Congressional Budget Office

Testimony

Statement of
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The Distribution of Revenues from a Cap-and-Trade Program for CO_2 Emissions

before the
Committee on Finance
United States Senate

May 7, 2009

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Chairman Baucus, Senator Grassley, and Members of the Committee, thank you for the invitation to testify on the distribution of revenues that could be generated by a cap-and-trade program for reducing U.S. emissions of carbon dioxide (CO_2).

Global climate change poses one of the nation's most significant long-term policy challenges. Human activities are producing increasingly large quantities of greenhouse gases, especially CO_2. A strong consensus has developed in the expert community that, if allowed to continue unabated, the accumulation of greenhouse gases in the atmosphere will have extensive, highly uncertain, but potentially serious and costly impacts on regional climates throughout the world. Those impacts are expected to include changes in the physical environment, changes in biological systems including agriculture, and changes in the viability of some economic sectors. Moreover, the risk of abrupt and even catastrophic changes in climate cannot be ruled out.

Those expected and possible harms can justify policy actions to reduce the extent of climate change. However, the potential cost of doing so may be significant because it would entail substantial reductions in global emissions over the coming decades. U.S. emissions currently account for roughly 20 percent of global emissions. As a result, substantially reducing global emissions would probably entail large reductions in U.S. emissions. Achieving such reductions would be likely to involve transforming the U.S. economy from one that runs on CO_2-emitting fossil fuels to one that relies on nuclear and renewable fuels, improvements in energy efficiency, or the large-scale capture and storage of CO_2 emissions.

One option for reducing emissions in a cost-effective manner is to establish a carefully designed cap-and-trade program. Under such a program, the government would set gradually tightening limits on emissions, issue rights (or allowances) consistent with those limits, and then let firms trade the allowances among themselves. Such a cap-and-trade program would lead to higher prices for energy and energy-intensive goods, which would in turn provide incentives for households and businesses to use less energy and to develop energy sources that emit smaller amounts of CO_2.

Higher relative prices for energy and energy-intensive goods would also shift income among households at different points in the income distribution and across industries and regions of the country. Policymakers could counteract those income shifts by authorizing the government to sell CO_2 emission allowances and using the revenues to compensate certain households or businesses, or by giving allowances away to certain households or businesses.

My testimony makes the following key points:

- Under a cap-and-trade program, consumers would ultimately bear most of the costs of emission reductions. Firms that used emission allowances for CO_2 would generally pass along to consumers the cost of using those allowances in the form of higher prices for their products—regardless of whether the government sold emission allowances or gave them away. Such price increases would be essential to the

success of a cap-and-trade program because they would be the most important mechanism through which businesses and households were encouraged to make investments and behavioral changes that reduced CO_2 emissions.

- Higher prices for energy-intensive goods and services would lead to a variety of consequences for different industries, regions of the country, and income groups. Industries that produce energy or energy-intensive goods and services could experience a decrease in sales, with adverse consequences for shareholders and employees in those industries. The impact on different regions of the country would reflect the location of industries and the ability of local economies to adapt to changes in the mix of production that a cap-and-trade program might bring about. Furthermore, energy-intensive goods and services such as electricity, home heating, and transportation consume a larger fraction of the income of low-income households, so those households would bear a relatively larger direct burden from policies that reduced CO_2 emissions.

- Policymakers have a wide range of options for distributing the value of the allowances. If allowances are auctioned, the revenues could be used to fund climate-related research and development, reduce existing taxes on capital or labor, give rebates to low-income households, or provide assistance to workers or industries or regions that would be most affected. Alternatively, some or all of the allowances could be given away for free. Giving away allowances to particular firms is generally equivalent to auctioning the allowances and giving the auction proceeds to those same firms.

- Designing programs that protect certain industries, regions, or income groups would entail trade-offs. Reducing existing taxes, for example, could lessen the overall cost of a cap-and-trade program but would do little to offset the burden that higher prices would impose on certain industries or on low-income households. Instead, policymakers might use the revenues from allowance sales to provide support for low-income households—an approach that would lessen their burden but have somewhat higher economywide costs. Or, allowances could be given away to certain industries. Depending on the conditions imposed as part of such free distributions, that strategy might or might not blunt increases in certain prices or protect certain workers.

- If policymakers gave priority to protecting low-income households, a variety of policy instruments would probably be needed. Although a significant fraction of those households have earnings—and thus are likely to file tax returns—many do not. Some mechanisms already in place, such as cost-of-living adjustments for Social Security and other entitlement programs, would automatically compensate some households for part or all of the increased energy costs. Still, no program could address all the region- and household-specific circumstances that could affect families' costs.

The testimony I am presenting today is the product of various efforts by the Congressional Budget Office (CBO) to support the Congress in its consideration of policies related to climate change. Earlier this week, we released the report *Potential Impacts of Climate Change in the United States*, which presents an overview of the current understanding of the impacts of climate change on the United States, emphasizing the wide range of uncertainty about the magnitude and timing of those impacts and the implications of that uncertainty for the formulation of effective policy responses.

In earlier work that was more directly related to the specific topic of today's hearing, CBO evaluated the distributional issues that would arise if a cap-and-trade policy was put in place in *Who Gains and Who Pays Under Carbon-Allowance Trading?* (2000). Today's testimony updates that analysis and others along the way, and a more detailed report is forthcoming. In recent years, CBO has also considered a number of approaches to reducing the cost of controlling emissions, in, for example, a testimony, *Flexibility in the Timing of Emissions Reductions Under a Cap-and-Trade Program*, delivered to the House Ways and Means Committee in March of this year. Other CBO analyses of design issues include *Policy Options for Reducing CO_2 Emissions* (2008) and *Trade-Offs in Allocating Allowances for CO_2 Emissions* (2007). A complete listing of CBO's efforts in the climate change area and access to them can be found under the Climate Change tab under the Frequently Requested heading at www.cbo.gov.

My testimony focuses on a policy that would reduce CO_2 emissions by enacting a cap-and-trade program. A cap-and-trade program would set a limit on total emissions during some period and require regulated firms to hold rights, or allowances, to the emissions permitted under that cap. (Each allowance would entitle companies to emit one ton of CO_2 or to sell fuel that would release one ton of CO_2 when it was burned.) After the allowances for a given period were distributed, firms would be free to buy and sell the allowances among themselves. Firms that were able to reduce emissions most cheaply would profit from selling allowances to firms that had relatively high abatement costs (that is, relatively high costs of reducing emissions). The trading aspect of the program would lead to substantial cost savings relative to command-and-control approaches—which would mandate how much entities could emit or what technologies they should use—because it would provide more flexibility in where and how emission reductions necessary to meet any given target were achieved.

A cap-and-trade program has been implemented at the federal level in the United States to limit emissions of sulfur dioxide (which contribute to acid rain). That program has been in effect since 1995 and is widely judged to have reduced emissions at a significantly lower cost than would have been the case if lawmakers had chosen to rely on a command-and-control approach. A cap-and-trade program for CO_2 emissions is currently in effect in the Northeast region of the United States, and several states outside that region are considering following suit. The European Union has a cap-and-trade program for CO_2 emissions as part of its effort to comply with emission

limits under the initial phase of the Kyoto Protocol, which spans the period from 2008 to 2012.

The Risk of Damage from Climate Change

Over the past century, researchers have developed an increasingly sophisticated understanding of the climate system through direct observations of the system, statistical analyses of those observations, and, more recently, simulations of the system using computer models. In spite of extensive uncertainties, both in the data and in the projections based on that data, researchers are increasingly confident about their ability to decipher the relationship between past activities and recent warming, to distinguish the effect of rising concentrations of greenhouse gases and changing land-use patterns from natural variability and other influences on climate, and to develop projections of the pace and ultimate magnitude and distribution of future warming and related changes.

