Congressional Budget Office

Testimony

Statement of
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The Distributional Consequences of a Cap-and-Trade Program for CO_2 Emissions

before the
Subcommittee on Income Security and Family Support
Committee on Ways and Means
U.S. House of Representatives

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Chairman McDermott, Congressman Linder, and Members of the Subcommittee, thank you for the invitation to testify this morning on the implications for low-income families of cap-and-trade programs that are designed to reduce 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, particularly CO_2. The accumulation of those gases in the atmosphere is expected to have potentially serious and costly effects on regional climates throughout the world. The magnitude of such damage remains highly uncertain, but there is growing concern about the risk that the damage may be extensive and perhaps even catastrophic.

A risk of such magnitude can justify actions to reduce that possible harm in much the same way that the hazards we all face as individuals motivate us to buy insurance. Although the potential damage from climate change is large, the potential cost of avoiding it is large too, because it would entail making large 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, and 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 allow firms to trade the allowances among themselves. The net financial impact of such a program on low- and moderate-income households would depend in large part on how the value of emission allowances was allocated. By itself, a cap-and-trade program would lead to higher prices for energy and energy-intensive goods. Those price increases would impose a larger burden on low- and moderate-income households than on higher-income households, relative to either their income or total spending. Lawmakers could choose to offset the price increases experienced by low- and moderate-income households by providing for the sale of some or all of the CO_2 emission allowances and using the revenues to compensate such households.

My testimony makes the following key points about those issues:

- A cap-and-trade program, like a tax on CO_2 emissions, could raise a significant amount of revenue because the value of the allowances created under such a program would probably be substantial. As the cap specified in legislation became more stringent over time, the value of the allowances would grow. A key decision for policymakers is whether to sell all of the emission allowances, thereby capturing their value in the form of federal revenue that could be used in various ways, or to give some of them away (for example, to companies that produce or use fossil fuels).

- Under a cap-and-trade program, firms would not ultimately bear most of the costs of the allowances but instead would pass them along to their customers in the form of higher prices. Such price increases would stem from the restriction on emissions and would occur regardless of whether the government sold emission allowances or gave them away.

- Price increases would be essential to the success of a cap-and-trade program because they would be the most important mechanism through which businesses and households would be encouraged to make investments and behavioral changes that reduced CO_2 emissions. Those increases, however, would impose a larger burden, relative to their income, on low-income households than on high-income households.

- Policymakers would face trade-offs in deciding how to use the value of the allowances. For example, they might sell the allowances and use the revenue to reduce existing taxes that discourage the productive use of capital and labor. That strategy could lessen the overall cost that a cap-and-trade program would impose on the economy but would do little to offset the burden that the price increases would impose on low-income households. Alternatively, policymakers might choose to use the revenue raised by selling allowances to provide support for low-income households—a strategy that would lessen the burden on low-income households but that could have somewhat higher economywide costs. Thus, policymakers will face trade-offs in deciding how to best use the value of the allowances. A policy of giving the allowances away to companies would preclude either reducing the economywide costs or lessening the burden on low-income households.

- Designing programs that protect low-income households could be challenging: No program could address all the region- and household-specific circumstances that could affect families' costs. A variety of policy instruments might be necessary to effectively target most low-income households. 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 households for some or all of the increased energy costs.

