THE HAMILTON PROJECT

Proposal 11: The Many Benefits of a Carbon Tax

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Deficit Reduction (10-year): $199 billion

Broader Benefits: Reduces the buildup of greenhouse gas emissions; replaces command-and-control regulations and expensive subsidies with transparent and powerful market-based incentives; promotes economic activity through reduced regulatory burden and lower marginal tax rates.

Introduction

This paper proposes introducing a modest carbon tax to finance reforms to the U.S. tax system to promote economic growth, reduce budget deficits, reduce redundant and inefficient regulation, reduce unnecessary subsidies, and reduce the costs associated with climate change. The revenues from the new levy could fund permanent reductions in more distortionary taxes on capital income while also contributing to deficit reduction. And by providing simple, transparent, but powerful market-based incentives to reduce damaging greenhouse gas (GHG) emissions, this levy could supersede the array of costly regulatory command-and-control approaches and expensive subsidies aimed at reducing dependence on fossil fuels and promoting clean energy. In addition to these benefits, of course, is a contribution to stemming the global buildup of GHGs and improving the United States' standing to foster the broader international action necessary to stabilize GHG concentrations and avoid catastrophic climate disruption. As this proposal shows, with a carbon tax these gains are possible with less-adverse, potentially even positive, consequences for economic activity, unlike other revenue raisers. Indeed, within twenty years a modest carbon tax can reduce annual emissions by 12 percent from baseline levels, generate enough revenue to lower the corporate income tax rate by 7 percentage points, and decrease the deficit by $815 billion, all while protecting the poorest households from undue burden.

The Challenge

The United States confronts serious policy challenges from an unsustainable budget deficit, a tax and regulatory system that most experts agree is inefficient, and the long-term threat from climate disruption. A carbon tax offers a policy that can help address all three challenges by combating climate change, curbing the rising debt level, and helping achieve efficient reforms to current policies.

Climate change poses serious risks to both the environment and the economy. Scientists project that, depending on future GHG emissions, by 2100 average global temperatures will be 2°F to 11.5°F higher than now (National Academy of Sciences 2012). These higher temperatures will raise sea levels and produce more-frequent, extreme, and damaging weather events, such as wildfires, heat waves, storms, and droughts. These changes will disrupt ecosystems and crop production, increase heat-related deaths, require costly adaptation, and produce many other monetary and nonmonetary consequences. While much remains to be learned about the potential impacts of climate change, the evidence overwhelmingly suggests that lower GHG concentrations will produce lower climatic disruptions; for that reason, it is prudent to take steps today to curb emissions.

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The federal budget deficit is growing at an unsustainable rate. Rising costs of Medicare, Social Security, and defense spending are at the forefront of the budget deficit problem, and politically feasible solutions remain elusive. A carbon tax is one policy mechanism that has the potential not only to make a meaningful dent in the budget deficit, but also to raise sufficient revenue to justify lowering other taxes. For instance, the United States currently has the highest statutory corporate income tax rate in the developed world. Using the revenue from a carbon tax, the United States could significantly lower the corporate tax rate while still reducing the budget deficit.

Some climate-related regulations are in place, and more are pending under the Environmental Protection Agency's (EPA's) Clean Air Act (CAA) authority. But the current approach to addressing climate change is inefficient and costly. Emissions standards, energy-efficiency standards, renewable electricity subsidies, and biofuel mandates are only a few examples of costly or ineffective policies. Indeed, current approaches can induce costs of each ton of abated carbon that are substantially higher than the U.S. government's estimate of the benefits, leading to negative net social benefits. A carbon tax could replace many such inefficient environmental and energy policies.

The Proposal

This paper proposes a tax starting at $16 per ton of CO_2-equivalent and rising 4 percent over inflation per year to 2050. The tax would be a simple excise tax on the carbon content of fossil fuels combusted in the United States and on select other GHG sources. This amount, $16 per ton of CO_2, translates to about $0.16 per gallon of gasoline and $30 per short ton of coal. This proposal also would repeal or modify inefficient and redundant environmental and energy regulations and eliminate approximately $6 billion of energy-related subsidies each year.

In each year, the proposal would reserve 15 percent of the carbon tax revenue to benefit the poorest households, for example by bolstering social safety net spending, to help offset some of the regressivity of the tax. Over the first decade, nearly all of the remaining revenue would be used to fund a permanent reduction in the top corporate income tax rate from 35 to 28 percent and reduce the deficit by about $199 billion. Over the subsequent decade, the proposal would generate enough revenue and budget savings to reduce the deficit by an additional $616 billion, for an undiscounted total of $815 billion in deficit reduction over twenty years.[1] The individual components of this package are described in detail below. Table 11-1 summarizes the budget and emissions reduction estimates for the proposal. Lacking available out-year projections, estimates in table 11-1 assume that the net revenue lost from reducing corporate income tax rates and the potential budget savings from reduced subsidies are the same in the second decade as in the first.