The great majority of experts conclude that they cannot explain observed patterns of warming and related changes without considering emissions from human activities and that it is very likely that most of the warming is due to human activities. Those experts also conclude that ongoing emissions at current or rising levels will continue to raise atmospheric concentrations and temperatures indefinitely.

These changes are expected to result in many different kinds of impacts on widely differing scales that will develop over widely varying periods of time. The projected types of impacts include changes in seasonal weather patterns; the amount and type of precipitation; storms and sea level; regular climate fluctuations; ocean acidity; ecosystems and biodiversity; agriculture, forestry, and fishing; water supply and other infrastructure; and human health. For example, a changing climate will involve changes in typical patterns of regional and seasonal temperature, rainfall, and snowfall, as well as changes in the frequency and severity of extreme events, such as heat waves, cold snaps, droughts, storms, and floods. Regional climates in the United States are expected to become more variable, with more intense and more frequent extremes of high temperature and rainfall. In general, extreme events tend to have disproportionately greater effects: A small percentage increase in hurricane wind speeds, for example, can greatly increase the potential damage. Unfortunately, changes in the frequency and intensity of extreme events—especially precipitation—are also more difficult to simulate and project.

Some effects, including the melting of ice caps, a rise in sea level, and increasing acidity of the oceans, will unfold relatively gradually. Other effects could appear comparatively abruptly. Some extreme, abrupt changes—such as major shifts in ocean currents and regional patterns of rainfall—could occur unexpectedly, even centuries after emissions have been curtailed and concentrations have been stabilized.

Uncertainty about the magnitude and effect of climate change arises from two main sources: how population growth, technological developments, and economic change

will influence land cover and the growth of emissions; and how rapidly the climate system will respond to accumulating greenhouse gases and other changes and how much warming will ultimately occur. Those uncertainties do not imply that nothing is known about future developments; rather, they suggest that projections of future changes in climate and of the resulting impacts should be considered in terms of ranges of outcomes or probability distributions. For example, some recent research suggests that the median increase in average global temperature during the 21st century will be in the vicinity of 9° Fahrenheit (F)—near the middle of the estimated range of the increase in temperature between the last ice age and today—if no actions are taken to reduce the growth of greenhouse-gas emissions. However, warming could be much less or much greater than that median level, depending on the growth of emissions and the response of the climate system to those emissions.

Just as the amount of warming that would occur in the absence of a policy to reduce emissions is uncertain, so too is the extent to which any given policy would reduce that warming. For example, a policy that limited emissions with the goal of stabilizing atmospheric concentrations of greenhouse gases at roughly 2.3 times the preindustrial CO_2 concentration would significantly moderate warming, but the policy could still result in warming of anywhere between 3° and 6°F over the course of the 21st century (see Figure 1).[1]

Given current uncertainties, crafting a policy response to climate change involves balancing two types of risks: the risks of limiting emissions to reach a temperature target and experiencing much more warming and much greater impacts than expected versus the risks of incurring costs to limit emissions when warming and its impacts would, in any event, have been less severe than anticipated. Climate policies thus have a strong element of risk management: Depending on the costs of doing so, society may find it economically sensible to invest in reducing the risk of the most severe possible impacts from climate change even if those impacts are not very likely to occur. In particular, the potential for unexpectedly severe and even catastrophic outcomes, even if unlikely, would justify more stringent policies than would result from simply balancing the costs of reducing emissions against the benefits associated with the expected reduction in the degree of warming.

Economic Consequences of a Cap-and-Trade Program

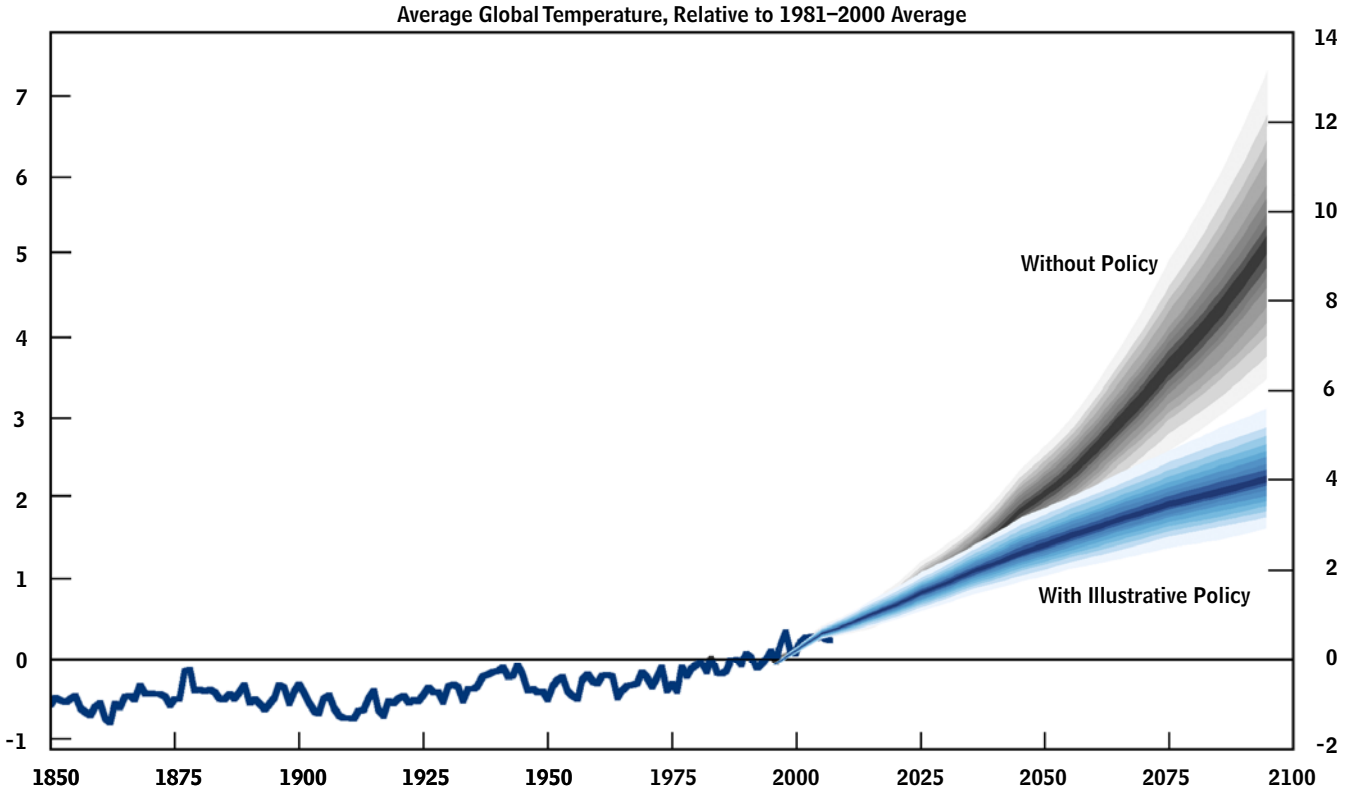
A cap-and-trade program for reducing CO_2 emissions in the United States could reduce the risks of climate change and the damages that would come from such change. It would do so by curtailing the use of fossil fuels, which in turn would change the patterns of output and employment in the United States.

1. Congressional Budget Office, *Potential Impacts of Climate Change in the United States* (May 2009), p. 14.

Figure 1.

