNETT. Seeing as how we're sitting on a \$79 trillion unfunded liability for Medicaid—or Medicare, I can think of a way, of someplace to put the revenue.

Mr. STONE. Deficit reduction is another way.

Senator BENNETT. My time has gone. My frustration as I listen to this whole thing just spills over, because I think we have fallen in love, Dr. Metcalf, with the idea of cap and trade is the way to solve this. Now we keep running into problems and as we run into problems, well, we'll solve this this way. We solve this that way, and I end as I began: Rube Goldberg is alive and well in the way this whole thing keeps getting bigger and more complex, and ultimately raises the question of why are we doing this.

Thank you, Mr. Chairman. I apologize for the emotion here, but it gets pretty hard when I try to figure out why some of this makes sense.

The CHAIRMAN. We're glad we could have this hearing to clear up all these matters in your mind.

Senator CANTWELL.

Senator CANTWELL. Thank you, Mr. Chairman.

I understand the Senator from Utah's frustration, but I think all the witnesses here actually, even though you have different philosophies and different approaches to the climate issue, I think are all more or less supporting more of a cap and dividend approach. Is that correct, something that would basically set a price or limit, but then distribute money back to consumers. Is that correct?

Mr. STONE. With a modification. We certainly at the Center on Budget think that direct refunds to households rather than an approach based on utilities and things like that is the way to go. We think there also are—

Senator CANTWELL. Because the utilities don't necessarily translate all that back to the consumer?

Mr. STONE. Yes, especially the part going to business customers, it's very uncertain how that's going to play out, yes.

But we recognize that there are some legitimate other policies, investments—the parts that in your bill you would go through the authorization and appropriations process to fund. So that a 100 percent refund of dividends squeezes out all those other possibilities. So that would be the caveat.

Senator CANTWELL. Dr. Palmer.

Mr. PALMER. I would agree with a lot of what Chad had to say, that there are important market failures related to research and development and things that we need to do to move forward new technologies that, while putting a price on carbon will hopefully help substantially in that regard, it still may be necessary to provide additional funding for research and development.

There could also be opportunities on the energy efficiency front. I think there's a lot of uncertainty there. We've seen a lot of studies that suggest that there are all these free energy savings that people aren't taking advantage of. But an important part of getting ready to find ways to take advantage of that is to try and understand better what will work. I know in the regional greenhouse gas initiative they're using a lot of their allowance revenues, some States, most of them, to fund energy efficiency, and it would be important to learn from those efforts what types of programs work and what don't.

Senator CANTWELL. Dr. Gilbert, a more transparent, elegant process, giving money back to consumers and keeping them whole?

Mr. METCALF. I've talked in previous research about using proceeds to reduce the payroll tax so that we get some incentives in labor supply. I think there is some need for spending to support pure research and development.

I also think there are some very low-cost things that ought to be looked at in terms of making energy prices more transparent to consumers. So things as simple as having washing machines that have a green, yellow, and red light that will be a green light when energy prices, when the cost of generating electricity is low, and red when they're high; things that allow consumers to respond to prices that they can't do currently.

I would say that the stimulus package that was passed earlier this year has a lot of money in there for energy efficiency. So I would be cautious about putting more money into the hopper until we're sure that we can spend that money effectively.

Senator CANTWELL. But sending a price signal and then giving the consumer something, both information and ability to mitigate and cushion, is a good idea?

Mr. METCALF. Yes, absolutely.

Senator CANTWELL. Thank you.

Dr. Ellerman, did you want to add anything to that? Are you on the cap and dividend approach?

Mr. ELLERMAN. Yes. I think we need to keep in mind the fundamental objective here is to put a price on greenhouse gas emissions in order to limit them. My personal preference is cap and dividend. It's simple, elegant in many ways. But I also recognize there are political realities and much of this has been brought out. So I think the notion, whatever transition—my basic philosophy would be whatever it takes to get a price on carbon at the level you will decide and such.

I think the key point is whatever transitional assistance that we should avoid what could be—what Senator Murkowski described as decade-long earmarks. They can be phased out over time and ultimately it should in some proportion go to consumers and households according to regions, income. Those need to be decided.

Senator CANTWELL. I think that, Dr. Ellerman, I think that the politics here is that there's people on both sides of the aisle on this committee who think that the shenanigans that has preceded this is just not going to be tolerated when it comes to cap and dividend or a cap and trade bill. I'm not going to tolerate it and I'm sure my colleagues aren't, either.

We can't just continue to have the notion that some trading regime is going to like magically work and that carbon futures, as my colleague was saying, is going to be cut up into tranches, as they already are being done in Europe today, carbon futures, and then traded around, and the mystery of all of this driving up the price. We already know what it's done to oil. I don't think we need to have it done to carbon futures.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Senator BARRASSO.

Senator BARRASSO. Thank you, Mr. Chairman. I appreciate all of the witnesses and their testimony.

Last week we were here in the same hearing room and the Congressional Budget Director, Doug Elmendorf, was here testifying to this committee and he said that the House-passed global warming bill will slow economic growth in the next decade, actually in the next few decades, he said, and cause significant job losses in the fossil fuel industry. He said there is going to be a lag between when the changes happen to the fossil fuel industry and then the green jobs may come, but there's going to be a lag and there's going to be significant drag on the economy, a reduction in the gross domestic product.

Also, the Environmental Protection Agency has testified that drastic CO₂ emissions cutbacks made in the U.S. are virtually worthless if the developing nations of China and India do not do anything to cut their own emissions.

So as we look at the impact, the potential impact on the communities—and certainly I'm from a State in Wyoming where we have significant amounts of fossil fuels, the coal capital of the world, where half of the electricity in the United States comes from coal—if Congress is going to pass this massive energy tax, which I view it as, a large unfunded mandate, what's the government's responsibility? I'm going to ask each of you: What would you think the Federal Government's responsibility is in terms of paying for the losses that are going to happen in the communities, for police officers, for

teachers, for the different services in the communities, to help fix the roof on the hospital? What is going to be the Federal Government's obligation to help these individuals in these communities who are now dependent on the jobs of fossil fuel and helping this Nation's economy?

So if we would start with Dr. Ellerman and maybe work our way down through the panel.

Mr. ELLERMAN. I would reiterate the point I just made on the transition assistance. I think there is a legitimate political argument for that. This will have impacts. The people who are impacted by it should be assisted in adjusting to the new price relationships and the new economy. You know best how to do this in different ways, but I think the basic point that some transition assistance is needed. It doesn't need to be the decade-long earmark, but that that assistance is needed, I take that as a given.

That can be done by auction revenues. It can be done by free allocation.

Senator BARRASSO. Dr. Metcalf.

Mr. METCALF. I think temporary transition assistance is certainly something that could be on the table. But I do want to point out, though, that the various studies, including the ones that Doug Elmendorf referenced, are talking about reductions looking ahead 10, 15 years, are reductions in GDP relative to where we would be in a no-policy world. In that world we're still seeing growth in GDP. It's just not growing quite as rapidly as it would in the absence of policy.

The other thing I'd note is that, as well as costs, there are also benefits. We're going to see increased demand for natural gas in the short term. This is going to be a transition fuel, and we're seeing a lot of development of natural gas in western States.

We're also going to see greater demand for wind and solar. So I think there are some opportunities as well as costs. So what I think States need to be looking at are how to take advantage of the opportunities as well as react to the costs.

Senator BARRASSO. Dr. Palmer. Just before you do, last week we heard at this table—when I asked specific questions about natural gas, they don't agree with what we just heard here in this testimony, that there is the question about whether it was independent and how it all played out. So there was no clarity on what the future was going to be on natural gas.

Yes?

Mr. PALMER. I think an important thing to keep in mind about all the studies that were presented last week is they were looking at a baseline where there isn't an alternative approach to regulating CO₂. I think one of the virtues of this debate that's going on in the Senate is that the alternative is not the no-CO₂ policy scenario that all these folks are comparing to, but that the EPA might go ahead and actually under its authority now regulate CO₂ using the Clean Air Act.

Most people expect that when that occurs, that the prices or the costs introduced by that approach to regulation will be substantially higher than the types of approaches that we're looking at here. So I think it's important to keep that in mind.

Senator BARRASSO. It's going to generate a lot of suits as well if they do that using their 25,000 tons as opposed to the hundredth of that for emissions which the law currently calls for, as they try to define it a little differently and tweak out several groups.

Dr. Stone.

Mr. STONE. Yes, thank you. We're talking about a situation in which we're going to be transforming or changing the composition of how we produce goods and services, moving from—moving toward more clean energy and other ways of doing things.

That does impose transition costs, as Director Elmendorf said. But I want to reiterate what Dr. Metcalf said, which is these costs to GDP are really quite small. We're talking about off of a much higher level standard of living in the future when they occur than we are talking about now. So it is important to have transition assistance and it's important to help encourage the transition into the sectors that will play a bigger role in the economy.

If we look at the United States over the 20th century and the beginning of the 21st century, the economy in 1999 does not look at all like the economy in 1959 or the economy in 1909. There's been lots and lots of changes in the sectoral composition of what we're producing, without leading to losses of jobs that are permanent over the long run.