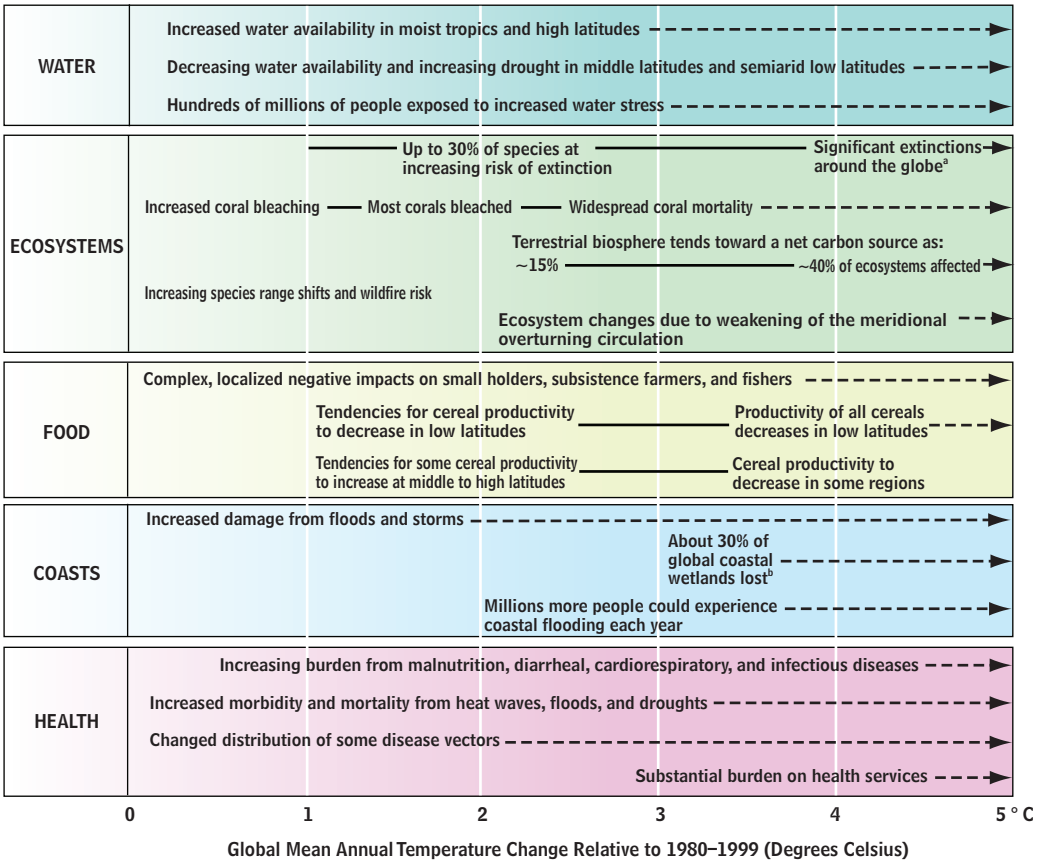
The Risk of Damage from Climate Change

Shifts in climate resulting from the accumulation of greenhouse gases in the atmosphere will have many different effects, including impacts on regional and seasonal weather patterns; the amount and type of precipitation; large storms and hurricanes; oscillations in temperature and precipitation; sea level; ocean acidity; ecosystems and biodiversity; agriculture, forestry, and fishing; water supply; and human health.

Although linking particular effects to specific changes in global temperature is extremely difficult, those effects are expected to become increasingly severe as the

Figure 1.

Key Effects of Climate Change as a Function of an Increase in Global Average Temperature



Source: Neil Adger and others, "Summary for Policymakers," in M.L. Parry and others, eds., *Climate Change 2007: Impacts, Adaptation and Vulnerability.* Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge, U.K.: Cambridge University Press, 2007), p. 16.

Note: Effects will vary by extent of adaptation, rate of temperature change, and socioeconomic pathway.

a. "Significant" is defined as more than 40 percent.

b. Based on an average rise in sea level of 4.2 millimeters per year from 2000 to 2080.

climate warms. According to the most recent major report of the Intergovernmental Panel on Climate Change (IPCC), even 1 degree Celsius of additional warming could result in increasing drought and decreasing water availability in arid regions such as the Mediterranean and the American Southwest; increasing damage from storms, flooding, and rising sea level in several regions; substantial bleaching of corals and a significant fraction of the world's species being placed at increasing risk of extinction; shifts in agricultural productivity, with degradation in some regions and improvement in others; and changes in the geographic distribution of some diseases. Figure 1, which is drawn from the IPCC report, summarizes the research about the types of environmental and economic changes that might accompany varying changes in the climate.[1] The potential for a rapid, abrupt change in climate to occur if global temperatures pass a critical, but uncertain, level is of most significant concern. Such rapid change would entail substantial damage because it would not allow time for species and ecosystems to adjust. For reasons similar to why individuals insure themselves against risks they face, policymakers might want to cut CO_2 emissions in order to reduce the potential for substantial damage.