Historical and Projected Climate Change

(In degrees Celsius) (In degrees Fahrenheit)



Source: Congressional Budget Office. Historical data are from the Hadley Centre for Climate Prediction and Research, http://hadobs.metoffice.com/hadcrut3/diagnostics/global/nh+sh/annual, and described primarily in P. Brohan and others, "Uncertainty Estimates in Regional and Global Observed Temperature Changes: A New Dataset from 1850," *Journal of Geophysical Research,* vol. 111 (June 24, 2006). The projection is based on data provided by Henry Jacoby, Massachusetts Institute of Technology, in a personal communication to CBO, December 22, 2008; the results are discussed in A.P. Sokolov and others, *Probabilistic Forecast for 21st Century Climate Based on Uncertainties in Emissions (Without Policy) and Climate Parameters,* Report No. 169 (Cambridge, Mass.: MIT Joint Program on the Science and Policy of Global Change, 2009), http://globalchange.mit.edu/files/document/MITJPSPGC_Rpt169.pdf.

Note: The projection, which is interpolated from decadal averages beginning in 1995, shows the possible distribution of changes in average global temperature as a result of human influence, relative to the 1981–2000 average and given current understanding of the climate. Under the Sokolov study's assumptions, the probability is 10 percent that the actual global temperature will fall in the darkest area and 90 percent that it will fall within the whole shaded area. However, actual temperatures could be affected by factors that were not addressed in the study (such as volcanic activity and the variability of solar radiation) and whose effects are not included in the figure.

Changes in Overall Economic Output

Policies that limit emissions of greenhouse gases would reduce the risk of damage from climate change. However, by channeling productive resources toward reducing that risk rather than toward producing goods and services that are measured in gross domestic product (GDP), such policies would be likely to reduce GDP relative to what would otherwise occur.

Restrictions on emissions would lower overall output through several channels. Those restrictions would raise prices for energy produced using fossil fuels, discouraging the use of such energy and energy-intensive products (such as cars and aluminum) and encouraging the use of nonfossil energy and more energy-efficient products. Lower energy consumption would render existing capital and labor less productive, which would lower output directly and would also tend to discourage investment and work. The cost of the energy-intensive process of producing new capital would rise, and some investment would be diverted toward the production of nonfossil replacements for the current fuel mix, reducing investment in other types of productive capital.

The aggregate economic costs of reducing emissions are quite uncertain, and estimates of them vary widely among studies, depending on the models used and the assumptions that analysts make about key factors, such as the development of new technologies. For example, in a review of modeling results for the Lieberman-Warner bill, which the Congress considered last spring (S. 2191), the Congressional Research Service found that estimated reductions in per capita GDP in 2030—relative to the level of GDP that would have occurred in the absence of the cap on emissions but not accounting for the effect that any additional warming might have on GDP—ranged from a low of less than 0.5 percent to a high of 3.8 percent. Six of the 10 available estimates found per capita GDP losses of less than 1 percent.[2]

The policy's design could also affect the macroeconomic costs of reducing emissions. The modeling results mentioned above assumed the allocation of allowances and revenues from the sale of allowances specified in S. 2191. Other allocations and uses of revenues could result in significantly different overall costs.

Despite changes in economic output as measured by GDP, CBO expects total employment to be only modestly affected by a cap-and-trade program to reduce greenhouse-gas emissions. Except during cyclical downturns such as the current recession, most individuals who seek employment are able to find jobs, and a cap-and-trade program would not greatly alter that ability. However, some regions and industries would experience substantially higher rates of unemployment and job turnover as the program became increasingly stringent. That transition could be particularly difficult for individuals employed in those industries (such as the coal industry) or living in those regions (such as Appalachia). However, any aggregate change in unemployment would be small compared with the normal rate of job turnover in the economy.

2. Larry Parker and Brent Yacobucci, *Climate Change: Costs and Benefits of S. 2191*. CRS Issue Brief RL34489 (Congressional Research Service, May 15, 2008), pp. 33–36.

Of course, policymakers need to weigh the aggregate costs of reducing emissions against the costs of climate change itself, including the effects on both measured output and other aspects of national life. Most of the economy involves activities that are not likely to be directly affected by changes in climate, so published estimates of the economic costs of direct impacts of climate change in the United States tend to be modest. A relatively pessimistic estimate for the loss in projected real (inflation-adjusted) U.S. GDP is about 3 percent for warming of about 7°F by 2100.

However, most of the published studies do not include all of the potential costs of climate change to the country over the coming century and beyond. Most important, there are few detailed estimates of the costs of warming in the upper half of the projected range of 6°F to 13°F of warming during the 21st century. Even for the levels of warming that have been examined, most of the estimates cover only a portion of the potential costs. Most studies leave aside nonmarket impacts—such as the effects on human health and quality of life and the loss of species' habitat, biodiversity, and ecosystem services—because determining the value of those changes is especially difficult. Most studies also do not incorporate the potential for abrupt changes in climate, such as shifts in ocean currents that could change weather patterns and affect agriculture over large areas, and rapid disintegration of ice sheets, which could dramatically raise sea level. Moreover, most studies do not incorporate impacts outside the United States. Most experts agree that populations in other countries, especially poor countries near the equator and bordering on desert zones, are likely to suffer the bulk of the damage from climate change during the 21st century. That would harm living standards that are already marginal in regions of Asia, Africa, and the Middle East; it might also contribute to widespread political instability.

The Distribution of Economic Costs

The effects of a cap-and-trade system on overall economic output are only part of the story. Some sectors of the economy, income groups, and regions of the country could shoulder a substantial burden under a cap-and-trade program, while others could benefit. Policymakers could partially compensate those who are harmed by distributing some part of the value of the emissions allowances to them.

The prices that consumers pay for energy and energy-intensive goods and services would rise to reflect the cost of CO_2 emissions under a cap-and-trade program. Such price increases would stem from the restriction on emissions and, in most circumstances, would occur regardless of whether the government sold emission allowances or gave them away. Indeed, the price increases would be essential to the success of a cap-and-trade program because they would be the most important mechanism through which businesses and households would be encouraged to make economically motivated changes in investment and consumption that reduced CO_2 emissions.

Those higher prices would create losses for some current investors and workers in the sectors of the economy that produce energy and energy-intensive goods and services. Investors would see the value of their stocks decline, and workers would face higher

risk of unemployment as jobs in those sectors were cut. Stock losses would tend to be widely dispersed among investors because shareholders typically diversify their portfolios. In contrast, the costs of unemployment would probably be concentrated among relatively few households and, by extension, their communities. The magnitude of those transitional costs would depend on the pace of emission reductions, with more rapid reductions leading to larger transitional costs. At the same time, the prices of stocks in industries that would be expanding under a cap-and-trade program could rise, as would job openings in those industries.

The distribution of costs would also be affected by international trade, especially for goods or services that embody large amounts of greenhouse-gas emissions. The cost of producing such goods in the United States would rise under a cap-and-trade system, thereby disadvantaging producers of those goods relative to foreign competitors that do not face a similarly stringent program for reducing emissions. Although large segments of our economy either do not face significant foreign competition or involve trade with countries that have a cap-and-trade system (the European Union, for example), some important manufacturing industries, such as steel, face competition from countries that do not face the costs of such a system.

Policymakers can significantly affect the distribution of costs associated with a cap-and-trade program, depending on how they decide to distribute the value of the allowances. In establishing a cap-and-trade program, policymakers would create a new commodity: the right to emit CO_2. Those rights would have substantial value. On the basis of a review of the literature and the range of CO_2 policies recently debated, CBO estimates that, by 2020, the value of those allowances could total between $50 billion and $300 billion annually (in 2006 dollars). The actual value would depend on various factors, including the stringency of the cap, the possibility of offsetting CO_2 emissions through carbon sequestration or international allowance trading, and other features of the specific policy that was selected.[3]

Unlike the potential reduction in GDP described above, the value of the allowances is not a cost to the economy as a whole: Some households will pay for the allowances, and other households will receive the income associated with them (either directly, by the government giving them allowances, which they can then sell, or indirectly, by the government selling the allowances and giving them the revenues in the form of tax reductions, for example).