It absolutely matters to pay attention to short-term adjustments and to ease those transitions. But it's not necessarily a long-run problem.

Senator BARRASSO. Thank you.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much.

Let me ask another few questions here. Dr. Palmer, here's a quotation from your testimony. You say: "In regions with deregulated generation markets, the value of emissions allowances used to produce electricity will be reflected in the electricity price even if they were received for free." Now, that's what happened in Europe in the first phase as I understand it to a great extent.

Dr. Ellerman, you've made a real study of this. Many of the rest of you may have as well. But I'd first ask Dr. Ellerman, do we have in the House-passed legislation protections against the value of these allowances essentially being factored in by utilities as a justification for raising electricity rates, even when they're freely allocated?

Mr. ELLERMAN. I think the short answer is it depends on what 50 public utility commissions decide to do. The intention is clearly to do that, and there is a question of how to refund the money to consumers without affecting the price of electricity. So you could imagine it as lower electricity bills or you could imagine simply an annual check that is sent to the local distribution company, that consumers pay the prices they would pay for the carbon and the carbon revenues collected by the local distribution company are simply sent to the household. That would avoid those.

But I think if 50 public utility commissions indeed do what is instructed and what is intended by the House provision, then I think it would avoid that.

The CHAIRMAN. Let me just ask Dr. Palmer. My understanding is that that would be the case, obviously, with regulated utilities,

where the charges they can charge are set by the public utility companies, but in a deregulated setting you're saying that the cost of electricity is going to go up. The more free allowances the utility gets, the higher they will raise the electric rates or the electric price; is that a correct understanding of what you're saying or not?

Mr. PALMER. Not so much that the more free allowances that they get, but that every time they produce a megawatt hour of electricity using fossil fuel they have to basically consume some allowances. Even if they got those allowances for free, they're making a choice when they produce the electricity between selling the electricity at a price that compensates them for using that allowance or selling the allowance.

So they are going to bid into the market for electricity a price that compensates them for using that allowance, whereas in the bill, where allowances are being allocated to distributors, that's a separate consideration because they don't really have a compliance obligation. But there is an important role in that case that the public utility commissions will play in determining exactly how that value gets allocated back to consumers.

I would argue that it's very difficult to expect that the public utility commissions will do that in a way that doesn't end up influencing the price that consumers perceive themselves to be paying for electricity.

The CHAIRMAN. Dr. Metcalf, did you have any views on this issue?

Mr. METCALF. Just that it is critical that we avoid a situation where consumers are under the impression that the price of electricity is going down because of this rebate of revenue which is being given to deal with the regional disparities, as Dr. Ellerman pointed out. Even if it's put on the bill in big red letters saying "This is money you're getting back that is not affected by how much electricity you consume," I think people just look at the bottom line of their bill and say, what's the amount of the check I need to write. So it's very easy for them to be confused by this, and this drives up the cost of cap and trade if we do that.

The CHAIRMAN. So you're back to the issue of how we design the rebate, and it needs to be a lump sum rebate?

Mr. METCALF. If you're going to do an LDC—if you're going to do rebates through the LDC, I think, as Denny pointed out, it would be better to keep it separate from the utility bill, through say quarterly checks from the LDCs rather than embedding it into the bill.

The CHAIRMAN. OK. Let me call on Senator Murkowski for questions.

Senator MURKOWSKI. I'm mulling over that last statement, because in Alaska we have a dividend system. We have our Permanent Fund dividend. We receive an annual check from the State. It comes from the revenues that are derived from our oil resource up north.

I wish that I could tell you that every Alaskan who receives a Permanent Fund dividend understands and appreciates where that money has come from. There's not a nexus between where this revenue was derived from and the fact that it's now in my hand or in my bank account.

So the suggestion that we need to separate the dividend checks from the utilities, I'm following you there. But if it is an annual check or a quarterly check that comes to the American public, I'm not convinced that they appreciate that this is your dividend that is coming to you because of this cap and trade, cap and dividend approach that we have.

You have said several times here this morning, Dr. Metcalf, that simpler is better. I think I've heard it from all of you. There have been some suggestions about how we can be more transparent with this, but I'm not as verbal as my colleague here in expressing the frustration with the complexity of it, but I think we all acknowledge that as simple as we want to try to make it, this is a very complicated initiative.

Senator Cantwell is working on a cap and dividend type of approach. Her proposal is shorter by hundreds of pages than anybody else I've seen, and it's still very complicated.

Is there really any way to make any form of a cap and dividend, cap and trade program truly transparent, truly simple and understandable and free from the prospect of manipulation, as Senator Cantwell has mentioned? Is it possible?

Dr. Ellerman.

Mr. ELLERMAN. Yes, I think it's possible. I think that market manipulation is a separate issue from the allocations. That is in how the market behaves, how it would be regulated, and that would be sort of a separate subject. But I think the allocation, the let's say complexity of the issue, resides in I think the difficulty of the many different impacts that this has and how you have to deal with them politically.

I don't think there is a simple answer. I would, for instance, make the comment to Senator Bennett that Rube Goldberg is also alive and well in the tax code, and a tax solution will not simplify the problem from the standpoint of what you do with the revenue that's collected, as you have in the allowance case.

So I don't think there is a simple solution. One elegant, simple one is just take all the money and give it back to households equally. But that doesn't address your issue that you raised. It doesn't address the issues that were raised by the gentlemen from Kentucky and Utah, or the low income issue cited by Dr. Stone and others.

So I think it is going to be more complex. Nor does it address the transitional issues that are inevitably going to accompany the program. So how you mix all this together—I think it's the nature of the beast is that it is going to be complicated.

Senator MURKOWSKI. Thank you, Mr. Chairman and thank all the witnesses. I appreciate the comments and the assistance this morning.

The CHAIRMAN. Senator Bunning.

Senator BUNNING. Just a couple questions. I want to make sure that I understand the exact reason that we're going to go to a cap and trade system. It's my understanding that if China and India and Russia, those three countries, do not sign on to a global agreement of some sort, that 20 years from now we will have more emissions and more pollutants in the air than we have presently.

So the United States has been tasked by certain people with leading the reduction of carbon emissions in their energy production. Why is the United States going to punish their economy and 20 years from now we have got more pollutants in the air if we did nothing?

Go right ahead, anybody?

Mr. METCALF. A couple of brief comments. This is an international problem and it requires international action.

Senator BUNNING. Good. I agree 100 percent.

Mr. METCALF. So I view the action that the United States takes by passing a bill as a first mover action to take the lead to begin to break the impasse. We can't—

Senator BUNNING. No, you've got to let me in, because—

Mr. METCALF. I would say that China is—

Senator BUNNING. Our Secretary of State has asked that question of the Indian foreign minister and of the China foreign minister on energy and got exactly an N-O answer: We are not going to do this in China and we are not going to do it in India presently.

Mr. METCALF. We have to be careful as to what they're saying they are and are not going to do, because they're not going to—China is actually taking considerable action to reduce emissions in the auto industry and in the utility—

Senator BUNNING. Is that why China is going to open up 94 new coal-fired generating plants—

Mr. METCALF. It's a fast-growing country.

Senator BUNNING [continuing]. With no restrictions? At least when we open up a coal-fired generating plant in Kentucky or anywhere else in the United States, there are at least new technologies used in coal-fired generating.

I brought up in an energy bill that we passed coal to liquids, using coal to make liquids, liquification or gasification at the end of the line, and boy, I got so much pushback from the environmental community you'd have thought I was the monster from Kentucky.

But the fact of the matter is there's got to be a transition period from where we're at now and where we want to be 20 years from now. We can lead, but we need followers, and we need a global agreement on carbon emissions if we're going to be successful. Does anyone disagree with that?

Mr. ELLERMAN. I would make the point that there have to be leaders; we see ourselves as leaders. There will have to be followers, and if there are not followers then action will be taken. No Congress can bind Congresses with respect to the 2050 target and that would be changed if there are no followers. But you have to start somewhere.

Senator BUNNING. Doug Elmendorf, Dr. Elmendorf, has made it perfectly clear that we injure our economy to a certain degree. Now, depending on the grandness of the economy—and right now what was a \$14 trillion economy is not a \$14 trillion economy, because we're in a very strong recession. But down, 20 years down the road, we should be doing a little better than \$14 trillion, and it's all relative.

But China is growing at 8 to 10 percent and India is going to be the largest populated country in the world in 20 years. They do not

have any birth control restrictions on their population. So we're dealing with very large populations. So if we're going to lead, we must have them to follow us.

Is there any disagreement?

Mr. METCALF. No, but I would just add that I think they will follow, for the following reason—

Senator BUNNING. I wish I was as confident.

Mr. METCALF. The damages that China and India are going to incur from the loss of glacial waters in the Himalayas, which is the source of water for these countries.

Senator BUNNING. We also were going to have an ice age in the 1980s. In the early 1980s, we were going to go back and have an ice age. So the science is not perfect.