How a Cap-and-Trade Program Would Work

As part of a global effort to reduce CO_2 emissions, the United States is considering a cap-and-trade program that would seek to mitigate those changes by setting a limit on total emissions during some period and requiring 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. 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

1. Neil Adger and others, "Summary for Policymakers," in M.L. Parry and others, eds., *Climate Change 2007: Impacts, Adaptation and Vulnerability.* Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge, U.K.: Cambridge University Press, 2007).

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.

Distributional Consequences of a Cap-and-Trade Program

In establishing a cap-and-trade program, policymakers would create a new commodity: the right to emit CO_2. The emission allowances would have substantial value. On the basis of a review of the existing literature and the range of CO_2 policies now being debated, CBO 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.[2]

Policymakers would need to decide how to allocate the allowances that corresponded to each year's CO_2 cap. One option would be to have the government capture 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 or some energy users 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. Whether policymakers decided to sell all of the allowances or give some of them away would have significant implications for the distribution of gains and losses among U.S. households and for the overall cost of the policy.

Market Forces Would Determine Who Bore the Costs of a Cap

Obtaining allowances—or taking steps to cut emissions to avoid the need for such allowances—would become a cost of doing business for firms that were subject to the CO_2 cap. However, those firms would not ultimately bear most of the costs of the allowances. Instead, they would pass those costs along to their customers (and their customers' customers) in the form of higher prices. By attaching a cost to CO_2 emissions, a cap-and-trade program would thus lead to price increases for energy and energy-intensive goods and services, the production or use of which contributes the most to those emissions. Such price increases would stem from the restriction on emissions and, except in limited circumstances (for electricity in states with price regulations, for instance), would occur regardless of whether the government sold

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

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.

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.

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. In addition, energy-intensive items compose 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).

Although the price of energy-intensive items such as electricity, natural gas, home heating fuels, and gasoline would increase the most, the price of most 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 (as a percentage of income) for items that were not energy-intensive would account for approximately 40 percent of the total price increases for households.

The price increases caused by a cap-and-trade program would impose additional costs on households. For example, 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), ranging from nearly $700 in additional costs for the average household in the lowest one-fifth (quintile) of all households arrayed by income, to about $2,200 for the average household in the highest quintile.

The higher prices that would result from a cap on CO_2 emissions would reduce demand for energy and energy-intensive goods and services and thus create losses for some current investors and workers in the sectors of the economy that supply such products. Investors might see the value of their stocks decline, and workers could 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.

Policymakers Would Determine Who Received the Value of the Allowances

Although the price increases triggered by a cap-and-trade program for CO_2 emissions would have a greater impact, relative to income, on lower-income households, the program's ultimate distributional effect would depend on policymakers' decisions about how to allocate the emission allowances. Those allowances would be worth tens or hundreds of billions of dollars per year. Who received that value would depend on how the allowances were distributed.

Lawmakers could choose to offset the price increases experienced by low-income households or the costs imposed on workers in particular industrial sectors by providing for the sale of some or all of the allowances and using the revenue to pay compensation. For example, CBO previously examined the distributional effects of a cap-and-trade program that would reduce CO_2 emissions in the United States by 15 percent. That study concluded that lower-income households could be better off as a result of the policy (even without including any benefits from reducing climate change) if the government chose to sell the allowances and use the revenue to pay an equal lump-sum rebate to every household in the United States.[3] In that case, the size of the rebate would be larger than the average increase in spending by low-income households resulting from the higher price of energy (see the top panel of Figure 2).[4] 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.

In contrast, using the revenues from selling allowances to reduce corporate income taxes would provide smaller offsets to the price increases experienced by low-income