Market forces would determine what households would pay for the allowances. In contrast, policymakers would determine how the value of the allowances was distributed. The options facing policymakers include cutting existing taxes to reduce the overall cost that the policy would impose on the economy, offsetting costs incurred by

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

workers or shareholders in adversely affected industries, providing compensation to adversely affected regions, or cushioning the effects of policy-induced price increases on low-income households.

Effects on Industries, Income Groups, and Regions

A cap-and-trade program would have different consequences for different industries, income groups, and regions of the country.

Energy-Intensive Industries. Imposing a price on emissions through a cap-and-trade program would increase production costs in the economy in two ways. For sectors that produce relatively large amounts of emissions, such as the electricity sector, costs would increase as firms acquired emission allowances or invested in equipment to reduce emissions. For sectors that purchase relatively large amounts of energy, such as the cement industry, costs would increase as energy prices rose in response to the cap. In differing degrees, those increases in costs could be passed along to consumers of energy and energy-intensive products. For energy producers—with the exception of electricity producers subject to rate-of-return regulation—most of the costs eventually would be passed forward to consumers, which would tend to reduce demand for their product. For energy-intensive manufacturers that produce traded goods, the ability to pass increased costs on to consumers depends on the availability of competitors' goods that are not subject to the cap-and-trade price on emissions.

Energy-producing sectors, such as coal-fired electric utilities, and energy-intensive manufacturing, such as the steel industry, would be expected to experience the greatest increases in production costs. However, producers of energy that yield a relatively low amount of greenhouse-gas emissions (for example, nuclear energy, wind generators, and biomass-fired electric utilities) could benefit from a cap-and-trade program. The reason is that those sources, even if they have compliance obligations under the cap-and-trade program, would become more attractive to consumers because their prices would not rise by as much as other energy sources, such as gasoline or electricity generated from burning coal. For example, the Energy Information Administration projected in its analysis of S. 2191 that the amount of electricity produced from nuclear power plants and from renewable energy sources (such as wind turbines and biomass utilities) would be more than 30 percent higher than under the baseline in 2030 and that production from coal-fired utilities would be more than 20 percent lower.

Of the manufacturing sectors, petroleum refiners, coal miners, primary metal manufacturers, and chemical producers have the highest greenhouse-gas emissions relative to their output. In 2006, those sectors alone accounted for about 10 percent of U.S. emissions of greenhouse gases (including emissions from the electricity consumed in those sectors) and employed more than 1.4 million workers at above-average wages, relative to the rest of the economy. The nonmetallic minerals sector (for example, the glass and cement industries), the paper and pulp industry, the apparel and textile sectors, and the mining industries also have relatively high emissions and energy costs.

Together, mining and manufacturing employed more than 10 percent of the U.S. labor force in 2006, accounting for about 15 million jobs. Losses in competitiveness in those sectors would be largest during the initial period of transition and would diminish over time as firms switched to lower-carbon fuels and invested in energy efficiency.

Other sectors of the economy also use significant amounts of energy and produce large amounts of emissions relative to their output but may not be directly covered under the cap-and-trade program. For example, U.S. agriculture purchases and burns significant quantities of fuel and also purchases large amounts of energy-intensive goods (such as fertilizer), but farms are not required (under most cap-and-trade designs) to hold allowances for the farms' greenhouse-gas emissions. That sector would face higher input costs but might be able to pass some of those along to consumers because the competition it faces from imported goods is not as strong as that faced by energy-intensive manufacturers. Similarly, the air, truck, and passenger transportation industries have very high energy costs and emissions relative to output, implying that a cap-and-trade program would result in higher input costs, which would probably be passed along to consumers in higher prices. Those transportation sectors accounted for nearly 5 percent of U.S. emissions in 2006 and employed roughly 2 percent of the U.S. labor force.

Households in Different Income Brackets. Obtaining allowances—or taking steps to cut emissions to avoid the need for such allowances—would become a cost of doing business for firms that were subject to the CO_2 cap. However, those firms would not ultimately bear most of the costs of the allowances. Instead, they would pass those costs along to their customers (and their customers' customers) in the form of higher prices. Such price increases would stem from the restriction on emissions and in most circumstances would occur regardless of whether the government sold the allowances or gave them away.

Although the price of energy-intensive items such as electricity, natural gas, home heating fuels, and gasoline would increase the most, the price of nearly all items would rise in response to the imposition of a cap-and-trade program because energy is an input for almost all goods and services. The price increases for items that were not energy-intensive would account for approximately 40 percent of the total price increases for households.

Without incorporating any benefits to households from lessening climate change, CBO estimates that the price increases resulting from a 15 percent cut in CO_2 emissions could cost the average household roughly $1,600 (in 2006 dollars). As noted above, most of those costs reflect the value of the allowances and would appear as income somewhere else in the economy, with the specific location depending on policymakers' decisions. The increased expense would vary for individual households, depending on the amount they consume and the types of goods they purchase. Accounting for those differences, CBO estimates that the additional cost would range from nearly $700 for the average household in the lowest one-fifth (quintile) of all

Table 1.

Average Annual Household Expenditures on Energy-Intensive Items, by Income Quintile, 2007

(Dollars)

	Quintile					All
	Lowest	Second	Middle	Fourth	Highest	Households
Utility Expenditures	1,203	1,596	1,840	2,181	2,847	1,934
Gasoline Expenditures	1,046	1,768	2,418	2,988	3,696	2,384
Total Spending on Energy-Intensive Items	2,249	3,364	4,258	5,169	6,543	4,318
Total as a Percentage of Income	21.4	12.2	9.2	7.1	4.1	6.8

Source: Congressional Budget Office based on data from Bureau of Labor Statistics, Consumer Expenditure Survey, 2007 (www.bls.gov/cex/2007/Standard/quintile.pdf).

Note: Energy-intensive items include natural gas, electricity, fuel oil, other heating fuels, gasoline, and motor oil.

households arrayed by income to about $2,200 for the average household in the highest quintile.

The rise in prices would impose a larger burden, relative to income, on low-income households than on high-income households for two reasons. First, low-income households spend a much larger fraction of their income than do high-income households. Second, energy-intensive items account for a greater share of low-income households' total expenditures. Data collected by the Bureau of Labor Statistics indicates that, measured as a share of income, spending on energy-intensive items by households in the lowest income quintile averages more than five times that by households in the highest income quintile (see Table 1).

Regions of the Country. The regional effects of a cap-and-trade policy would vary according to the extent to which the sources of income in the region depend on carbon-intensive fuels, such as coal, and the extent to which households' consumption is linked to carbon-intensive fuels. Regions in which the employment base is linked to the production of carbon-intensive fuels, or to industries that rely heavily on those fuels, would probably be more substantially affected. Those regions would be particularly hard hit if workers had limited opportunities to gain employment in industries that are less carbon-intensive.

Regions would also tend to experience greater costs if the households in that region consumed goods that result in greater CO_2 emissions (for example, their electricity comes from coal-fired generators or they need to drive long distances). Some studies that compare the costs of average households across regions have found little variation. However, a recent study that compared household costs on the basis of both income levels and regions found that the costs borne by low-income households varied significantly across regions. For example, the study found that the extra costs

low-income households faced were significantly lower in California and New York State than in the Ohio Valley and the Mid-Atlantic States.[4]

Distributing the Value of the Allowances

A key decision that policymakers would face in designing a cap-and-trade program is how they would distribute the value of the allowances. One option would be to have the government capture the value of the allowances by selling them, as it does with licenses to use the electromagnetic spectrum. Another possibility would be to give the allowances to energy producers, some energy users, or other entities at no charge. The European Union has used that second approach in its cap-and-trade program for CO_2 emissions, and nearly all of the allowances issued under the 14-year-old U.S. cap-and-trade program for sulfur dioxide emissions are distributed in that way. Giving the allowances away to specific entities is equivalent to selling the allowances and giving them cash because those allowances could be sold in a liquid secondary market and, thus, could be easily converted into cash.