Mr. METCALF. The science is not perfect, but I think the risks are great and I think they recognize the risks. I think this is why, as Dr. Ellerman says, we can be leaders and I think we can have some confidence that they will follow. But if they don't follow, then future Congresses change the rules.

Senator BUNNING. Yes. In the meantime, the dollar is worth 74 cents and our economy is not turning the corner, no matter what the stock market says. The economy is not turning the corner to come out of recession. I worry about that because I have 40 grandkids, and we're \$12 trillion in debt, not counting the liability that we have built up in Medicare. So I worry about that in the future, that we're going to restrict our economy and let China and India and Russia go right on past us.

So I hope that we get a global agreement in leading.

Thank you.

The CHAIRMAN. Senator Bennett.

Senator BENNETT. Thank you, Mr. Chairman.

Talking about refunding the money to consumers, the clearest and easiest way to refund money to consumers is to not take it from them in the first place. I just make that observation here.

All right, let's look at—talk has been made about green jobs, about renewable energy, whatever. Let's look at the reality of the physical plant. If we're going to have the promised land, where all of our energy comes from non-emitting—and I use the word “non-emitting” rather than “non-polluting” because CO₂ is not a pollutant, the Supreme Court to the contrary notwithstanding. CO₂ is required for life, let's understand that. But all right.

In the language here, a non-emitting situation in the United States. It's the only one we can control. Let the Chinese and the Indians take care of themselves. The promised land of a non-emitting energy plant in the United States, which is going to be predominantly nuclear, with some solar, maybe some wind, tidal, geothermal, all of these wonderful things—I'm for it. I voted for the subsidies that have gone into the R and D for these things. It's the right thing to do.

It's 30 years away. Physically it's 30 years away. To build that many nuclear plants, to open up that much geothermal, to physically produce the promised land is 30 years away, and the bridge to the promised land is built out of fossil fuels. That is I think an indisputable fact. If I'm wrong, you can tell me. But I haven't been able to find any indication that that's not the reality.

So the question is, assuming we get on with it—and every time I've tried to move forward on the nuclear thing I get stopped by the same people that are pushing Waxman-Markey in the name of let's take care of the environment. But that's a separate issue.

If we're going to get to the promised land, if we're going to build the bridge to the promised land out of fossil fuels in the most efficient way possible, what is the role of cap and trade in building that bridge? Yes, sir.

Mr. STONE. The role of cap and trade, which would be the same role as the carbon tax if that was the substitute, is to create a price signal that encourages people to make the investments faster than they otherwise would to move the promised land forward a little sooner, to in the mean time find ways to reduce their use of fossil fuels.

The reason we have the cap tighten gradually is because it will take time for those things to happen. So there is a reason why you want to raise the prices and give the money back, because you're doing two different things. You're raising the prices of a particular commodity to discourage their use and encourage the development of substitutes—

Senator BENNETT. Let me interrupt you for just a minute. I fear that one aspect of cap and trade will be to distort to building of the bridge. In other words, the marketplace says we want to go to natural gas, that is the least emitting of all of the fossil fuels we can use. Will cap and trade—forget cap and trade drives you toward nuclear and solar. Will cap and trade create a dynamic within the building of the bridge that says less coal and more natural gas?

Mr. STONE. The price signal doesn't distinguish. The price signal says take the best path. If you allocate emissions allowances, you make bets on particular technologies rather than others, you may win, you may lose; you may distort, you may correct the market failure. But the price signal itself, which is the key feature of cap and trade and of a carbon tax, is to have a level playing field with respect to where you make your decisions.

Mr. ELLERMAN. Let me make the point, I think it's easy to overestimate what are the effects of a carbon price. Future growth, whether it's in China or the United States or Europe, depends on much more than just a carbon price or its absence. If there's one lesson that we can draw from the existing cap and trade programs in the European Union as well as the SO₂ and NO_x programs in the United States, it's that they're effective in reducing emissions and the side effects are small.

A point I make to many people about the European system is Europe doesn't look any different today than it did before 2005 when they had a carbon price. No one suggests that the economic problems of unemployment and other things in Europe today, which we have the same type of problem, are due to a carbon price. It's simply the side effects have been small.

The same with respect to, say, the SO₂ program and the effects on the coal industry. Yes, there were effects within the coal industry, but what had been predicted about large switching to gas simply did not occur, because low sulfur coal was cheaper than gas.

I think as a general rule I would argue that we find that, yes, there are these effects, they have to be dealt with, but they're

small, and what does happen is emissions are reduced. That's the beauty of the proposals, of these sort of systems.

Senator BENNETT. If I may, if indeed Europe looks the same as it did before because the effects are small, I think the case could be made that the impact on emissions has been equally small. I don't think Europe is any farther along in meeting their Kyoto goals than we are. As a matter of fact, I don't think many countries in Europe are as far along in meeting the Kyoto goals.

We didn't sign onto Kyoto. Al Gore did, but the Congress did not. Yet the greatest drop in fossil fuel use in the United States has come as a result of the recession and nothing else. We've seen a dramatic drop in fossil fuels simply because the economy has slowed down.

So we could have that other discussion, but I buy your point that the impact has not been too great, but ask you to consider the other side of it, that maybe the impact of the cap and trade system in reducing emissions has not been that great either.

Mr. ELLERMAN. I think it must be admitted, the emission reduction is small. It's in the order of, we estimate or I estimate, around 3 to 5 percent of what emissions would otherwise have been. But that's only in the first years. What it will be in the future we will see. But we can say that it has reduced emissions modestly. The ambition was modest of the program at its start. The feared or hoped-for side effects, depending on the perspective, have not been as great as people thought.

But it has achieved the objective, which is limiting emissions.

Senator BENNETT. Any other comments?

Mr. METCALF. I think with a significantly higher price, higher than what we have seen in Europe, going down the road into the future, I think we will see as a transition the use of natural gas.

I think the other thing to keep in mind is we have the, I believe, second largest reserves of coal in the world. As the Senator from Wyoming pointed out, over half of our electricity comes from coal. We are a tremendously innovative society and I have great confidence that we're going to use that coal, but that we can figure out a way to use it without releasing emissions. So I think there are great opportunities here.

But pricing is part of what we'll need to get to that future.

Senator BENNETT. You think that cap and trade will drive us toward that innovation that would not otherwise take place?

Mr. METCALF. It's a necessary step. It won't do it all by itself. We'll need R and D. But without carbon pricing the alternative will be a regulatory approach with the EPA, which will be much more costly.

Senator BENNETT. I agree with that.

Mr. PALMER. Just to reiterate something that Dr. Metcalf said, I think that history has shown us that cap and trade does lead to very innovative approaches, particularly with regard to SO₂ control. Initially people thought that in order to achieve the goals of the program we would have a lot of scrubbers installed, and we did see firms actually looking for innovative, cost-effective ways to reduce CO₂ emissions that they didn't anticipate would work before the program, like coal blending and things.

I think once there's a price signal on CO₂ you'll see similar types of innovations.

Senator BENNETT. I'm a little less excited about the example of the SO₂ thing because it was not a worldwide problem like this one. It was restricted to a single industry in a single country, and in that circumstance it worked. I'm a little less convinced that it's going to work when you're dealing with the Indians. I've talked to the Indians, too, and I know exactly how much we can depend on the Indians cooperating.

Thank you, Mr. Chairman, for your indulgence.

The CHAIRMAN. Let me thank all the witnesses. I think this has been useful testimony for us. We appreciate it, and that will conclude our hearing.

[Whereupon, at 11:47 a.m., the hearing was adjourned.]

APPENDIX

RESPONSES TO ADDITIONAL QUESTIONS

RESPONSES OF A. DENNY ELLERMAN TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. There is a great deal of money at stake in any carbon market that Congress may seek to create, and some portion of this value will be reflected in costs that covered entities, consumers, or others incur. We heard at a separate Energy Committee hearing on October 14th about the projected costs of the House bill.

I am concerned about the significant risk that allowances and their attendant compliance usage will be made even more expensive if stringent state and regional programs are allowed to drain the federal supply of allowances. While any real solution to global warming must be global in scale, we're also trying to get a handle on how much our domestic efforts will cost and state and regional approaches may complicate, or harm, these efforts.

If federal climate legislation does not explicitly preempt state and regional programs, as well as the regulatory approach being pursued by the EPA, do you believe the end result will be higher compliance costs, assuming the ultimate environmental objectives are held constant?

Assuming preemption is included, how would you recommend phasing out the allowances associated with existing state and regional programs?

Answer. If a federal cap-and-trade program is in place, state and regional programs covering a subset of the same sources, as well as prescriptive, source-specific federal regulation under the Clean Air Act covering the same sources, will only add cost with no environmental gain. It should be noted that this conclusion holds only if these additional regulations require some sources to reduce emissions more than they would in response to the price resulting from the federal cap. These sources would incur more costs, and their extra abatement will—with an unchanged federal cap—allow other sources to abate less and to incur less cost. Still, the net cost from a national perspective will be greater since the added costs of the sources subject to double regulation will be greater than the savings accruing to sources subject only to the federal cap-and-trade program. The complicated interaction between state and federal regulation is discussed more thoroughly in a paper written by a colleague and me in the third essay in the collection on cap-and-trade design that can be downloaded at <http://web.mit.edu/ceepr/www/publications/DDCF.pdf>.

