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THE EFFECTS OF CLIMATE-CHANGE POLICIES ON THE FEDERAL BUDGET AND THE BUDGETS OF LOW-INCOME HOUSEHOLDS:

An Economic Analysis

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Effective measures to reduce greenhouse-gas emissions can be compatible with sound budgeting and the fair treatment of low-income consumers. Designing a policy that meets these objectives requires, however, that lawmakers be mindful not just of the environmental consequences of their actions but of the budgetary and distributional implications as well.

Restrictions on greenhouse-gas emissions, whether achieved through a "cap-and-trade" system that directly limits annual emissions or a carbon tax, are necessary to avoid unacceptable economic and environmental costs from global climate change. These policies end the free disposal of greenhouse gases into the atmosphere at the lowest possible cost by providing market signals encouraging energy efficiency and the development of clean alternatives to fossil fuel. At the same time, however, they raise the price of energy and energy-related products and services.

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

KEY FINDINGS

- In designing the strong policies that are essential to address climate change, policymakers should take into account the implications for family budgets, as well as the federal budget.
- Restrictions on greenhouse-gas emissions will make energy-related products costlier. Low-income consumers will be hit hardest, since these products take up a larger share of their incomes. If they are not shielded from these higher costs, many low-income families will be pushed into (or deeper into) poverty.
- Climate-change policies also will create other needs, such as for more basic research on alternative-energy sources.
- But climate-change policies can generate the revenues needed to fully address these needs — as long as these revenues are not given to energy companies and other emitters as windfall profits.
- Thus, if a "cap-and-trade" system is adopted, the allowances required to emit carbon dioxide should largely (or entirely) be auctioned off rather than given away free to energy companies as windfall profits, and the proceeds should be used wisely. Otherwise we risk exacerbating poverty, gaps between rich and poor, and the nation's budget problems.

Fortunately, the same climate-change measures that generate higher energy-related costs can also generate substantial resources to cover those costs. The nonpartisan Congressional Budget Office (CBO) estimates that various recent proposals to limit greenhouse-gas emissions by establishing a cap-and-trade system (or a carbon tax with a similar effect on limiting emissions) could generate $50 billion to $300 billion per year by 2020 — far more than what would be needed to protect vulnerable households.

Although the resources that can be generated by sound climate-change policies are substantial, so too are the budget claims arising from those policies. Besides the need to protect vulnerable populations, those claims include basic research into alternative energy sources and assistance for workers and communities that depend on the coal industry and other industries most affected by the shift to a less carbon-intensive economy. In addition, higher energy prices will drive up the cost to federal, state, and local governments of providing many important services and benefits. Unless these costs are offset, government services will need to be reduced or taxes increased, or the federal deficit will rise.

In a cap-and-trade system, making sure there are adequate budget resources requires that most or all of the emission allowances are auctioned off, not given away for free to energy companies and other emitters due to misconceptions about the financial losses they would incur. The Congressional Budget Office estimates that less than 15 percent of the total value of the allowances would be enough to offset those financial losses. More than that would simply create what CBO has called "windfall profits" for companies receiving the free allowances.

If lawmakers capture the necessary revenue and make wise choices among competing claims in designing climate-change policy, they can achieve the economic and environmental benefits from reducing greenhouse-gas emissions while addressing the impact of higher prices on low-income consumers and other legitimate new claims on available resources. If, however, lawmakers give away too many emissions rights to existing emitters, as some of the bills currently pending in Congress would do, they will fail to capture sufficient resources to meet these needs, while conferring windfall profits on energy companies and other emitters. This latter course would risk large increases in deficits and debt (already on course to reach unsustainable levels in future decades), increases in poverty, and a further widening of the gap between rich and poor.

Major Policy Options to Control Greenhouse-Gas Emissions

A strong scientific consensus has emerged that global warming, due to the buildup of greenhouse gases in the atmosphere, is real and that human activities are a key contributor. As CBO has stated, most analyses have suggested that a well-designed climate policy that reduces greenhouse-gas emissions would produce economic and environmental benefits that exceed the costs the policy would impose on the economy.[1] Moreover, because the possible consequences of inaction include irreversible and ultimately catastrophic outcomes, it would be prudent to begin acting now.