How policymakers decided to use the value of the allowances would have significant implications for the distribution of gains and losses among U.S. households and for the overall cost of the policy. Although the direct economic effects of a cap-and-trade program described in the previous section would fall disproportionately on some industries, on some regions of the country, and on low-income households, the program's *ultimate* economic effect would depend on policymakers' decisions about how to allocate the revenues from the emission allowances.

Those decisions would affect not only the distributional consequences of a cap-and-trade policy but also its total economic cost. For instance, the government could use the revenues from auctioning allowances to reduce existing taxes that tend to dampen economic activity. Some of the effects of a CO_2 cap would be similar to those of raising such taxes: The higher prices caused by the cap would reduce real wages and real returns on capital, which would be like raising marginal tax rates on those sources of income. Using the value of the allowances to reduce taxes could help mitigate that effect of the cap. Such an approach would lower the "efficiency cost" of the policy, which reflects the economic losses that occur because prices of goods and services do not reflect the resources, including nonenvironmental resources, used in their production. The efficiency cost includes decreases in the productive use of labor and capital as well as costs (both monetary and nonmonetary) associated with reducing emissions.

In general, policymakers face a trade-off between using the value of the allowances to reduce the overall cost of the policy and using that value to offset costs that are

4. See Dallas Burtraw, Richard Sweeney, and Margaret Walls, *The Incidence of U.S. Climate Policy: Alternative Uses of Revenues from a Cap-and-Trade Auction*, Discussion Paper (Washington, D.C.: Resources for the Future, April 2008).

imposed on particular households (for example, those that have low income, that work in particular industries, or that live in certain regions of the country).

CBO previously examined the distributional and efficiency effects of a cap-and-trade program that would reduce CO_2 emissions in the United States by 15 percent. In that analysis, CBO considered the implications of three ways to use the value of the allowances that illuminate some of the trade-offs that policymakers face. Those options were:

- Selling the allowances and issuing lump-sum rebates to households,
- Selling the allowances and using the revenues to finance cuts in existing taxes, and
- Giving the allowances to producers in adversely affected industries.

My testimony summarizes CBO's quantitative estimates of the distributional effects associated with those alternative uses of the allowance value and points out the potential efficiency consequences of those options.

The three cases that CBO considered represent only a small number of the many options available. For example, policymakers have also considered:

- Using some of the revenues obtained by selling allowances to fund research and development of low-carbon energy technologies or
- Giving some of the allowances to local companies that deliver electricity to households.

Although CBO has not estimated the magnitude of the distributional and efficiency consequences of those two approaches, this section presents a qualitative discussion of those consequences. In addition, CBO has written more extensively about the ability to target compensation toward low-income households. The final section of my testimony concludes with a discussion of CBO's findings.

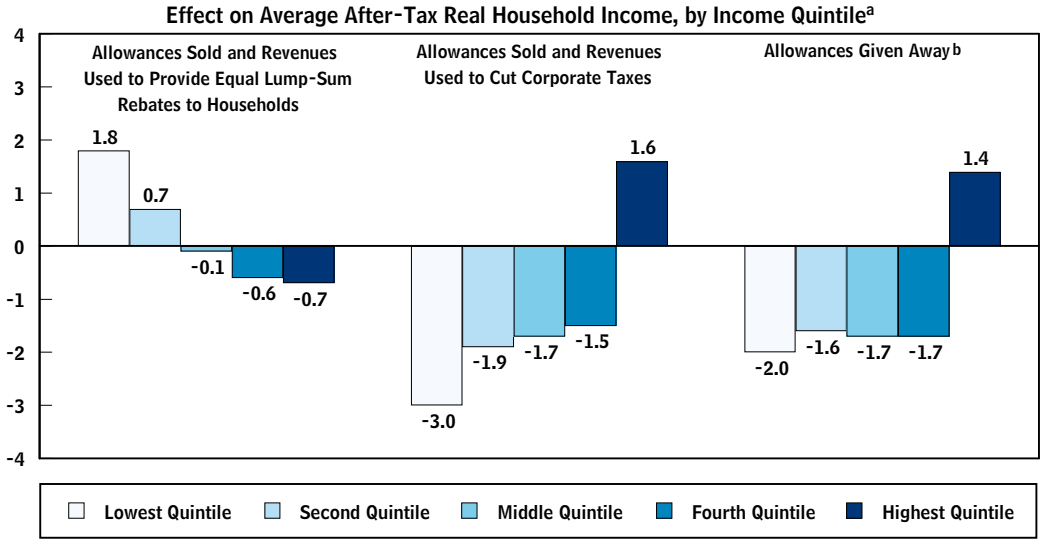
Cut Taxes. Using the revenues from selling allowances to reduce corporate income taxes could lower the overall cost to the economy. For example, the efficiency cost of a 15 percent cut in emissions could be reduced by more than half if the government sold allowances and used the revenues to lower corporate income taxes rather than to provide lump-sum rebates to households or to give the allowances away (see Figure 2).

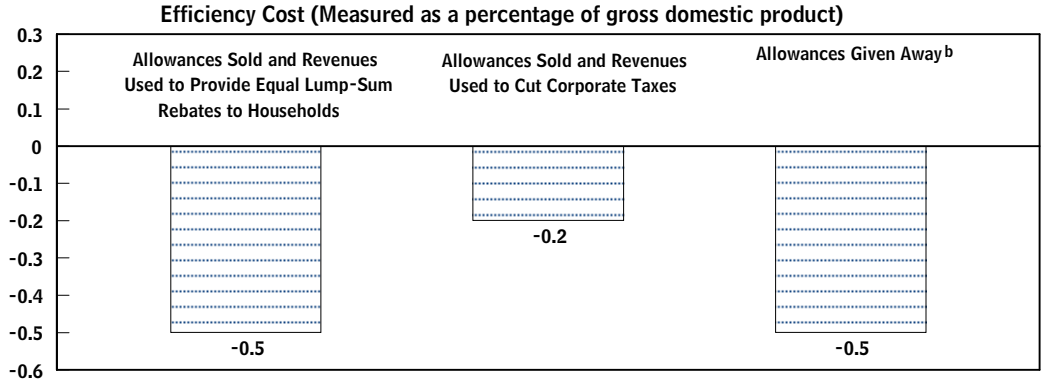
However, that approach would be likely to provide smaller offsets to the price increases experienced by low-income households than would an equal lump-sum rebate to every household. Although corporations write the checks to pay the corporate income tax, that money ultimately comes from households through some combination of lower returns to capital, lower wages, and higher prices. Who pays the tax is

Figure 2.

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

(Percentage change)





Sources: Congressional Budget Office (top panel); Terry M. Dinan and Diane Lim Rogers (bottom panel), "Distributional Effects of Carbon Allowance Trading: How Government Decisions Determine Winners and Losers," *National Tax Journal*, vol. 55, no. 2 (June 2002), 199–221.

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

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

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

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

uncertain, but most assumptions about the incidence of the tax suggest that higher-income households pay a greater portion of the corporate income tax than low-income households. Thus, the benefits to low-income households from reducing corporate income taxes probably would not offset the increased costs they would face from higher energy prices. Using the revenues from selling allowances to decrease payroll taxes would also provide smaller offsets to low-income households than would an equal per-household rebate.

Rebate the Allowance Value to Households. Lawmakers could choose to help offset the price increases experienced by households by providing for the sale of some or all of the allowances and using the revenues to provide rebates. CBO examined the potential effects of a decision to sell the allowances and use the revenues to pay an equal lump-sum rebate to every household in the United States.[5] Low-income households would be better off in that case because the size of the rebate would be larger than the average increase in their spending resulting from the higher price of energy (see Figure 2).[6] High-income households would be worse off under that scenario (again, excluding any benefit from reducing the risks associated with climate change) because the average increase in their spending would be larger than the rebate.