My recommendation for the phasing out of existing state and regional program allowances is to allow those allowances which had been acquired at some cost to be converted into federal allowances on a comparable cost basis, as is provided in the Waxman-Markey legislation. Thus, whatever a covered entity or intermediary had actually spent on state or regional allowances would be converted at cost to federal allowances. Disallowing a ton-for-ton substitution would discourage speculation in state and regional allowances and resulting distortions in the federal system. Accounting issues in determining the cost-basis of state allowances and the equivalent federal allowance value will have to be addressed, but these are manageable technical issues. Such a provision would also require some small set aside within the federal cap for this purpose.

Question 2. Cap-and-trade's advocates have consistently stated their desire to protect consumers from price increases brought on by such programs. So far, their answer has been to increase the number of permits given away for free, in hopes that the recipients will pass less of a burden on to consumers.

Is there a more straightforward and transparent way to make the consumer whole, regardless of the structure of the program itself?

Would it make sense to cut out the middlemen, and directly compensate Americans for their increased expenses instead?

Answer. The most straightforward and transparent way to make the consumer whole is to rebate the proceeds of an allowance auction directly to consumers or households, for instance, on a per-capita basis, somewhat in the manner of stimulus

checks or the payments from the Alaska Petroleum Trust. The key issue is how to deal with the differing impact of the carbon cost by region and income category. For instance, households in regions where electricity is predominantly coal-fired will face higher costs than consumers in regions with little coal-fired electricity. Similarly, energy costs constitute a somewhat larger share of expenditure for lower income households than higher income households. The free allocation to local distribution companies and the provisions to fund low and moderate income programs in the Waxman-Markey bill are attempts at dealing with these two problems, respectively. Whether the means chosen to do so, as well as the allocation shares and criteria, are appropriate can be debated, but some provision to deal with these concerns will likely be required. I would recommend phasing out such provisions over time bearing in mind that there will always be regional differences in cost reflecting differing resource endowments and demographic characteristics.

Question 3. A great deal of effort on the part of regulated entities—and even non-regulated entities—has gone into securing free permits at the outset of the House and Senate cap-and-trade programs. The importance of these free permits is apparent in the number of blanks left in the recently circulated Senate bill.

As a matter of economics, is Congress any less capable of addressing the priorities reflected in permit allocations by spending auction revenues or tax receipts instead?

Answer. Congress can address priorities equally by allocating permits or by deciding the use of auction revenues or tax receipts. There are slight technical differences in that a permit allocation is a share of allowance value in contrast to appropriations which are typically fixed sums. Perhaps more importantly, permit allocations are not subject to annual determination, like appropriations, so that recipients likely view permit allocations as less subject to subsequent change and therefore more secure and more valuable. The fundamental decision—how to use the value created by a cap or by a tax—is the same and best addressed by the legislative branch.

Question 4. Some have raised concerns about the detrimental impact that giving away free permits might have on the liquidity and stability of a carbon market. Dr. Ellerman recently wrote that “free allowances... reduce the value of the flexibility afforded by banking. As a consequence, the price impact of short run shocks to the system are magnified, resulting in a suboptimal allocation of emissions reductions through time and raising the cost of the system.”

Assuming we want to design the most efficient and straightforward climate program, can you elaborate on this issue for us and how we can account for it in legislation?

Answer. This quote is drawn from an article analyzing the causes of the price spike in the US SO₂ allowance market in late 2005 in which we (including my two co-authors) concluded that the large, existing bank, which should have prevented the spike, or at least dampened its magnitude, was not available to the market because of the interaction of free allocation with electric utility rate regulation. In essence, electric utility regulation provided little incentive to utilities with large banks to sell a portion of their banks even if they thought that the sales could be made up by later purchases at lower, future prices.

More fundamentally, this behavior reflects an asymmetry that exists when free allocation is not coupled with borrowing. Any installation that finds itself short in some compliance period must purchase allowances to cover emissions; however, installations that are long are under no compulsion to sell. This problem is avoided if it is possible for installations to borrow even if for only as little as a year ahead.

In a well-functioning market with all participants having the flexibility to bank and to borrow, we can be reasonably confident that the resulting prices accurately reflect current expectations with respect to present and future prices. However, when borrowing is not permitted, proper market clearing depends on the ability of installations that are long in that period, or holders of banked allowances, to make the appropriate calculations and to be willing to sell to those who are short in the current period. If these longs do not do so, for either regulatory or behavioral reasons, prices will be higher than they should be driven by the need of owners of short installations to purchase allowances as the only means of being in compliance. Borrowing provides these participants with the flexibility to comply with future vintage allowances if they expect next period prices to be lower or they can abate more in the next period at lower cost.

RESPONSES OF A. DENNY ELLERMAN TO QUESTIONS FROM SENATOR CANTWELL

Question 1. What effect does the point of regulation have on regional disparities in household costs, when one accounts for both direct and indirect costs on consumers from the carbon price signal? And does less (uniform) coverage affect the (indirect) carbon costs passed down to consumers in different regions?

Answer. The point of regulation (what entity is required to surrender allowances against emissions) will have no effect on household costs. Whether the point of regulation is “upstream” (where the carbon first enters the commercial chain) or “downstream” (at the point of emissions) only determines the point at which carbon cost is incorporated into the final price of goods and services. In this respect, all the carbon (and other) costs faced by households are indirect in that they are already embodied into the price of the goods or services consumed.

The distinction between direct and indirect costs is usually applied to industrial facilities that are regulated downstream for their own emissions (direct costs) but also consume electricity into which the cost of carbon has already been incorporated (indirect cost). A cap-and-trade (or a comparable tax) system will impose both of these costs on the industrial facility, but for those purchasing that facility’s output, both costs are included in the sale price and therefore constitute what would be considered an “indirect” cost for those purchasers and other downstream users.

I do not see how the point of regulation would affect regional disparities which will depend upon the carbon content of goods and services (for instance, electricity) consumed in a region and how the prices of goods or services in that region are formed.

Question 2. Combined with a 100 percent auction of allowances, what effect would an equal per capita distribution of the auction revenues have on the regional disparities in net household costs from a carbon policy? How are indirect carbon costs embedded from the production process of goods and services factored in?

Answer. A strictly per capita distribution of auction revenue would tend to under-compensate the average household in regions characterized by more carbon use and to over-compensate the average household in regions characterized by less carbon use. Electricity provides a good example of how household carbon cost might differ. Where electricity is predominantly generated by coal, households would face a larger absolute and relative increase in electricity prices as a result of carbon policy than in regions where electricity is generated predominantly by less carbon-intensive means. Similar disparities would exist with respect to household gasoline costs between states that are predominantly rural and others that are predominantly urban.

The embedding of indirect costs has been discussed in the previous response. In general, producers can be expected to incorporate the full costs of all inputs into whatever they produce. When those inputs already include the carbon cost, as would be the case with electricity purchased by manufacturers, the carbon cost component will be embedded along with all other costs in the price of the final output.

Question 3. What is the simplest and fairest way to compensate all energy consumers while specifically maintaining a robust carbon price signal and protecting household incomes of the entire lower and middle classes? Roughly, what portion of the allowance value is necessary to keep the majority of households whole?

Answer. The simplest way is to rebate auction revenues directly to households perhaps on a per capita basis. Whether that would be the fairest way is open to debate since the carbon content of household energy use varies by region and energy expenditures constitute a larger share of total expenditure for low income households than for higher income households. Thus, it could be argued that a direct distribution to households should be adjusted to take regional and income differences into account, even though it would detract from the simplicity of a straight per capita distribution. Still, all households will not be entirely compensated because energy use varies among households even when income category and region are held constant. At best, we can hope to make appropriate adjustments for average households. So long as the distribution to households is not made dependent on ongoing energy use, the carbon price signal will be robust in encouraging less carbon use by all.

The question about the appropriate share of allowance value refers presumably to direct compensation of households through a rebate or cap-and-dividend mechanism since all allowance value is ultimately returned to households. A dedication of allowance value to specific uses, such as carbon capture and sequestration (CCS) or renewable energy (RE), will reduce the amount of the direct rebate and thus make the rebate recipients less whole, although those households associated with CCS or RE either through investment or labor would benefit by these dedications. Such uses can be justified and in the interest of all if the funds were to lead to earlier deployment of cheaper low carbon technologies without subsidy in the future.

Question 4. Are lump sum payments to all Americans legally residing in the United States feasible?

Answer. This is a technical question about which I am not qualified to comment. I am told by those who have looked at the issue that it is feasible using tax, social

security, and other lists, although there are problems. Stimulus checks are an often cited example.