[1] See Congressional Budget Office, Statement of Peter R. Orszag, Director, "Approaches to Reducing Carbon Dioxide Emissions," before the Committee on the Budget, U.S. House of Representatives, November 1, 2007, and Letter from Peter R. Orszag, Director, Congressional Budget Office, to Senator Jeff Bingaman, July 9, 2007

The most important greenhouse gas is carbon dioxide, which is released into the atmosphere when the carbon in fossil fuels is burned to produce energy. Constraining fossil-fuel consumption thus is critical for curtailing greenhouse-gas emissions and limiting global warming.[2] One policy approach long favored by economists is a *carbon tax*, which would raise the price of fossil fuels in proportion to their carbon content. That would discourage the burning of fossil fuels and encourage both energy conservation and the development of alternative, "clean" sources of energy.

Rather than a carbon tax, most current legislative proposals use a *cap-and-trade* approach, which places an overall limit (cap) on how much carbon can be burned and enforces the limit by requiring energy producers to hold an allowance for each ton of carbon burned.[3] The "trade" part of the system reflects the fact that these emission allowances could be bought and sold freely.

Although a carbon tax and a cap-and-trade system might appear quite different, they are in fact closely related (see the box on page 4). The market price of an emission allowance under a cap-and-trade system would function much as a carbon tax would, raising the price of fossil fuels based on their carbon content and creating similar incentives to conserve energy and invest in clean alternatives.

A third possibility is a hybrid: a cap-and-trade system with a "safety valve" in which the government effectively sets a ceiling[4] on the price of emission allowances by standing ready to sell additional allowances above the cap at a fixed price if firms' costs of complying with the system turn out to be unexpectedly (and unacceptably) high. In effect, the ceiling price acts as a carbon tax on emissions that exceed the cap.

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[2] More accurately, limiting or offsetting the amount of carbon-equivalent emissions released into the atmosphere is the key. Fossil fuels can be burned without contributing to the buildup of greenhouse gases in the atmosphere if there is a way to directly "capture and sequester" or to indirectly "offset" the carbon dioxide released from burning fossil fuels so that there is no net increase in atmospheric concentrations. Other greenhouse gases would also have to be accounted for in a comprehensive policy.

[3] An allowance must exist for each ton of carbon ultimately released into the atmosphere. For practical reasons, it is easier to require that energy producers have an allowance for each ton of carbon they introduce into the economy whether or not they are the ones that actually do the burning. For example, an oil importer would be required to have an allowance even though most of the carbon in a barrel of oil is not released into the atmosphere until it is burned as gasoline or another fuel.

[4] The government could also set a floor on the price of emission allowances by purchasing any surplus allowances that became available at the floor price. That would maintain price incentives for conservation and alternative-energy development when energy demand declines (such as during a recession). By setting both a floor *and* a ceiling, the government could limit destabilizing fluctuations in allowance prices in both directions.

Comparing a Carbon Tax with Cap-and-Trade

A carbon tax and a cap-and trade system use different mechanisms, but both rely on market forces to achieve the same end result — a financial penalty on greenhouse gas emissions accompanied by reductions in emissions.

- A carbon tax significantly increases the cost of emitting greenhouse gases and relies on the forces of supply and demand to reduce emissions to the target level. Higher prices due to the tax will lower the demand for carbon-based energy, and producers will supply less in the face of reduced demand.
- A cap-and-trade system sets a target level, or "cap" on emissions, relying on the same market forces to limit demand. The emissions cap restricts the supply of carbon-based energy, and prices will rise sufficiently so that the amount demanded falls to match the amount supplied.

From the standpoint of the ultimate consumer, there is little difference between the two approaches. Regardless of whether companies have to pay a tax or purchase an emission allowance, most of the cost of emitting greenhouse gases will be passed on to consumers. Similarly, regardless of the approach, energy companies and others responsible for greenhouse gases will experience declining demand and will have to cut back their production accordingly.