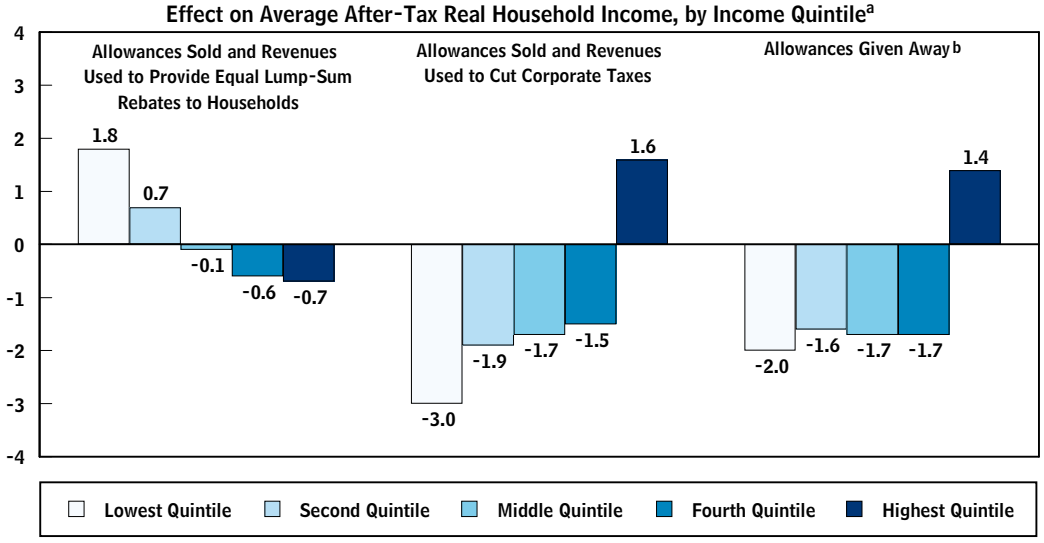
3. See Congressional Budget Office, *Who Gains and Who Pays Under Carbon-Allowance Trading? The Distributional Effects of Alternative Policy Designs* (June 2000).

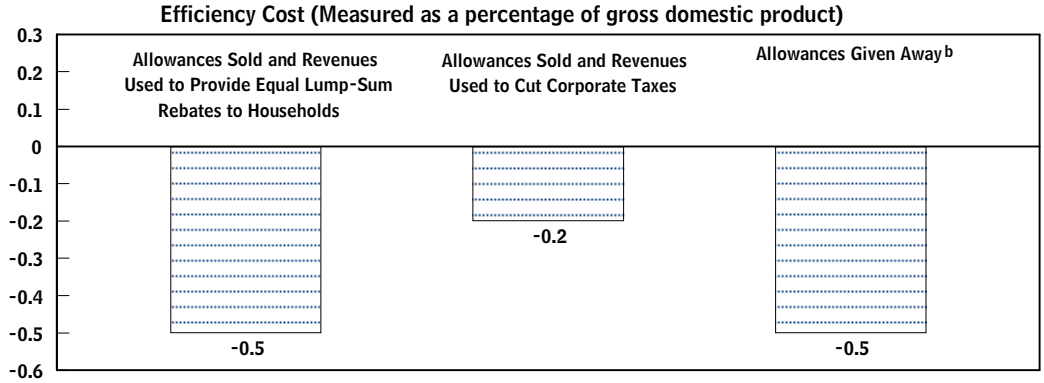
4. One researcher has suggested that an environmental tax credit based on earnings also could reduce the regressive effects of the price increases that would result from a tax or cap on CO2 emissions. See Gilbert E. Metcalf, *A Proposal for a U.S. Carbon Tax Swap*, Discussion Paper 2007-12 (Washington, D.C.: Brookings Institution, Hamilton Project, October 2007).

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.

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. The issue of who pays the tax is 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 and that the benefits to low-income households from reducing corporate income taxes would not offset the increased costs 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. That offset would be less than the increased costs borne by low-income households but larger than the offset provided by a reduction in corporate income taxes.

Giving all or most of the allowances to energy producers—as was done in the cap-and-trade program for sulfur dioxide emissions—would also exacerbate the regressivity of the price increases. The reasons is that the prices of those goods and services would go up, regardless of whether producers were required to purchase the allowances or received them for free (because the price increases stem from the restriction on emissions). Those price increases would reflect the value of the allowances. If companies benefited from the price increases but did not have to purchase the 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 allocation would far outweigh the loss in sales that they might experience as consumers cut back on their use of fossil fuels.

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

Reducing the Overall Economic Impact of a CO_2 Cap

How lawmakers allocated the revenue from selling emission allowances 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 revenue from auctioning allowances to reduce existing taxes that tend to dampen economic activity—primarily, taxes on labor, capital, or personal income. A CO_2 cap would have economic effects like those of raising such taxes: The higher prices caused by the cap would reduce real

(inflation-adjusted) wages and real returns on capital, which would be equivalent to raising marginal tax rates on those sources of income. Using the value of the allowances to reduce such taxes could help mitigate that adverse effect of the cap. Alternatively, policymakers could choose to use the revenue from auctioning allowances to reduce the federal deficit. If that reduction lessened the need for future tax increases, the end result could be similar to dedicating the revenue to cuts in existing taxes.