Question 5. H.R. 2454 gives away a significant share of allowance value much of which goes to the largest historic emitters of carbon dioxide. Are these allowance giveaways likely to distort the carbon price signal and dampen incentives for businesses and individuals to become more efficient and transition to lower-carbon energy sources? Second, doesn't the granting of free allowances to selected industries necessarily entail the government picking winners and losers in its allocation decisions, which will bias fuel and energy technology choices?

Answer. I believe you are referring to the provisions in HR 2454 that provide allowances to local electricity distribution companies (LDCs). These companies are responsible for the distribution of electricity and not for its generation. As a consequence, they do not generate any emissions and they do not face an obligation to surrender allowances. Their only means of realizing the value of the allowances allocated to them is to sell them to those who are required to surrender allowances, namely, the generators from whom they buy power for distribution to retail customers. A further important point is that LDCs are all subject to state public utility commission (PUC) regulation. The intent is that LDCs will use the revenues from the sale of allowances to offset the additional cost of the electricity that they purchase and thereby to reduce the impact on retail electricity rate-payers. This "LDC fix" treats regulated and deregulated generators alike and ensures that rate payers will receive the benefit of free allocation assuming that state PUCs follow the intent as stated in HR 2454. This distribution of free allowances to LDCs is also intended to address the regional disparities referred to in my response to question 3 since 50% of the distribution is according to the historical emissions from electricity generation in the states.

Whether the LDC fix would distort the carbon price signal would depend upon how the PUC returned the revenues from the sale of the allowances to rate-payers. For instance, if the monies were returned to rate-payers in a manner that seemed to reduce the cost of electricity, a distortion would occur. Alternatively, if the monies were returned to rate-payers by a separate check, the distortion would be avoided.

Granting free allowances to selected industries certainly favors the recipient industries but it does not necessarily bias those industries' fuel and energy technology choices. So long as the free allocation does not depend on current or future emissions, the incentive to adopt less carbon-intensive fuels and energy technologies would be maintained. This result obtains because the use of a freely allocated allowance incurs an opportunity cost in that the recipient foregoes the revenue from selling the allowance if it is used to cover emissions. Profit-maximizing firms can be expected to recognize this lost opportunity and to price that cost into their sales prices. It is the same as if the government had given a cash grant to the company that was unrelated to its current or future emissions (as distinct from past emissions).

Question 6. Won't both the dampening of the carbon price signal and the selecting of winners and losers outside of the market increase overall costs of reducing emissions? Assuming that a main goal of a climate policy is to establish a consistent carbon price signal, wouldn't it make more sense to rely strictly on market mechanisms by auctioning all of the allowances and avoiding the potential distortions that go along with giveaways of allowances or allowance value?

Answer. As discussed above, free allocation of allowances need not distort the carbon price signal. It all depends on how the free allocations are handled by recipients or intermediaries (such as LDCs). The potentially distorting effect of how state PUCs might handle free allocations to LDCs under their jurisdiction has already been mentioned. It is also argued by some that the recipients of free allocations do not recognize opportunity cost, especially when receiving more allowances than their emissions as occurred in the European Union's Emissions Trading System. In fact, one of the emerging arguments for auctioning is that it ensures that the carbon price will be recognized since all emitters will be forced to pay cash for allowances, just as they do for other inputs. However, auctioning does not deal with the distributional issue, namely, what to do with the auction revenues. Auctioning does ensure that the carbon price signal is undistorted.

RESPONSES OF CHAD STONE TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. There is a great deal of money at stake in any carbon market that Congress may seek to create, and some portion of this value will be reflected in costs that covered entities, consumers, or others incur. We heard at a separate Energy Committee hearing on October 14th about the projected costs of the House bill.

I am concerned about the significant risk that allowances and their attendant compliance usage will be made even more expensive if stringent state and regional programs are allowed to drain the federal supply of allowances. While any real solution to global warming must be global in scale, we're also trying to get a handle on how much our domestic efforts will cost and state and regional approaches may complicate, or harm, these efforts.

If federal climate legislation does not explicitly preempt state and regional programs, as well as the regulatory approach being pursued by the EPA, do you believe the end result will be higher compliance costs, assuming the ultimate environmental objectives are held constant?

Assuming preemption is included, how would you recommend phasing out the allowances associated with existing state and regional programs?

Answer. The climate change work by the Center on Budget and Policy Priorities has focused on the design of programs to assist low-income households and we do not have specific recommendations about how to address the issue of what is the best way to integrate existing state programs into a national program. Certainly, keeping the costs of meeting the emissions cap as low as is reasonably possible consistent with other policy objectives would be one of the key criteria in assessing different approaches to achieving an effective national system.

Question 2. Cap-and-trade's advocates have consistently stated their desire to protect consumers from price increases brought on by such programs. So far, their answer has been to increase the number of permits given away for free, in hopes that the recipients will pass less of a burden on to consumers.

Is there a more straightforward and transparent way to make the consumer whole, regardless of the structure of the program itself?

Would it make sense to cut out the middlemen, and directly compensate Americans for their increased expenses instead?

Answer. Market-based approaches to reducing greenhouse gas emissions like cap-and-trade or a carbon tax work by making it more expensive to continue to engage in economic activity that leads to greenhouse gas emissions. "Putting a price on carbon" gives households and businesses an incentive to conserve energy and make investments in alternative clean sources of energy and energy efficiency, but it also imposes costs that are ultimately borne by consumers. At the same time, these approaches generate substantial resources, whether in the form of carbon tax revenue or allowance value, which can be used to mitigate the cost impact on consumers.

The main approach to mitigating the cost impact on energy consumers in the House bill and in the Kerry-Boxer bill is to allocate free emissions allowances to local distribution companies (LDCs), the utilities that sell directly to retail customers, with the requirement that the LDCs use the allowance value to benefit their customers. This approach should be distinguished from an approach that gives free allowances to electricity generators with no restrictions on their use. The LDC approach is intended to avoid conferring windfall profits on utilities. However, such utility-based relief has a number of inherent limitations.

Providing relief directly to consumers is a preferable policy. That is the approach taken in the low-income provisions of the House energy bill, where 15 percent of the emissions allowance value is set aside to fund energy refunds for qualifying households. The Kerry-Boxer bill in the Senate also sets aside some allowance value (though an insufficient amount compared with the House) to fund low-income energy refunds.

A policy of direct refunds is a more attractive alternative to a utility-based approach for delivering broad-based consumer relief. Policymakers would decide the size of the refund and how far up the income scale to extend eligibility to receive the refund. A sound approach building off existing delivery mechanisms would be to provide the refund as a refundable tax credit for households above a certain income threshold while relying on the electronic benefit transfer (EBT) system to deliver relief to low-income households, many of whom are not required to file a tax return. The House low-income provision provides a refund to most low-income households through the EBT system; low-income childless workers, who are unlikely to participate in a program that uses EBT, receive an increase in the earned income tax credit.

Direct refunds preserve the "price signal" that encourages businesses and households to make cost-effective decisions to reduce their carbon footprints while restoring the purchasing power to consumers' budgets that otherwise would be lost due to the higher prices of energy and energy-intensive products.

Question 3. A great deal of effort on the part of regulated entities—and even non-regulated entities—has gone into securing free permits at the outset of the House and Senate cap-and-trade programs. The importance of these free permits is apparent in the number of blanks left in the recently circulated Senate bill.

As a matter of economics, is Congress any less capable of addressing the priorities reflected in permit allocations by spending auction revenues or tax receipts instead?

Answer. Congress could achieve the same priorities reflected in permit allocations through the disposition of the proceeds from auctioning 100 percent of the emissions allowances or through decisions about how to spend the receipts from a carbon tax that achieves an equivalent reduction in emissions. In cases where allowances are given away free for specific purposes, Congress could achieve the same objective by using an equivalent amount of auction proceeds or tax revenue to subsidize that purpose. The real question is whether the purpose represents a sound policy, not whether it is funded by a free allocation or by auction proceeds.

For example, instead of giving allowances to LDCs and requiring them to use the allowances for the benefit of their customers, Congress could provide an equivalent amount of money out of auction proceeds or tax revenues and require that they use that money for the benefit of their customers. Utility-based relief is a problematic way to deliver consumer relief, but the question of whether the policy itself is sound or not does not hinge on the means of financing it. There could be administrative or transactions cost differences between free allocations and spending auction revenues or tax receipts that would lead to the choice of one method over the other for some specific purposes, but in general free allocations are not a necessary condition for Congress to meet its priorities.

Question 4. Some have raised concerns about the detrimental impact that giving away free permits might have on the liquidity and stability of a carbon market. Dr. Ellerman recently wrote that “free allowances... reduce the value of the flexibility afforded by banking. As a consequence, the price impact of short run shocks to the system are magnified, resulting in a suboptimal allocation of emissions reductions through time and raising the cost of the system.”

Assuming we want to design the most efficient and straightforward climate program, can you elaborate on this issue for us and how we can account for it in legislation?

Answer. To the extent that free allowances to emitters that need to hold allowances lead to a thinner market for allowances, there could be increased volatility. That concern does not apply to free allowances to entities that have to sell the allowances they receive in order to obtain the funds they need to carry out the purpose of the free allocation (e.g. free allowances to LDCs in competitive electricity markets). For LDCs in regulated markets, requiring arms-length transactions between the LDC operation and the generating operation would reduce the concern about the market being too thin, but if the market were already sufficiently liquid to mitigate excess volatility, such a requirement would impose additional transactions costs.