It might seem that if energy producers were given emission allowances free of charge in a cap-and-trade system, they would not have the same incentive to raise their prices. That is *not* the case, however, as long as the allowances are sufficiently scarce to restrict the production of fossil-fuel energy, which is their purpose in the first place. If emission allowances are scarce, the forces of supply and demand will raise the price of energy, which, as CBO has pointed out, will provide a windfall gain to producers who get to charge the higher price even though they did not have to pay for the allowances.

With enough information, the amount of emissions reduction likely to be achieved by a carbon tax could be predicted with a high degree of certainty, as could the price of an allowance under a cap-and-trade system. Matters are more complicated in the real world, however, where there can be considerable uncertainty about how much emissions reduction will be achieved at any particular carbon tax rate or how much it will actually cost to cap emissions at any particular level. A carbon tax sets the cost of emitting each additional ton of greenhouse gases, but does not directly limit how many tons will be emitted. A cap-and-trade system establishes the amount of emissions, but does not determine how expensive it will be to keep emissions to the capped amount.

The difference between the two approaches is an important consideration in the design of climate-change policy, where the goal is to limit the total amount of greenhouse gases emitted over time (rather than in a single year). Missing an emissions target in any one year is not very damaging as long as there is time to make the adjustments needed to meet the ultimate target for greenhouse-gas concentrations in the atmosphere. To the extent that a cap-and-trade system strictly regulates annual emissions, however, it could impose large — and unnecessarily damaging — costs to meet the target in any particular year. Such costs could arise from fluctuations in energy demand or supply due to harsh weather, the business cycle, or unexpected setbacks in the development of alternative technologies. Those potential costs are one reason why many economists favor a carbon tax over cap-and-trade.

Revenue Implications of Different Climate-Change Policies

The revenues at stake are substantial. CBO estimates that a carbon tax beginning at $14 per ton in 2008 and rising gradually to $18 per ton by 2018 would raise $229 billion over the ten years 2008-2017.[5] That tax rate, however, is based on a relatively modest emissions-reduction target compared with the targets envisioned in current legislative proposals (which CBO has not officially scored). Tax rates at least two to three times higher would likely be necessary to achieve those stricter targets. Higher tax rates would, of course, generate more revenue.[6] A carbon tax of $55 per ton would yield about $90 billion at 2005 emissions levels of just over 6 million tons of carbon dioxide (about 1.64 million tons of carbon).[7] According to one estimate, such a tax would produce an 8.4 percent reduction in carbon-dioxide emissions in the short run.[8]

Whether a cap-and-trade system or a hybrid approach would yield as much revenue as a carbon tax depends on how the emission allowances are initially allocated. The key question is whether a large fraction of the allowances are given away *free* to energy producers or whether most are auctioned off to provide revenue for addressing distributional concerns and other consequences of the policy.

CBO suggests that the emission allowances could be worth between $50 billion and $300 billion per year (in 2006 dollars) by 2020, depending on a variety of factors, including how strict the emissions cap is.[9] A well-designed auction would, in principle, allow the government to capture most or all of that value as government receipts. However, many current proposals would distribute a large fraction of the allowances free to existing emitters in proportion to their current emissions. That approach would substantially reduce the revenue generated by the policy. Moreover, as CBO has emphasized, such proposals would provide windfall profits to the energy companies and other energy-intensive industries receiving the permits but would not prevent consumer prices from rising (see box on page 6).

One rationale for giving away the emission allowances is the belief that energy producers and other energy-intensive industries have to be compensated for financial losses they could incur as a result of the reduction in energy demand caused by greenhouse-gas restrictions. Regardless of the merits of this view, it is a misconception that a large percentage of the allowances would have to be given away to provide such compensation. According to CBO's review of the evidence, less than 15

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[5] Congressional Budget Office, *Budget Options*, February 2007, p. 331.

[6] The intended effect of the policy is to reduce carbon emissions, and the more effective the tax is in encouraging emissions reductions, the smaller the base on which the tax will be collected. Thus, a very high tax rate (or very tight emissions cap) could raise substantial revenue at the beginning, but as the economy adapted to the high cost of energy over time, emissions (and hence tax revenues) would fall.

[7] A tax of $55 per ton of carbon is equivalent to a tax of $15 per ton of carbon dioxide, because burning a ton of carbon results in 44/12ths tons of carbon dioxide.