Give Allowances to Key Industries. Rather than sell the allowances, the government could give all or most of them to energy producers—as was done in the cap-and-trade program for sulfur dioxide emissions. However, this approach would not offset the regressivity of the price increases. The reason is that the prices of energy-intensive goods and services would rise regardless of whether producers were required to purchase the allowances or received them for free. The price increases would stem from the restriction on emissions and the resulting fact that allowances would have value in the private market even if they were given away by the government. Thus, giving away allowances to energy-intensive manufacturers without requiring certain actions would generally not affect the prices charged for energy-intensive goods.

Moreover, giving allowances to producers would tend to benefit higher-income households. If companies benefited from the price increases but did not have to purchase allowances, they would receive windfall profits, which could be very large. For example, in 2000, CBO estimated that if emissions were reduced by 15 percent and all of the allowances were distributed free of charge to producers in the oil, natural gas, and coal sectors, the value of the allowances would be 10 times the combined profits of those producers in 1998. Thus, the windfall gains that they would receive as a result of the free distribution would far outweigh the loss in sales that they might experience as consumers cut back on their use of fossil fuels.

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

6. One researcher has suggested that an environmental tax credit based on earnings also could reduce the regressive effects of the price increases that would result from a tax or cap on CO_2 emissions. See Gilbert E. Metcalf, *A Proposal for a U.S. Carbon Tax Swap*, Discussion Paper 2007-12 (Washington, D.C.: Brookings Institution, Hamilton Project, October 2007).

Profits resulting from a free distribution of allowances would accrue to shareholders, who are primarily from higher-income households. That additional income would more than offset those households' increased spending due to higher prices (see Figure 2). Low-income households, by contrast, would benefit little if allowances were given unconditionally to firms, and they would still bear a disproportionate burden from the price increases that would nonetheless occur. Thus, giving away allowances unconditionally would be significantly regressive, making higher-income households better off as a result of the cap-and-trade policy and making lower-income households worse off.

Giving away allowances for free but with certain conditions would have a different effect on households. For example, if energy-intensive manufacturers received allowances as transition assistance based on historic levels of output or emissions, producers would be likely to experience windfall profits. However, if the receipt of that assistance was tied to future decisions about production, such as the level of output, firms would generally maintain production and thereby employment at higher levels than they would without such assistance. As a result, prices for those goods would not rise by as much as they might have. At the same time, because sectors receiving such transition assistance would not be likely to reduce emissions as much as they might have without free allowances, other sectors would have to reduce emissions by a larger amount in order to meet an overall cap on emissions, leading to higher price changes in the sectors that did not receive such assistance.

Finally, giving the allowances to selected industries, regardless of whether or not those allowances were tied to their decisions about production, would not encourage the productive use of labor and capital in the same way that cutting tax rates would. As a result, the efficiency cost of a cap-and-trade program would be higher if policymakers chose to give allowances to firms rather than to use the value of the allowances to reduce the corporate income tax (see Figure 2).

Give Allowances to Local Distribution Companies. One option that policymakers have considered is to give allowances to local distribution companies, which purchase electricity from generators and sell it to households. The distributional and efficiency outcomes associated with this option depend on how those companies would use the revenues obtained from selling the allowances (because they would not need the allowances for compliance purposes, they would sell them to producers that did). For example, they could use the revenues to offset the higher electricity prices that households would otherwise face. Alternatively, they could use the revenues to directly fund improvements in energy efficiency for the households that they serve.

Determining the distributional effects of these different options would require further research because electricity is only one of the goods that households consume, and actions that the local distribution companies took could result in the need for greater emission reductions outside the electricity sector. For example, using the allowance revenues to offset the increase in electricity prices that households would otherwise face would seem to decrease the burden that the cap-and-trade program would

impose on low-income households, but that may or may not be the case. Muting the increase in electricity prices would increase the overall cost of the policy because it would reduce households' incentives to undertake measures to reduce their electricity consumption, such as choosing more efficient appliances or turning down their thermostats. As a result, the burden of meeting the cap would fall more heavily on other sectors, and that additional burden would be reflected in higher prices for other goods and services that households purchase. (For example, the price of gasoline would probably increase more than would otherwise be the case.) As a result, determining the distributional consequences of having the local distribution companies use the value of the allowances to offset increases in electricity prices would require accounting both for the protection that households would receive from electricity prices increases and the corresponding increases in the prices of other goods and services that they purchase.

Fund Research and Development. Some observers have proposed that the federal government allocate a part of the revenues that could be generated by a cap-and-trade program to research and development (R&D) that would reduce the cost of transitioning from a high-emissions economy to one that uses less energy overall and produces that energy with lower-emission technologies. In 2008, the federal government spent over $6 billion recorded on the "climate change budget," a cross-agency tabulation of spending for programs directed toward better understanding and monitoring the global climate, providing incentives to firms and households to develop and adopt technologies that reduce energy use and greenhouse-gas emissions, and supporting developing countries in reducing their greenhouse-gas emissions. The American Recovery and Reinvestment Act of 2009 (Public Law 111-5) provided one-time spending authority of almost $40 billion for purposes that arguably could be included in a future tabulation of the climate change budget.

The breadth of programs clustered under the climate change umbrella makes it difficult to characterize the benefits provided by past spending: Some programs have been judged to be cost beneficial while others have failed to achieve their stated objectives. But going forward, at least one justification for additional and large public expenditures would be weakened if a cap-and-trade program was in effect. The damages caused by greenhouse-gas emissions are not currently recognized in the prices that firms and households pay for energy and other goods that cause those emissions when produced. Because a cap-and-trade program would increase the prices paid by firms and households, both groups would have incentives to seek alternatives. In the case of firms, that would probably include increased investment in developing and putting in place new lower-emission technologies, which would be more eagerly sought by consumers in the marketplace. In that sense, a cap-and-trade program is an R&D program because it encourages firms to spend more on innovation; it also supports the wide adoption of lower-emission technologies because it reduces the relative price that consumers pay for those innovations.

Options for Offsetting the Economic Impact of a Cap-and-Trade Program on Low-Income Households

Lawmakers could choose a variety of policies for offsetting the costs to households of higher energy prices. An important consideration in using revenues to provide assistance to households would be to do so in a way that did not incur significant new administrative or compliance costs. Using existing transfer programs or providing rebates through the income tax system would avoid creating new institutional structures for administering payments. Existing systems that already collect information on household income also are well suited to targeting assistance on the basis of need.

No single existing system would reach all households, however. For example, only 54 percent of households in the lowest fifth of the income distribution receive earnings and thus would be likely to file an income tax return (see Figure 3). Households that normally would not file a return would need to file to participate in a rebate program based on the income tax system. The response to the recent stimulus rebates suggest that such an approach can work but that 100 percent participation is unlikely.

Delivering rebates through a combination of the income tax system and existing transfer programs would, in theory, do a better job of reaching affected households than would relying on either approach by itself, and it would not require a new program. In practice, however, it is not easy to coordinate among existing programs to avoid overlap and ensure that economically equivalent households receive roughly the same benefit. For example, although 54 percent and 45 percent of households in the lowest quintile receive earnings and Social Security benefits, respectively, 10 percent of households receive both. As a result, 11 percent of households in the lowest quintile receive neither.