RESPONSES OF CHAD STONE TO QUESTIONS FROM SENATOR CANTWELL

Question 1. What effect does the point of regulation have on regional disparities in household costs, when one accounts for both direct and indirect costs on consumers from the carbon price signal? And does less (uniform) coverage affect the (indirect) carbon costs passed down to consumers in different regions?

Answer. Economic analysis suggests that the point of regulation does not significantly affect the ultimate “incidence” of the costs of putting a price on carbon. Thus, whether the charge for the carbon in coal is collected at the mine mouth or from the electricity generator that burns the coal to produce electricity, the price to consumers of coal-based electricity will be about the same. Regions that are more heavily dependent on coal-based electricity will experience larger effects than less coal-dependent regions, but not because of the point of regulation. Similarly the indirect carbon costs will depend primarily on the amount of carbon embodied in the good or service, not on who is required to hold the allowance for the carbon (the point of regulation).

I am not aware of systematic regional differences in the proportion of non-covered emissions versus covered emissions. According to the EPA analysis of the Kerry-Boxer bill, “The economic literature shows small variations in the gross costs of climate policy across regions.” This literature looks at the full effect, including not only home energy, but also gasoline, and indirect effects. The main source of regional variation is home energy but home energy accounts for less than half the total impact. The variability across regions is much less as a percentage of the total impact than it is of just the home energy impact.

Question 2. Combined with a 100 percent auction of allowances, what effect would an equal per capita distribution of the auction revenues have on the regional disparities in net household costs from a carbon policy? How are indirect carbon costs embedded from the production process of goods and services factored in?

Answer. The net impact on households at different income levels or in different regions depends on the relationship between their gross cost (the impact on their budget due to policies that “put a price on carbon”) and the financial relief they receive as a result of how emissions allowances are used.

The gross costs, which vary across individuals at different income levels and in different regions, are determined by their individual “carbon footprint.” That is the amount of carbon embodied in their home energy consumption, their gasoline consumption, and all the other goods and services where carbon is embodied indirectly through the energy intensity of their production or transportation. The gross costs incurred by individuals and regions are largely unaffected by whether emissions allowances are given away or auctioned.

The one important exception is free allocations to electricity generators. In competitive markets, generators would charge the same prices whether they received allowances for free or had to buy them in the market. But in regulated markets generators probably would not be allowed to pass on the “opportunity cost” value of free allowances whereas they could pass on the costs of purchased allowances. This difference does not apply to free allocations to LDCs where the free allowances are used to benefit retail customers, assuming that public utility regulation of the LDC allowances works the way it is intended to work.

Auctioning 100 percent of allowances and using the proceeds to fund an equal per capita distribution of the auction revenues would not affect the distribution of costs, but it would affect the distribution of net financial impacts, and in a progressive way. Low- and middle-income households in general would receive per capita energy refunds that on average would be greater than their gross costs while higher income households on average would have costs that exceed their refunds. The net financial benefit of 100 percent auctions and per capita refunds would be slightly smaller in higher-cost regions and slightly higher in lower-cost regions. As discussed in the answer to question 1, however, differences across regions, once all the costs are factored in, are relatively modest.

Question 3. What is the simplest and fairest way to compensate all energy consumers while specifically maintaining a robust carbon price signal and protecting household incomes of the entire lower and middle classes? Roughly, what portion of the allowance value is necessary to keep the majority of households whole?

Answer. Direct refunds through refundable tax credits and payments delivered through the electronic benefit transfer system (EBT) for low-income households, many of whom do not file income taxes because they are not required to, are the simplest and most direct way to compensate consumers while preserving the carbon price signal. Refunds are an effective way to deliver consumer relief. They can be provided with no need for new agencies or bureaucracy at the state or federal level. Refunds protect households against the loss of purchasing power from higher energy-related prices without blunting consumers’ incentives to respond to those higher prices by conserving energy and investing in energy efficiency improvements. Because energy-related products will cost more, households with the flexibility to conserve energy or invest more in energy efficiency will get more value for their budget dollar by taking these steps than by using their rebate to maintain their old ways of consumption. At the same time, refunds help households that cannot easily reduce their energy consumption to avoid a reduction in their standard of living.

There are two approaches commonly considered: per capita dividends and refunds based on household size. Under a per capita dividend, the size of a family’s dividend would be tied strictly to the number of people in the family. The evidence suggests, however, that energy expenditures increase less than in proportion to family size. (In other words a family twice as large as another consumes less than twice as much energy.) Refunds are better suited to providing a more appropriate family-size adjustment.

Our rough calculations indicate that a household-based refund equal to the average “hit” to households in the middle quintile (fifth) of the population that phased out in the fourth (next-to-the-highest) quintile would cost about 60-70 percent of the allowance value and fully protect the bottom 60 percent of the population as a group. The refund would be uniform for households of the same size, hence lower-income households (who generally have lower costs) would, on average, come out ahead, whereas households in the top 40 percent would not be fully compensated.

Question 4. Are lump sum payments to all Americans legally residing in the United States feasible?

Answer. Such delivery should be feasible, but there is no single existing mechanism that can be used right out of the chute. It should be relatively straightforward to use the tax system to reach the majority of people, who file income tax returns. Seniors and veterans who do not file income tax returns could be reached through direct payments like those used in the economic recovery legislation. That leaves

low-income households that are not required to file income tax returns. They can be reached through the EBT system. Because there is no single delivery mechanism capable of reaching everyone, there will be an issue of coordination among delivery mechanisms to assure maximum coverage without duplication. CBPP has looked into ways of doing this for a household-size based refund.

Question 5. Your testimony suggests that it would be possible to reach the lowest income quintile of the population with direct refunds through existing federal and state programs like EBT, Temporary Assistance for Needy Families, Social Security, the Supplemental Nutritional Assistance Program, LIHEAP, etc. This segment of the population would be the most difficult to reach otherwise, since many of the people in the lowest income bracket don't have bank accounts and aren't required to file income tax returns. If it is possible to reach this segment of the population, couldn't those in higher income brackets be reached readily and, if so, do you see advantages to a policy that auctions more allowance value and refunds it directly to households, rather than relying on LDCs to distribute allowance value allocated to them for free?

Answer. As discussed in the answer to question 3, direct refunds through tax credits and payments delivered through the electronic benefit transfer system (EBT) for low-income households are the simplest and most direct way to compensate consumers while preserving the carbon price signal. As discussed in the answer to question 4, it will be important to take into consideration the importance of coordinating delivery in order to assure maximum coverage while avoiding duplication of coverage.

RESPONSES OF KAREN PALMER TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1a. There is a great deal of money at stake in any carbon market that Congress may seek to create, and some portion of this value will be reflected in costs that covered entities, consumers, or others incur. We heard at a separate Energy Committee hearing on October 14th about the projected costs of the House bill.

I am concerned about the significant risk that allowances and their attendant compliance usage will be made even more expensive if stringent state and regional programs are allowed to drain the federal supply of allowances. While any real solution to global warming must be global in scale, we're also trying to get a handle on how much our domestic efforts will cost and state and regional approaches may complicate, or harm, these efforts.

If federal climate legislation does not explicitly preempt state and regional programs, as well as the regulatory approach being pursued by the EPA, do you believe the end result will be higher compliance costs, assuming the ultimate environmental objectives are held constant?

Answer. It depends on what programs and regulations you are talking about preempting. If the ultimate environmental objectives are held constant (a single cap on national emissions of CO₂, for example) then a single cap and trade program will be the most efficient (lowest cost) approach to achieving that goal. There is clearly an economic logic for preemption of state and regional cap and trade programs. However, there is precedent for allowing states to have stricter environmental standards than federal standards so there may be other reasons why states would want to go further. Also, most current state climate policies are not of the cap and trade variety but instead seek to limit emissions by encouraging energy efficiency, the adoption of renewables or sustainable land use policy. To the extent that these policies seek to promote a number of goals in addition to mitigation of climate change, they should probably not be preempted. Although, clearly if they are operating largely on sectors that are covered by the emissions cap and trade program, these policies won't be able to achieve further reductions in emissions beyond those called for by the federal cap unless federal allowances are retired.

Question 1b. Assuming preemption is included, how would you recommend phasing out the allowances associated with existing state and regional programs?

Answer. There are at least two important considerations in phasing out of state and regional programs. One is that these programs will have developed a bank of CO₂ emissions allowances and those allowances should be honored in the new federal cap and trade program. This would be an important way of giving credit for early action. These banked allowances should be usable to cover some portion of their value (in terms of tons of CO₂) under the prior regional program. There is precedent under the transition from the Title IV to the CAIR program to honor allowances of earlier vintages at one ton for one ton even though the SO₂ caps under CAIR are much stricter than the Title IV program. This approach could be taken here as well. Alternatively, allowances could be traded in based on the relative

value. Because the RGGI program is not very stringent, RGGI allowances are trading for a low price compared to allowance prices expected under a federal cap and trade program. These allowances could be exchangeable for federal allowances based on the initial price of the of RGGI allowances of that vintage (original acquisition cost) relative to the initial price for federal CO₂ allowances (or some forecast of that price). For example, if RGGI allowances originally sold for \$3.50 and the initial price of a federal CO₂ allowance is \$7.00, then an entity holding RGGI allowances could trade in two RGGI allowances for one federal allowance.