[8] See Gilbert E. Metcalf, "A Proposal for a U.S. Carbon Tax Swap: An Equitable Tax Reform to Address Global Climate Change," The Hamilton Project, The Brookings Institution, October 2007, p. 12.

[9] Congressional Budget Office, testimony, *op. cit.*

CBO on Windfall Profits

In his recent testimony on approaches to reducing carbon dioxide emissions, CBO Director Peter Orszag described how in a cap-and-trade system giving away a large percentage of emission allowances free to energy companies could create *windfall profits* for those companies. The following are key excerpts from that testimony[1]:

> "Giving allowances away to companies that supply fossil fuels or that use large quantities of fossil fuels in their production processes could create "windfall" profits for those firms. The reason is that the cap-and-trade program would still result in higher prices for consumers and households but would not impose additional costs on those firms. Even if the companies received allowances for free, they would still raise prices to their customers because the cost of using an emission allowance for production—rather than selling it to another firm—would be embodied in the prices that they would charge for their goods and services.
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> "For example, one study suggested that if emissions were reduced by 23 percent and all of the allowances were distributed for free to producers in the oil, natural gas, and coal sectors, stock values would *double* for oil and gas producers and *increase more than sevenfold* for coal producers, compared with projected values in the absence of a cap. If emissions were instead reduced by 15 percent, as in the scenario discussed above, profits in those sectors would rise several fold. For example, in 2000, CBO examined the effects of reducing emissions from 1998 levels and estimated that under a 15 percent cut, the value of allowances would be 10 times as large as coal, oil, and natural gas producers' combined profits in 1998 and more than double their profits in 2006. Because the additional profits would not depend on how much a company produced, they would be unlikely to prevent the declines in production and resulting job losses that would stem from the price increases" (emphasis added)

[1] Statement of Peter R. Orszag, Director, "Approaches to Reducing Carbon Dioxide Emissions," before the Committee on the Budget, U.S. House of Representatives, November 1, 2007.

percent of the value of emission allowances would be sufficient to offset the net losses in the stock-market value of companies affected by a policy restricting greenhouse gas emissions.[10]

The erroneous belief that consumer energy prices will not rise in a cap-and-trade system if the emission allowances are given away may also contribute to the belief that large numbers of emission allowances should be given away to energy companies and other industrial emitters. Such a belief is belied by the basic law of supply and demand. A cap on emissions will limit the amount of energy produced from fossil fuels. Regardless of whether the government gives away or sells the allowances, market forces will raise the price of fossil-fuel energy to the point where the amount demanded will fall to equal the amount supplied. Either way, energy companies will be able to sell their products at the higher price. The increase in prices is the source of windfall profits for the companies that receive allowances for free but are able to charge the higher price.

[10] The 15 percent figure is a net figure and includes some offsetting gains, such as those that companies producing "clean" energy would secure. Such companies would benefit from higher prices without incurring new costs. (In addition, some energy companies could incur losses in some areas and gains in others.)

Thus, giving away more than 15 percent of the allowances to historical emitters would over-compensate them for their potential losses and leave them with windfall profits. Meanwhile consumers would face the same costs as they would if the allowances were auctioned, and the government would have fewer resources to address needs that would arise as a result of climate-change legislation.[11]

Economic and Distributional Implications of Climate-Change Policy

The higher energy prices associated with climate-change policy would impose transitional adjustment costs on specific industries such as coal and electricity generation, as well as on the people who work in those industries and the communities they live in. Higher energy prices could also have a modest impact on the economy and would increase the cost of living for consumers, especially those with low or moderate incomes. In a well-designed policy, of course, these impacts would be more than offset by the benefits from avoiding costly and potentially catastrophic environmental and economic damages from climate change, and the net effect of the policy would be beneficial.

Transitional adjustment costs. The economic costs recognized most prominently in current cap-and-trade proposals are those likely to be experienced by fossil-fuel producers and other energy-intensive sectors of the economy. As discussed above, however, the costs to affected firms are likely to be small relative to the total value of emission allowances — and would not justify large giveaways of these allowances. (Moreover, as CBO has pointed out, the losses in the stock-market value of energy companies would be widely dispersed among investors, so prudent investors holding diversified portfolios generally would not suffer large losses.) Of more concern are the potential *concentrated* losses among workers and communities dependent on coal or other fossil fuels, who would not necessarily benefit from the giveaway of emission allowances to energy companies.