SET THE OPTIMAL TAX RATE AND BASE

This proposal recommends an initial tax rate per ton of CO_2-equivalent of $16 (2012 dollars) beginning in 2014 and an annual statutory increase in the tax of 4 percent over inflation. From an economic perspective, policymakers should set the price of carbon—that is, the tax—equal to the present value of the environmental and social damages produced by each additional ton of CO_2 emissions (or the equivalent in other GHGs). This

TABLE 11-1.

Summary of Budgetary and Emissions Impact

PROPOSAL: Implement a tax of $16 per ton of CO_2 ; increase it by 4 percent plus inflation each year		
Total Budget Effects (Undiscounted)	**Over 10 Years**	**Over 20 Years**
Revenue	$1.1 trillion	$2.7 trillion
Set-aside for low-income individuals	*($161 billion)*	*($405 billion)*
Revenue loss from lowering the corporate tax rate from 35 percent to 28 percent	*($800 billion)*	*($1.6 trillion)*
Savings from reduction in clean energy spending	$60 billion	$120 billion
Net deficit reduction	**$199 billion**	**$815 billion**
Monetized Benefit of CO_2 reductions, valued at $16 per ton	**$52 billion**	**$148 billion**

Note: Table 11-1 reports estimates for the tax on carbon in fossil fuels used in the energy sector, per McKibbin and colleagues (2012). These sources comprise about 79 percent of U.S. GHG emissions. The proposal's actual tax revenue and emissions reductions could be a few percentage points higher than the values in table 11-1. Additional GHG sources, such as cement-related CO_2 and methane emissions from landfills and coal mines, are in the proposal's tax base, and the proposal includes border tariffs on select goods from countries without analogous carbon prices. However, federal government spending on its own energy consumption is likely to be higher, too.

is called the social cost of carbon (SCC). Of course, measuring the SCC is difficult because of the scientific and analytical challenges of predicting climate change impacts, monetizing them, discounting effects in the distant future, and assessing the costs of low-probability but catastrophic outcomes.

However, useful benchmarks exist, and $16 falls within their range, as shown in table 11-2. The U.S. government uses a range of SCC estimates to calculate the benefits of rules that reduce GHG emissions.[2] Sixteen dollars is within the bounds of the range, but is lower than the government's central estimate of $23. Other countries and subnational governments have carbon pricing policies to which we can look for precedents for a U.S. federal carbon tax, and $16 also falls within their range. For example, $16 is $6 higher than the recent auction value of California's cap-and-trade allowances for 2015, but about $13 lower than the current carbon tax in British Columbia, Canada.

In this proposal, the tax rate rises each year by 4 percent over inflation. Another option would be to adjust the tax rate periodically to target a specific level of U.S. emissions. The price signal predictability in this proposal will reduce the risks of long-term investments and prevent inadvertent stringency or laxity that could undermine the program's political feasibility or effectiveness. A long-run tax trajectory set in law also avoids protracted debates over the appropriate emissions target and the process for adjusting the rate to achieve it, and it simplifies revenue forecasts. In lieu of a specific emissions target, Congress should request regular expert agency reviews of the environmental and economic performance of the tax and revisit tax rates when appropriate.

Many economists recommend that the real rate of increase in the tax match the returns on relatively low-risk capital assets, or about 4 or 5 percentage points above inflation in typical economic conditions.[3] This modest rate of increase avoids creating the incentive for fossil-carbon resource owners to hasten extracting their resources in anticipation of lower after-tax profits later.

To optimize the tradeoff across taxing as much GHG emissions as possible and minimizing the administrative burden, it makes sense to levy this tax on carbon and other GHGs at the upstream choke point in their distribution. The price signal will pass through to retail prices just as if the tax were collected from consumers. The Congressional Research Service (CRS; 2012b) estimates that 80 percent of U.S. GHG emissions could be taxed via payments from only 2,300 upstream entities. In this approach, the tax would fall on petroleum at refineries, on natural gas at the wellheads or processing plants, and on coal at the mine mouth. The tax base should also include CO_2 emissions from nonenergy industrial processes such as cement

TABLE 11-2.

Benchmark CO_2 Prices

Carbon Price Benchmark[a]	Price per ton of CO_2-equivalent (2012 US$)
This proposal's starting tax rate	16.00
U.S. 2015 SCC, 5% discount rate	6.36
U.S. 2015 SCC, 3% discount rate	26.55
December 2012 trading price of allowances in the EU ETS	8.77
Carbon tax in British Columbia, Canada[b]	29.70
Carbon tax in Australia	24.21
Carbon tax in Sweden	156.00
EPA projection for CO_2 allowance trading price under H.R. 2454 in 2015, Scenario 3[c]	14.95
Settlement price of California's GHG cap-and-trade allowances, advance auction of 2015 vintage[d]	10.00
Regional GHG Initiative, Auction 18 Clearing Price for CO_2 Allowances, December 5, 2012[e]	1.93