The second issue is that regional cap and trade programs such as the RGGI program create a pool of revenue for the participating states through the auctioning of allowances. States are using this pool of money to help promote the program goals of encouraging energy efficiency and development of clean energy sources. Allocating a portion of the allowance value under a federal program to the states (presumably not just those states involved in RGGI, but all states) will help to continue these efforts at the state level.

Question 2a. Cap-and-trade's advocates have consistently stated their desire to protect consumers from price increases brought on by such programs. So far, their answer has been to increase the number of permits given away for free, in hopes that the recipients will pass less of a burden on to consumers.

Is there a more straightforward and transparent way to make the consumer whole, regardless of the structure of the program itself?

Answer. I think it would be much more straightforward to auction the allowances and then use the revenue to compensate consumers directly. Ideally this compensation would not be linked to energy consumption so there would be clear signals that prices have increased. As a practical matter, it may be desirable on distribution or compensation grounds to do some linking (such as through allocation to local distribution companies for residential customers only) to help reduce some regional differences, but this approach should be time limited with a transition to a more complete cap and dividend approach.

Question 2b. Would it make sense to cut out the middlemen, and directly compensate Americans for their increased expenses instead?

Answer. Yes. A cap and dividend approach makes a lot of sense and work at Resources for the Future suggests that it will lower the cost of the cap and trade program and improve the outcome of households in virtually all regions of the country relative to an LDC allocation similar to that proposed in HR 2454. This compensation should be independent of a particular household's expenditures on energy in order to provide the right signals for energy conservation, which will be an important part of the strategy to reduce emissions.

Question 3. A great deal of effort on the part of regulated entities—and even non-regulated entities—has gone into securing free permits at the outset of the House and Senate cap-and-trade programs. The importance of these free permits is apparent in the number of blanks left in the recently circulated Senate bill.

As a matter of economics, is Congress any less capable of addressing the priorities reflected in permit allocations by spending auction revenues or tax receipts instead?

Answer. As a matter of economics, allocating allowances and allocating tax receipts are equivalent. It could be argued that there might be fewer transaction costs for the economy as a whole associated with holding a centralized allowance auction and then allocating the tax revenue directly.

Question 4. Some have raised concerns about the detrimental impact that giving away free permits might have on the liquidity and stability of a carbon market. Dr. Ellerman recently wrote that "free allowances... reduce the value of the flexibility afforded by banking. As a consequence, the price impact of short run shocks to the system are magnified, resulting in a suboptimal allocation of emissions reductions through time and raising the cost of the system."

Assuming we want to design the most efficient and straightforward climate program, can you elaborate on this issue for us and how we can account for it in legislation?

Answer. I haven't studied this particular issue in detail and I'm not familiar with Dr. Ellerman's writings on the topic but I will offer a few perspectives on potential differences in banking behavior between free allocation and an auction. Free allocation to LDCs will lead to higher allowance prices than would occur with an auction and thus there will be weaker incentives for taking early action to reduce emissions beyond legal requirements in the early years and to build up a bank. Experimental economics research suggests that free allocation of allowances to generators may create some sort of endowment effect that results in higher allowance prices than would occur with greater auctioning.

If incentives to bank are not optimal, one way to deal with potential price fluctuations and short run shocks would be to include a price collar for allowances. The

price collar would include both a ceiling and a floor on allowance prices and these values would escalate over time. The floor could be enforced through a reserve price in an allowance auction, below which allowances would not be sold. The high side of the price collar would act like an emissions fee, in that if the market price of allowances reached that level, emitters could just pay a fee for every ton emitted instead of purchasing allowances.

RESPONSES OF KAREN PALMER TO QUESTIONS FROM SENATOR CANTWELL

Question 1. What effect does the point of regulation have on regional disparities in household costs, when one accounts for both direct and indirect costs on consumers from the carbon price signal? And does less (uniform) coverage affect the (indirect) carbon costs passed down to consumers in different regions?

Answer. I have not studied this question directly but I suspect that point of regulation (which is different from point of allocation) won't really have different regional effects. However, which sectors are covered by the program will have an effect that depends on which forms of energy are used in which region. For example, if a program were to focus on the electricity sector only, it could result in greater fuel switching by end users out of electricity and this would result in emissions leakage. Also, the relative shares of electricity and other fuels in total household energy use will differ across regions of the country and that will affect the impact on households of different program scopes.

Question 2. Combined with a 100 percent auction of allowances, what effect would an equal per capita distribution of the auction revenues have on the regional disparities in net household costs from a carbon policy? How are indirect carbon costs embedded from the production process of goods and services factored in?

Answer. According to modeling work done by some of my colleagues at RFF, moving from a 30% LDC allocation to 100% cap and dividend will clearly lower the cost of the cap and trade program to households in all regions, with the possible exception of the Ohio Valley where average cost per household rises slightly. This analysis accounts for both direct energy use and increase cost of energy embedded in goods and services. The latter is account for using an input output matrix on carbon content developed by Hassett, Mathur and Metcalf in a 2007 National Bureau of Economic Research working paper titled "The Incidence of a US Carbon Tax: A Lifetime and Regional Analysis." Also, the 100% cap and dividend is after setting aside roughly 14% of the allowance value to cover increased costs of direct energy use to local, state and federal government resulting from the climate policy. Thus, the 100% is actually 100% of 86% of the allowance value.

Question 3. What is the simplest and fairest way to compensate all energy consumers while specifically maintaining a robust carbon price signal and protecting household incomes of the entire lower and middle classes? Roughly, what portion of the allowance value is necessary to keep the majority of households whole?

Answer. The simplest and fairest way to achieve these goals would be to use a cap and dividend approach to allocate allowances. This approach helps compensate lower income households by keeping the cost of the program low. However, it is impossible to compensate everyone for their costs under the cap-and-trade policy. Using a cap and dividend approach for the 86 percent of allowance value not required to cover allowances required for direct government energy use, should fully compensate the bottom five income declines and that is the best that can be achieved.

Question 4. Are lump sum payments to all Americans legally residing in the United States feasible?

Answer. Lump sum payments to all Americans are feasible and could follow a model like the Alaska Permanent Fund which allocates oil revenues on a pro rata share to all adults who were legal residents in Alaska during the prior year. Limiting allocations to adults as is done in Alaska would seem to make the most sense.

Question 5. In your testimony (p.7), you state that a cap-and-dividend approach to allowance value distribution could improve efficiency and limit impacts of the policy on households compared with one that would use local distribution companies (LDCs) as the primary means of distributing value to consumers. Could you explain how eliminating the LDC allocation for commercial and industrial consumers in H.R. 2454 would improve its efficiency? If a cap-and-dividend approach would be more efficient, why not distribute all of the allowance value that way, including the LDC portion allocated for residential consumers?

Answer. Despite congressional intensions to the contrary (at least as expressed in HR 2454) the way that an LDC allocation provides compensation is to reduce the perceived or actual price of electricity relative to what it would have been if those allowances had been sold at an auction, which economists agree is the most efficient

way to allocate emissions allowances. Lower electricity price means lower incentives to conserve and thus greater demand for allowances in the electricity sector. This will raise the price of allowances and mean that more reductions have to come from other parts of the economy. Eliminating the LDC allocation for commercial and industrial customers will preserve the allowance cost pass through for those customers classes and mute this effect. Keeping LDC for residential customers would help address some of the distributional concerns about regional differences in household energy consumption, but distributing all of the allowance value through cap and dividend would be the most efficient approach.

Question 6. In your testimony, you mention that auctioning more allowances can actually reduce regional disparities in electricity prices. This seems to counter the conventional wisdom that the free allocation of allowances helps to level prices among regions. Can you elaborate how this works exactly?

Answer. The regional disparities that I was addressing here are the disparities between those regions that have cost of service regulation of the electricity sector and those regions that rely on markets to price electricity generation. When allowances are allocated for free to generators, which has been the approach used in most cap and trade programs to date, then the effect of these free allowances on electricity prices will differ across states depending on how electricity markets are regulated. For those states where competitive markets set electricity prices, the value of allowances allocated freely to generators will be reflected in electricity prices. However, for those states where electricity prices are set according to cost of service regulation, the value of allowances received for free will not be included in prices paid by customers. Those, free allocation to generators creates a disparity across regions. This disparity can be addressed either by auctioning allowances to all generators, which will lead to higher prices everywhere, versus free allocation to local distribution companies, which will tend to reduce regional disparities in prices, but at lower levels.