Macroeconomic effects. Although the implementation of climate-change policy could cause some short-run macroeconomic effects in the areas of inflation and overall employment, especially if it were done clumsily, there should be no significant long-run impact in those areas.[12] There could, however, be some modest long-run impacts on living standards and economic activity (as it is conventionally measured)[13] as restrictions on carbon consumption raise energy prices and constrain the kinds of goods and services people can buy. While these restrictions may also have some impact on economic activity by increasing any disincentives to work, save, and invest that arise from

[11] The government would receive some revenue from the taxation of those windfall profits, but the amount collected would be far less than the full value of the permits.

[12] Climate-change policy increases the price of energy relative to the price of other goods and services, but the overall inflation rate will be determined by the monetary policy actions of the Federal Reserve, which should be able to keep overall inflation within its target range. In addition, while climate-change policy will reduce output and employment in some industries, in the long run there should be compensating increases in output and employment in other industries.

[13] Standard measures of economic activity, such as the gross domestic product (GDP), measure market activity and do not capture the non-market benefits of conservation or non-market costs such as environmental damage. In the long run, however, even conventionally measured economic activity could be higher than it would have been without action to address climate change, because some of the costs of climate change that would be avoided are economic costs that would be captured in measured GDP.

existing income taxes,[14] any such impacts would be necessary costs for achieving the benefits of reduced greenhouse-gas emissions. They would not "harm" the public any more than expenditures on antibiotics to fight a serious infection "harm" a patient. Moreover, as discussed below, any "side effects" in terms of economic performance are likely to be modest (analogous to losing a day or two of work a year due to the antibiotic treatment in order to avoid greater harm from failing to treat the infection).

Distributional effects. Low- and moderate-income families would be affected disproportionately by higher energy prices because they spend a larger percentage of their budgets on energy than higher-income families do. CBO has estimated that a cap-and-trade policy that achieved a 15 percent reduction in carbon dioxide emissions would raise the costs of energy and energy-related products by an average of $680 (in 2006 dollars) for the 20 percent of households with the lowest incomes (those with incomes below about $27,000 in today's dollars for a family of three). Updating and refining that estimate using a methodology similar to CBO's, we estimate that the average impact on households in the poorest 20 percent of the population would be approximately $750 in 2007 dollars.[15] According to CBO's estimates, the impact of those cost increases is the equivalent of a 3.3 percent reduction in the real (inflation-adjusted) after-tax income of the 20 percent of households with the lowest incomes (our figure would be modestly higher).[16] In contrast, the richest 20 percent of households (those with incomes above $106,000 in 2007 dollars for a family of three) would experience the equivalent of a 1.7 percent reduction in real after-tax income, or about half as much.

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[14] In the environmental economics literature, this is called the "tax interaction" effect. Higher energy prices that raise the price of consumer goods lower the reward to working or saving and may thereby increase any pre-existing disincentives to work or save. There is controversy over the size of these pre-existing distortions. If they are small to begin with, any additional cost to the economy will be small as well.

[15] The Center's methodology differs from CBO's in an important respect. CBO's figure is for the one fifth of households with the lowest incomes, *not* for the poorest fifth of the U.S. population. There is an important difference. If one simply ranks households by income, *regardless of household size*, then the bottom fifth of households disproportionately consists of one-and two-person households, and as a result, includes significantly less than one fifth of the U.S. population. Moreover, the bottom fifth of households, if measured in this manner, includes many small households that are *not* poor (i.e., that are above the poverty line), while missing many larger households that *are* poor. (The poverty line *is* adjusted by household size.)

CBO has developed a standard methodology for how to address this problem when ranking households by quintile, so that one can examine the poorest fifth of the population, rather than the bottom fifth of households irrespective of household size. CBO uses that methodology in most work it conducts on income distribution issues. The $680 figure for the bottom fifth, however, was not calculated using this preferred methodology.

The income limits for the top and bottom fifths cited in this paragraph are based on the Census Bureau's standard definition of "money income" (i.e., cash income), with households ranked using CBO's size-adjustment methodology.