Reductions in Income Tax Rates

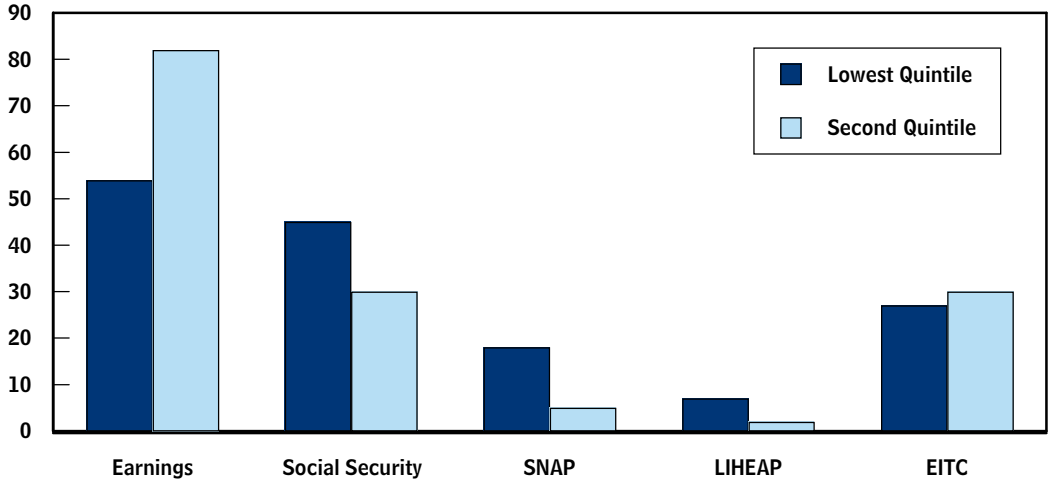
Reductions in individual or corporate income tax rates would be straightforward to administer and would provide the largest benefits in terms of economic efficiency, but they would score low in terms of offsetting energy price increases for low- and moderate-income households. Reductions in individual income tax rates would enable taxpayers to lower the amount of taxes withheld from their paychecks to cover the cost of additional expenditures on energy-intensive items as they occurred throughout the year.

A proportional reduction in all individual income tax rates would provide the largest percentage increase in after-tax income and the largest dollar amount of tax reductions for taxpayers in the highest income tax brackets; taxpayers in the 10 percent or 15 percent tax brackets, who constitute roughly two-thirds of taxpayers with taxable income, would receive minimal benefits. Limiting the rate reductions to only the two lowest income tax brackets would provide a larger share of the tax benefits to taxpayers in those brackets, but taxpayers whose income put them near the top of the 15 percent bracket ($41,450 for a single taxpayer and $83,000 for a couple in 2008)

Figure 3.

Low-Income Households with Income and Benefits from Selected Sources

(Percent)



Sources: Congressional Budget Office tabulations and tax calculations based on data from the March 2005 Current Population Survey.

Notes: Quintiles are based on household income, unadjusted for household size. Quintiles have equal numbers of people.

SNAP = Supplemental Nutrition Assistance Program; LIHEAP = Low Income Home Energy Assistance Program; EITC = earned income tax credit.

would benefit the most. Reductions in income tax rates would not help low-income households that did not have sufficient income to owe income taxes.

A reduction in corporate income tax rates would benefit owners of corporate stock in the short run, with most of the benefits going to higher-income households. As capital markets adjusted over the longer term, however, the economic gain from reducing the tax would spread across all types of capital. And over time, at least some of the economic gains could also be shifted to wage earners, although the degree of such shifting is uncertain. Nevertheless, any gains by low- and moderate-income households from a reduction in corporate taxes would be modest—even over the longer term—and insufficient to offset their increased energy costs.

Payroll Tax Rebates. A payroll tax rebate would reach the approximately 165 million workers covered under the Social Security and Medicare programs. Economist Gilbert Metcalf of Tufts University has proposed a payroll tax rebate for Social Security and

Medicare taxes as an offset to a carbon dioxide tax.[7] Under that proposal, the rebate would apply to the tax on the first $3,660 of earnings. With a combined employee and employer tax rate of 15.3 percent, the maximum energy credit per worker would be $560.[8]

Households without covered earnings would not benefit from a payroll tax rebate. Many of those households have low income or include retirees. Data from the 2008 Current Population Survey, produced by the U.S. Census Bureau, indicate that although about 80 percent of all households would be eligible for a payroll tax rebate, only slightly more than half (54 percent) of the households in the lowest fifth of the income distribution would qualify. Among those who qualified, some would receive less than a full $560 rebate if their earnings were less than $3,660. About three-quarters of the households in that quintile who would not qualify for a payroll tax rebate receive Social Security benefits and thus would be partially protected from higher energy costs by cost-of-living adjustments.

Administering a payroll tax rebate would be complicated by a number of issues. Adjusting payroll tax withholding would impose some administrative burden on employers, who also would lack the necessary information to adjust withholding for workers with more than one job. An alternative to adjusting payroll tax withholding would be to pay the rebate through the income tax system when workers filed their returns. Although that approach would be easier to administer, the timing of the rebate would not coincide with the timing of individuals' increased expenditures. Furthermore, because some workers who pay payroll taxes do not currently file income tax returns, some additional administrative costs would be incurred to process more returns.

A payroll tax rebate (like any fixed-dollar rebate) would be progressive over most of the income distribution, providing benefits that were a larger percentage of income for lower-income households except for those with the very lowest income and little or no earnings. (The rebate would not necessarily be equal for households with the same income, because the rebate amount would depend upon the number of workers within each household.)

A payroll tax rebate would provide modest incentives for greater participation in the labor force by increasing workers' take-home pay. It would not offer new work incentives for people already in the labor force with earnings high enough to qualify for the maximum rebate.

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7. Gilbert E. Metcalf, *A Green Employment Tax Swap: Using a Carbon Tax to Finance Payroll Tax Relief,* Tax Reform, Energy, and the Environment Policy Brief (Washington, D.C.: Brookings Institution and World Resources Institute, June 2007).

8. A payroll tax rebate would not have to affect the financial status of Social Security and Medicare or the future retirement benefits of workers. Workers would receive credit for their full covered earnings, and the Social Security and Medicare trust funds could be credited for the full amount of the payroll tax.

Income Tax Rebates. The Internal Revenue Service (IRS) has experience delivering rebates based on information in income tax returns, most recently with the 2008 stimulus payments. When filing, households could claim a rebate as a credit against their income tax liability. That transaction would present the same timing issues described in the preceding section. Unless the rebates were refundable (that is, payable in excess of the amount of income tax owed), they would be of little or no value to taxpayers who filed income tax returns but owed no income tax—which was the case for approximately 45 million of the 138 million returns filed in 2006. Moreover, as seen in the experience with stimulus payments, the IRS would need to undertake substantial educational efforts, and many wage earners and others who otherwise would not file income tax returns (because their income falls below the statutory requirements for filing) would need to file one to obtain the rebate. In 2006, for example, an estimated 20 million households did not file a return. Households with very low income and those headed by elderly people account for most of the households that do not file a return.

The economic stimulus rebates that were available in 2008 provide an indication of the number of eligible households that are likely to file an income tax return in order to claim a rebate. The IRS received approximately 156 million individual income tax returns during the 2008 filing season, the first year in which filers could claim the recovery rebate included in the Economic Stimulus Act of 2008. That total represents an increase of 16 million returns (11.5 percent) over the number received in the previous year. Much of that increase probably represents those filing solely to claim the rebate—the annual increases in returns received during the 2006 and 2007 filing seasons were just 1.6 percent and 3.0 percent, respectively. Although many households appear to have filed a return just to claim the rebate, the number that did so was a bit below expectations. When the Economic Stimulus Act of 2008 was enacted, the Joint Committee on Taxation estimated that $106.7 billion in stimulus payments would be paid in fiscal year 2008. A total of $94.1 billion was actually distributed in that year, although it is difficult to know how much of the shortfall was attributable to eligible people failing to claim the rebate. The economic stimulus rebates were temporary, however. The percentage of eligible households that would file under a permanent program would probably be higher.