RESPONSES OF GILBERT E. METCALF TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. There is a great deal of money at stake in any carbon market that Congress may seek to create, and some portion of this value will be reflected in costs that covered entities, consumers, or others incur. We heard at a separate Energy Committee hearing on October 14th about the projected costs of the House bill.

I am concerned about the significant risk that allowances and their attendant compliance usage will be made even more expensive if stringent state and regional programs are allowed to drain the federal supply of allowances. While any real solution to global warming must be global in scale, we're also trying to get a handle on how much our domestic efforts will cost and state and regional approaches may complicate, or harm, these efforts.

If federal climate legislation does not explicitly preempt state and regional programs, as well as the regulatory approach being pursued by the EPA, do you believe the end result will be higher compliance costs, assuming the ultimate environmental objectives are held constant? Assuming preemption is included, how would you recommend phasing out the allowances associated with existing state and regional programs?

Answer. How federal climate legislation interacts with state and regional policy is an important question. In principle policies could operate in tandem. Compliance costs rise, however, to the extent that rules and coverage differ between national and sub-national systems. Given the global nature of climate change, no good reason exists for state- or region-specific policy.

Since many of the sub-national greenhouse gas programs have included permit auctions, simple pre-emption of sub-national programs would be unfair to companies that purchased permits in good faith. Allowing firms to use permits from these programs that were purchased prior to some specified date in lieu of federal permits (at a legislated conversion rate) would be reasonable.

Question 2. Cap-and-trade's advocates have consistently stated their desire to protect consumers from price increases brought on by such programs. So far, their answer has been to increase the number of permits given away for free, in hopes that the recipients will pass less of a burden on to consumers.

Is there a more straightforward and transparent way to make the consumer whole, regardless of the structure of the program itself?

Would it make sense to cut out the middlemen, and directly compensate Americans for their increased expenses instead?

Answer. Auctioning permits and using some of the proceeds to compensate consumers for higher energy costs would be preferable to the use of free permits allo-

cated to LDCs. Using revenue to rebate portions of the payroll tax, to expand the EITC or lower marginal tax rates on the income tax, or to provide a carbon rebate check to households are all possible ways to return money to households that are simple and more transparent than free permit allocation.

Question 3. A great deal of effort on the part of regulated entities—and even non-regulated entities—has gone into securing free permits at the outset of the House and Senate cap-and-trade programs. The importance of these free permits is apparent in the number of blanks left in the recently circulated Senate bill.

As a matter of economics, is Congress any less capable of addressing the priorities reflected in permit allocations by spending auction revenues or tax receipts instead?

Answer. None at all.

Question 4. Some have raised concerns about the detrimental impact that giving away free permits might have on the liquidity and stability of a carbon market. Dr. Ellerman recently wrote that “free allowances. . . reduce the value of the flexibility afforded by banking. As a consequence, the price impact of short run shocks to the system are magnified, resulting in a suboptimal allocation of emissions reductions through time and raising the cost of the system.”

Assuming we want to design the most efficient and straightforward climate program, can you elaborate on this issue for us and how we can account for it in legislation?

Answer. I’m not familiar with this argument and would defer to Dr. Ellerman on this point.

RESPONSES OF GILBERT E. METCALF TO QUESTIONS FROM SENATOR CANTWELL

Question 1. What effect does the point of regulation have on regional disparities in household costs, when one accounts for both direct and indirect costs on consumers from the carbon price signal? And does less (uniform) coverage affect the (indirect) carbon costs passed down to consumers in different regions?

Answer. Point of regulation should have no bearing on the regional impacts of carbon pricing. Economic theory backed up by considerable empirical evidence support the view that the household burdens will be unaffected by the choice of point of regulation. This means that policy can be written to choose the point of regulation to minimize the administrative and compliance costs of the program. For example, choosing refineries as the point of regulation for crude oil (along with import location for finished petroleum products) leads to lower administrative costs than regulating oil either at the well head or the point of consumption. This occurs because we have only 150 refineries in the United States as opposed to thousands of wells or points of final consumption.

Question 2. Combined with a 100 percent auction of allowances, what effect would an equal per capita distribution of the auction revenues have on the regional disparities in net household costs from a carbon policy? How are indirect carbon costs embedded from the production process of goods and services factored in?

Answer. Coastal states tend to benefit from an equal per capita distribution of auction revenues relative to states in the middle of the country. This occurs because of the higher proportion of carbon-free electricity and milder weather (on average) in coastal states. Regional variation is driven almost entirely by variation in the direct carbon costs (higher energy prices) rather than indirect carbon costs.

Question 3. What is the simplest and fairest way to compensate all energy consumers while specifically maintaining a robust carbon price signal and protecting household incomes of the entire lower and middle classes? Roughly, what portion of the allowance value is necessary to keep the majority of households whole?

Answer. It is important to distinguish the price signal from compensation mechanism. We can achieve any desired compensation distribution we wish for the same price signal. Any policy that potentially dilutes the price signal (e.g. free allocation to LDCs) can be replicated (in the sense of achieving the same distributional outcome) with a policy that maintains a strong price signal. The price signal is essential to help us achieve our goal of reducing greenhouse gas emissions at minimum cost.

Question 4. Are lump sum payments to all Americans legally residing in the United States feasible?

Answer. This is not my area of expertise. But I believe it would be relatively straightforward to reach most legal residents. Certain segments of the population (e.g. homeless families) would be difficult to reach. One concern with cash payments (as opposed to reductions in tax payments) is the potential for fraud. Experience with the Earned Income Tax Credit suggests that requiring Social Security numbers for dependents claimed in order to be eligible for EITC payments reduced the number of claimants significantly. This is not an intractable problem but does require

careful program design and consultation with government agencies that have experience in making cash payments.

Question 5. H.R. 2454 gives away a significant share of allowance value much of which goes to the largest historic emitters of carbon dioxide. Are these allowance giveaways likely to distort the carbon price signal and dampen incentives for businesses and individuals to become more efficient and transition to lower-carbon energy sources? Second, doesn't the granting of free allowances to selected industries necessarily entail the government picking winners and losers in its allocation decisions, which will bias fuel and energy technology choices?

Answer. Permit giveaways should have no impact on the price signal so long as firms are not required (e.g. by state regulators) to use the free permits to lower energy prices. Rather permit giveaways alter the distribution of wealth.

Question 6. Won't both the dampening of the carbon price signal and the selecting of winners and losers outside of the market increase overall costs of reducing emissions? Assuming that a main goal of a climate policy is to establish a consistent carbon price signal, wouldn't it make more sense to rely strictly on market mechanisms by auctioning all of the allowances and avoiding the potential distortions that go along with giveaways of allowances or allowance value?

Answer. For both this and the last question it is important to distinguish between the price signal and distributional outcomes. A cap and trade program will lead to a higher price on emissions thereby providing the appropriate price signal. Allowance allocation (free versus auctioned permits) simply determine who receives the value of the permits. One way to see that is to recognize that free allocation of permits is equivalent to fully auctioned permits in which the revenue is then given to the groups that otherwise would receive free permits. Whether the permits are auctioned or allocated freely a firm faces an opportunity cost of emissions by either having to purchase an allowance from some other firm or by foregoing the opportunity to sell an allowance that it holds. This provides the price signal.

Question 7. Many of the cap-and-trade proposals that Congress has considered in the past seem to necessitate the creation of a large, new bureaucracy to monitor greenhouse gas emissions from numerous sources. For administrative simplicity and efficiency, to what extent does the point of regulation matter?

Answer. Point of regulation matters. A fully downstream system, for example, would require tens of thousands of firms and households to comply. A more upstream system has many fewer firms and reduces the administrative burden both on compliance and monitoring.

Question 8. Would an upstream (i.e., wellhead, mine mouth, port of entry) cap that levied a consistent unit price on fossil carbon make sense for all fossil fuels (petroleum, coal and natural gas)?

Answer. This would be a reasonable approach—and one that I have advocated elsewhere.

Question 9. If the point-of-regulation were upstream, how could carbon capture and sequestration (CCS) efforts be fairly and appropriately compensated for the sequestered carbon? Would carbon credits in excess of the cap for the amount of sequestered carbon make sense?

Answer. Under a fully upstream approach, carbon allowances could be provided to firms for their sequestered carbon by the government. These could then be sold on the open market. This provides exactly the same benefit as a system in which the firm engaging in CCS is statutorily responsible for submitting allowances for emissions.

Question 10. I am intrigued by your discussion of the potential efficiency gains from distributing allowance value to American families through tax cuts rather than a lump sum per capita dividend. How likely is it that we would realize these efficiency gains in the real world, especially if distorting giveaways like those in the House-passed bill accompany these tax cuts? Is it possible that a lump sum per capita dividend could actually be equally or more efficient in the real world?

Answer. Since the giveaways are lump sum in nature they do not create distortions. Giveaways simply lead to potentially perverse distributional outcomes. While it is possible for a lump sum distribution to be more efficient in the presence of other tax distortions, it is unlikely to occur here. Most analyses of allowance systems find the lump sum distribution to have the highest efficiency costs when compared to other allocations that auction allowances and use the proceeds to lower tax rates.

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