[16] The exact percentage would depend not only on the precise size of the cost impact but also on the precise way that income is measured in the denominator.

Climate Policy Need Not Affect Low- and Moderate-Income Households Disproportionately

The policies needed to reduce greenhouse-gas emissions thus would, by themselves, result in regressive changes. But they also can generate substantial revenue that could be used to offset those regressive impacts. For example, CBO has found that the potential revenue from auctioning off emission allowances under a cap-and-trade system could yield more than enough revenue to offset the losses likely to be experienced by low- and moderate-income families and workers in the industries hit hardest by the adjustment to a less carbon-intensive economy. The revenue could be sufficient to address these issues and meet various other legitimate purposes arising from the legislation as well.

In contrast, giving away a substantial fraction of emission allowances to existing energy producers would do almost nothing to compensate low- and moderate-income families for their losses. A very large percentage of the benefits of such a giveaway would go to shareholders of the energy companies, most of whom have high incomes, while little revenue would be available to mitigate the effects on those least well-off. (See the box on page 11 for excerpts from CBO's assessment of distributional effects in a cap-and-trade system.)

Addressing the regressivity and adjustment costs discussed here would not be the only claims on the resources that could be generated by a cap-and-trade system or carbon tax. Governments at all levels would pay more for the energy and energy-related products that they consume directly (for example, the Defense Department is the single largest consumer of energy in the United States). In addition, the impacts on living costs and economic activity described above, while modest in the overall economy, could nevertheless trigger increases in automatic cost-of-living adjustments in Social Security and other benefit programs and some modest reductions in tax revenues. These issues can be addressed — and any increases in deficits and debt avoided — by using a share of the allowances to offset such tax and expenditure changes. (Note: action to reduce the damages from climate change should have some positive effects on the budget over the longer run, by reducing government expenditures for such things as natural disasters, crop failures, and disease epidemics.)

In addition, although higher energy prices would create strong incentives for energy conservation and investment in clean-energy technologies, there are likely to be claims for additional subsidies to encourage a wide variety of activities in the name of climate change. In many cases, such investments may be a valuable complement to the market incentives provided by a cap-and-trade system or carbon tax. On the other hand, such spending would be wasteful if it merely subsidized activity that would take place anyway or that was not well focused on reducing greenhouse-gas emissions.[17]

Finally, economic analysis suggests that if there are instances where existing taxes have some disincentive effects that may dampen economic activity, receipts from cap-and-trade auctions or a carbon tax could be used to reduce those taxes. This, in turn, would lower any economic cost of restricting greenhouse-gas emissions. For example, CBO reports that the changes in economic

[17] The price incentives created by a cap-and-trade system or carbon tax will encourage profitable investments in clean-energy technologies and technologies for sequestering greenhouse gases, but there may be other investments with a high social rate of return whose benefits cannot be fully captured by private investors. Government subsidies or direct public investment can be justified in such cases, where the returns are not fully "appropriable." Such investments tend to be in basic research or pre-market development rather than in commercial development.

activity required to achieve a 15 percent reduction in greenhouse-gas emissions result in net economic losses equivalent to roughly one-half of one percent of GDP in 2010 if all of the allowances were given away.[18] If, however, all of the emission allowances were auctioned off and the proceeds were used to cut payroll taxes or corporate income taxes that loss could be cut substantially.[19] At the same time, CBO points out that using the auction proceeds exclusively to reduce net economic costs would itself come at a price, because those proceeds would not be available to address the regressive effects of increases in consumer costs or to make investments in basic research on clean technologies.

CBO found that using the proceeds from auctions exclusively for tax cuts would offset only a modest fraction of the impact of higher energy costs on low-and moderate-income households, and using the proceeds to cut corporate taxes would be "particularly regressive." With all the auction receipts used for either a payroll tax cut or a reduction in corporate income taxes, the 20 percent of households with the lowest incomes would have the largest net losses (as a share of income) while the richest 20 percent of households would end up with tax cuts that exceeded their increase in energy costs. (It also should be noted that analyses by CBO and others find that reducing long-term budget deficits would do substantially more to boost the economy over time than cutting taxes.)