The decision about whether or not to sell the allowances and use the proceeds in ways that would benefit the economy could have a significant impact on the efficiency cost of an emissions cap. (The efficiency cost of a policy reflects the additional costs that producers would incur in order to produce goods in a way that led to lower emissions; it also reflects the loss in well-being that consumers would experience as a result of forgoing consumption of goods.) 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 revenue to lower corporate income taxes, rather than devoting the revenue to providing lump-sum rebates to households or giving the allowances away (see the bottom panel of Figure 2 on page 8).

In choosing among options for using revenues from the sale of allowances, policymakers could face a trade-off between providing targeted assistance to low- and moderate-income households and offsetting some of the adverse effects on economic activity caused by the price increases. For example, using some of the auction proceeds for an equal lump-sum rebate paid to every household in the United States (set at an amount equal to the increase in energy costs for the average household) could actually more than offset the average increase in spending on energy-intensive goods by low-income households; however, a lump-sum rebate would not lower existing tax rates and thus would not offset any of the adverse effects that higher energy prices had on incentives to work. In contrast, using a portion of the auction proceeds to reduce corporate income tax rates could offset a substantial share of the additional adverse economic incentives, but it would relieve only a small portion of the increase in energy costs experienced by low-income households.

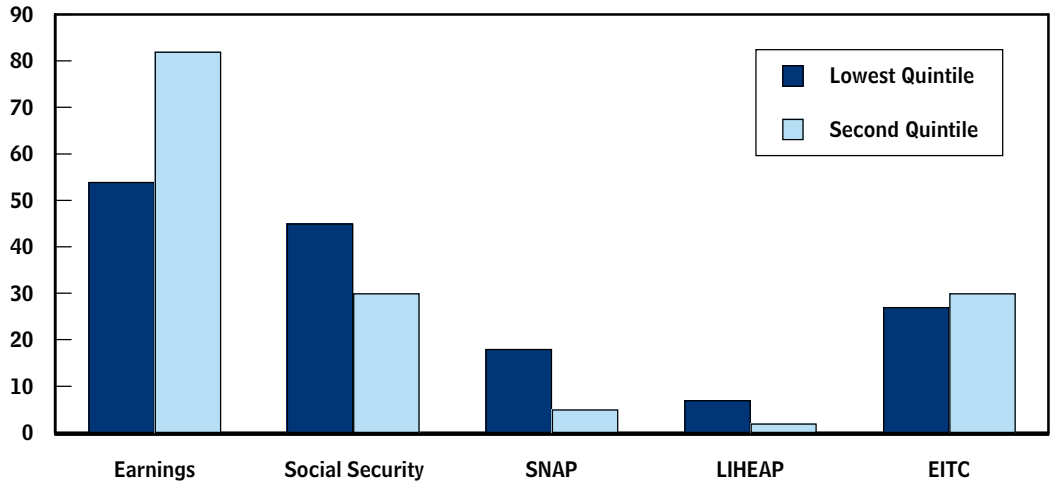
Policies can be designed to achieve a mixture of outcomes. For example, lowering payroll tax rates on a portion of earnings or reducing the rate at which the earned income tax credit (EITC) phases out would target more relief toward lower-income families than would a reduction in corporate tax rates, while potentially offsetting a small fraction of the adverse economic effects of the program.

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

Figure 3.

Low-Income Households with Income and Benefits from Selected Sources



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.

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 reduce 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) 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 who are 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.[5] 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.[6]

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5. 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).

6. 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.

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.

Income Tax Rebates

The Internal Revenue Service (IRS) has experience, most recently with the 2008 stimulus payments, in delivering rebates based on information in income tax returns. 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 to 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 economic stimulus package enacted in 2008 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.

Increased EITC Payments

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.[7]

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 without 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.[8] 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.

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

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

8. 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., *Tax Policy and the Economy*, vol. 20 (Cambridge, Mass.: MIT Press, 2006), pp. 74–110.

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.

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 to 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.[9]

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.

9. 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).

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 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.