A refundable tax rebate of a fixed dollar amount would be progressive, providing greater relief as a percentage of income to low-income households. Rebates can be adjusted for differences in family size. They can also be targeted toward lower-income taxpayers by reducing (phasing out) the amount of the credit at higher incomes. For example, the individual income tax rebates that were part of the 2008 economic stimulus package were reduced by 5 percent of income in excess of $75,000 for individuals and $150,000 for couples. Phasing out a rebate reduces its budgetary cost but adds complexity to the calculation of tax liability and makes the true tax on additional income (the marginal tax rate) less transparent.

One issue is whether the rebates would be paid to all households or only those that met certain income requirements. The recent economic stimulus rebates were payable to households without income tax liability if their combined income from earnings, Social Security, and veterans' disability payments was at least $3,000. Allowing all households to claim a refundable income tax rebate would increase administrative costs.

A fixed rebate that did not depend on earnings would not provide households with any additional incentives to work or save and thus would not offset any of the overall economic costs associated with a cap-and-trade program.

Expand the Earned Income Tax Credit

An option based on the current tax system, and targeted specifically toward low-income households, would be to expand the earned income tax credit. The EITC is a refundable credit (that is, households receive a payment if the credit exceeds their income tax liability) payable to low-income families with earnings. In 2008, single parents with one child and income up to $33,995 ($36,995 for a married couple) were eligible for the credit. Single parents with two or more children could qualify with income up to $38,646 ($41,646 for a married couple). Childless workers between the ages of 25 and 65 were eligible for a much smaller credit but must have had income less than $16,000 to qualify.

In 2006, taxpayers filed for the earned income tax credit on 23 million tax returns. The total amount of the credit was $44.4 billion, of which $39.1 billion (88 percent) was refundable. About half of the total EITC payments went to families whose income was less than $15,000.[9]

Increasing the EITC payments would be straightforward for the IRS to administer. If the increase was proportional to the existing credit, most of the benefits would go to low-income families with children and very few to childless workers. Increasing the EITC would not provide any benefits to households that had no earnings, however.

An expansion of the EITC could also yield economic benefits. For example, studies have found that increases in the EITC have had a positive effect on the participation of low-income single women in the labor force.[10] Although increasing the EITC would raise marginal tax rates for some workers, there appears to be little adverse effect on the number of hours worked by people who are already working.

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9. Internal Revenue Service, *Statistics of Income—2006: Individual Income Tax Returns*, Publication 1304 (Rev. 07-2008), 2008.

10. See Bruce D. Meyer, "The U.S. Earned Income Tax Credit, Its Effects, and Possible Reforms," Harris School of Public Policy Studies (University of Chicago) and National Bureau of Economic Research (August 2007); and Nada Eissa and Hilary W. Hoynes, "Behavioral Responses to Taxes: Lessons from the EITC and Labor Supply," in James M. Poterba, ed., T*ax Policy and the Economy,* vol. 20 (Cambridge, Mass.: MIT Press, 2006), pp. 74–110.

Automatic Increases in Social Security and Supplemental Security Income Benefits

Households receiving benefits from the Social Security or Supplemental Security Income (SSI) programs would be partially protected from higher energy costs because those benefits are automatically increased each year to reflect increases in consumer prices. Therefore, considered in combination with automatic increases in Social Security benefits and SSI, options such as a payroll tax rebate that are limited to households with earnings can reach a large portion of the low- and moderate-income population. Data from the Current Population Survey indicate that about 95 percent of households would qualify for a payroll tax rebate or an automatic cost-of-living increase in Social Security benefits, including 85 percent to 90 percent of households in the lowest income quintile. Cost-of-living increases for Social Security and SSI would only partially protect households receiving those benefits because income from those sources covers only part of their total expenditures. That effect would be exacerbated because expenditures on energy-intensive items are a higher share of total expenditures for the elderly (see Table 2).

Supplement to SNAP Benefits

An energy credit based on the same eligibility rules as those for the Supplemental Nutrition Assistance Program (SNAP, formerly known as the Food Stamp program) would be a way to target benefits toward low-income households. To be eligible for SNAP, an applicant's monthly income must be at or below 130 percent of the poverty guideline ($2,238 for a family four) and countable assets must be less than $2,000 ($3,000 for households with elderly or disabled members). Approximately 27 million people receive SNAP benefits each month. About 65 percent of eligible people participate in the program, and nearly 90 percent of eligible children do.[11]

An energy credit could be distributed to households through the same system as SNAP benefits, which are paid through an electronic benefit transfer system. Those SNAP benefits are deposited electronically in individual accounts each month, and recipients use a card to debit their account when paying for groceries.

An energy supplement to SNAP benefits would not affect work or savings incentives at the margin and thus would not offset any of the economic efficiency costs of higher energy prices.

Increased Funding for the Low-Income Home Energy Assistance Program

Increases in funding for the Low Income Home Energy Assistance Program (LIHEAP) could supplement other options for offsetting higher energy costs but by themselves would not be an effective way to help the majority of low- and moderate-income households. Federal rules restrict LIHEAP assistance to households with

11. Kari Wolkwitz, *Trends in Food Stamp Program Participation Rates: 1999–2005* (prepared by Mathematica Policy Research for the U.S. Department of Agriculture, Food and Nutrition Service, June 2007).

Table 2.

Average Annual Household Expenditures on Energy-Intensive Items, by Age, 2007

(Dollars)

	Under Age 65	Age 65 and Over	All Households
Utility Expenditures	1,947	1,880	1,934
Gasoline Expenditures	2,607	1,461	2,384
Total Spending on Energy-Intensive Items	4,554	3,341	4,318
Total as a Percentage of Income	6.6	8.3	6.8

Source: Congressional Budget Office based on data from Bureau of Labor Statistics, Consumer Expenditure Survey, 2007 (www.bls.gov/cex/2007/Standard/sage.pdf).

Note: Energy-intensive items include natural gas, electricity, fuel oil, other heating fuels, gasoline, and motor oil.

income up to 150 percent of the federal poverty guideline (or 60 percent of state median income if greater). States, however, can choose to set lower income limits, and as a result, eligibility requirements vary from state to state. In 2006, an estimated 5.5 million households received assistance through LIHEAP—about 16 percent of federally eligible households.

Providing assistance to all low- and moderate-income households would require a major expansion of the program, a substantial increase in administrative costs, and possibly a major overhaul of the program. The current program is funded as a block grant from the federal government to the states and other entities, leaving wide latitude in the types of assistance provided. Increasing LIHEAP subsidies could raise the overall cost of achieving a given cap because it would offset the price signals that are necessary to motivate households to undertake low-cost reductions.

Increased Incentives for Energy-Saving Investments by Households

The increase in energy prices that would result from a cap-and-trade program would encourage businesses and households to adjust their energy usage. Using revenues from auctioning allowances to subsidize household investments that reduced carbon dioxide emissions would lower the cost to households of adapting to higher energy prices. For example, subsidizing weatherization improvements would enable households to use less energy for heating and cooling.

However, incentives for energy-saving investments in combination with a cap-and-trade program would not reduce CO_2 emissions below the level set by the program. Although investment incentives could alter the timing of emission reductions by lowering the cost of meeting the targets, the cap set by the program would ultimately determine the total amount of the reductions.

Furthermore, such incentives could increase the total costs (both public and private) of meeting the cap because they would encourage households to choose certain alternatives over others in adjusting to higher energy prices. For example, a tax credit for solar heating would encourage the use of that technology even if it was not the most cost-efficient alternative in the absence of the credit. Creating a tax-incentive system without distorting technology choices is difficult.

A wide variety of deductions or credits related to energy savings already exist at both the federal and state levels. A federal credit (termed the Section 45 production tax credit) is available for electricity produced using certain renewable energy sources, including wind, biomass, geothermal energy, solar energy, and others. Other credits are available for the manufacture of energy-saving appliances, the construction of new energy-efficient homes, energy-efficient improvements to existing homes, and purchases of alternative types of motor vehicles.