While there are tradeoffs between economic efficiency and fairness in the design of climate-change policy, one policy that fails to measure up on *either* ground is giving away a substantial fraction of the permits to existing emitters. As CBO has explained,

> Because giving allowances to energy producers would disproportionately benefit higher-income households and would preclude the possibility of using the allowance value to reduce taxes on capital and labor, such a strategy would appear to rate low from both a distributional and an efficiency perspective.[20]

Indeed, Harvard economist Greg Mankiw, who served as Chairman of President George W. Bush's Council of Economic Advisers, has said that giving the allowances away free to energy producers and other emitters would constitute "corporate welfare." Mankiw recently wrote:

> Economists recognize that a cap-and-trade system [with the allowances given away to emitters] is equivalent to a tax on carbon emissions with the tax revenue rebated to existing carbon emitters, such as energy companies. That is,
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> Cap-and-trade [with the allowances given away to emitters]
> = Carbon tax + Corporate welfare.[21]

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[18] These losses are what economists call "deadweight" or "welfare" losses from the changes in economic activity induced by the emissions-reduction policy. Such losses are not always reflected in measures of output such as GDP. To the extent that people purchase additional clothes to keep them warm when they cut back on home heating in winter, for example, their economic welfare is lower but there may be no corresponding reduction in GDP.

[19] Testimony of CBO Director Orszag, *op. cit.*.

[20] Congressional Budget Office, letter to Senator Jeff Bingaman, Chairman, Committee on Energy and Natural Resources, United States Senate, July 9, 2007, pp. 3-4.

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

CBO's Assessment of Distributional Effects in a Cap-and-Trade System

The following are excerpts from CBO Director Peter Orszag's recent testimony on these issues:[1]

- "Although the price increases triggered by a cap-and-trade program for CO_2 emissions would be regressive, the policy's ultimate distributional effect would depend on policymakers' decisions about how to allocate the emission allowances."

- "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 that contribute the most to those emissions. Such price increases . . . would impose a larger burden, relative to income, on low-income households than on high-income households."

- "Lawmakers could more than offset the price increases experienced by low-income households or the costs imposed on workers in particular sectors [of the economy] by providing for the sale of some or all of the [emission] allowances and using the revenue to pay compensation."

  "Conversely, giving all or most of the allowances to energy producers to offset the potential losses of investors in those industries … would exacerbate the regressivity of the price increases. On average, the value of the CO_2 allowances that producers would receive would more than compensate them for any decline in profits caused by a drop in the demand for energy and energy-intensive goods and services that cause emissions. As a result, the companies that received the allowances could experience 'windfall' profits…."

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

The following are excerpts from CBO's analysis of trade-offs in allocating CO_2 emission allowances[2]:

- "Selling emission allowances would allow the government not only to compensate some households for their higher costs or workers for their lost jobs, but also to devote part of the sales revenue to reducing existing taxes that discourage economic activity (such as income or payroll taxes). Those tax reductions, like free allocations to energy producers, would tend to disproportionately benefit high-income households. However, unlike free allocations, they would reduce the near term cost that a cap-and-trade program would impose on the economy, perhaps substantially."

- "Because giving allowances to energy producers would disproportionately benefit higher-income households and would preclude the possibility of using the allowance value to reduce taxes on capital and labor, such a strategy would appear to rate low from both a distributional and an efficiency perspective."

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[1] Statement of Peter R. Orszag, Director, "Approaches to Reducing Carbon Dioxide Emissions," before the Committee on the Budget, U.S. House of Representatives, November 1, 2007.

[2] Letter from Peter R. Orszag, Director, Congressional Budget Office, to Senator Jeff Bingaman, July 9, 2007.

Conclusion

The economic and distributional effects of climate-change policy will generate major new claims on the federal budget, especially the need to offset the regressive impact of higher energy prices. But a well designed climate-change policy can also generate significant resources that can be used to avoid regressive outcomes and address other legitimate budgetary claims that arise from the new policy. Policymakers need to recognize the importance of generating adequate revenue and addressing fairness concerns to avoid ending up with a policy that increases poverty and further widens gaps between rich and poor, increases deficits and debt, or both.