Notes: EU ETS = European Union's Emissions Trading System.

a. A number of the policies in this table do not price all fossil energy carbon. For example, the Australian carbon tax excludes oil.

b. British Columbia Ministry of Finance (n.d.). $30 Canadian, currency converted February 11, 2013.

c. This figure comes from EPA's modeling of the House-passed cap-and-trade bill of 2009, also known as the Waxman-Markey Bill. We report results for Scenario 3 with the Adage Model, converted to 2012 dollars using the consumer price index. Scenario 3 excludes the effect of the energy efficiency programs in H.R. 2454. EPA estimates that the addition of those programs would have produced a slightly lower allowance price than the price in Scenario 3. (See EPA 2009 and its data annex.)

d. California Environmental Protection Agency (n.d.).

e. Regional Greenhouse Gas Initiative (2012).

manufacturing, as well as identifiable point sources of non-CO_2 GHG emissions, such as methane emissions from landfills and coal mines. The tax also would fall on the carbon content of imported fossil fuels at the border. Carbon in fossil fuels that is not emitted—for example because it is securely sequestered underground or used in feedstocks for plastics—should receive a tax credit or rebate.[4] Likewise, biofuels and other renewable energy would not be taxed, but their costs of production could rise with the price of any taxed fossil fuels inputs.[5]

To avoid significantly disadvantaging American energy-intensive trade-exposed industries—industries like metals, chemicals, glass, pulp and paper, and cement—relative to their counterparts in economies with less-ambitious climate policy, the tax should also include narrowly tailored and temporary "border carbon adjustments" that impose tariffs on imports of the most intensely energy-intensive trade-exposed goods (such as aluminum) in proportion to differences in climate policy across countries.[6]

Finally, this proposal would eschew granting tax credits for emissions-reducing activities outside the taxed sources. Such offsets would introduce a host of complexities that invite gaming, raise administrative costs, and reduce revenue. Although clearly many details would remain for implementing regulations, this proposal's principal design goal is the simplest, broadest price signal feasible.

REPEAL REDUNDANT REGULATIONS AND EXPENDITURES

A price on carbon will lower GHG emissions and spur innovation in low-GHG technology, and, therefore, a carbon tax will make many other, less-efficient energy and environmental regulations unnecessary. Indeed, an important component of the cap-and-trade bill passed by the U.S. House of Representatives in 2009 was the preemption of EPA CAA authority for some GHG emissions.

A similar amendment to the CAA upon adoption of a carbon tax may not be workable. First, environmental groups may strongly oppose CAA preemption, arguing justifiably that CAA authority might be important if the tax does not produce meaningful climate benefits. Furthermore, amending the CAA involves more congressional committees in fiscal reform that is already complex. One approach would be for EPA to issue a rule, coordinated to the passage of the carbon tax, that would suspend new CAA regulation of GHGs for a period of eight years while the tax takes effect. Given the probable delays from litigation and state implementation, it is unlikely EPA could have its regulations for existing stationary sources of GHGs in effect much before then anyway.

Federal agencies have promulgated a host of regulations that could be eliminated or scaled back with passage of a carbon tax. For example, as long as electricity prices reflect the environmental damages associated with electricity production and consumers have good information about the energy use of the products they buy, then arguably consumers (rather than federal agencies) should decide what products best serve their needs.[7] Examples of policies that the Department of Energy could convert to information-provision approaches include energy standards for dryers, air conditioners, light bulbs, refrigerators, and industrial coolers and freezers. With a carbon tax administered by the Internal Revenue Service, EPA also could reduce its mandatory GHG emissions reporting. In addition, because the tax promotes the market for energy-efficient vehicles and induces less driving, Congress should repeal the unworkable 2005 Renewable Fuel Standard (RFS).[8] In theory, the administration also could scale back fuel economy standards for passenger cars and light duty trucks, but that is likely infeasible since the federal standards arise in part from automakers' interest in avoiding multiple state-level standards.

Even with a price on carbon, the private sector is likely to undersupply basic research and development on energy-efficient and low-carbon technologies. This proposal would preserve all research spending. Near-commercial development and technology deployment are different. The carbon tax, both through current and expected effects on prices, induces firms and consumers to develop and deploy cost-effective GHG-abating technologies.[9] Thus, subsidies for existing and near-commercial clean-energy technologies either would compensate investors for what they do anyway (with no net environmental benefits) or induce them to invest in inefficiently high-cost abatement. For example, the Congressional Budget Office (CBO; 2012b) estimates that tax subsidies for electric vehicles will cost about $7.5 billion through 2019 and produce little to no environmental benefit. This is in part because under fuel-economy rules, electric-vehicle makers can sell compliance credits to other automakers, allowing them to sell more high-emissions vehicles than they otherwise could (CBO 2012b). Even ignoring the role of corporate average fuel economy standards, CBO estimates that the cost to taxpayers of using the tax credits to abate carbon emissions ranges from $300 to $1,200 per ton of CO_2.

Given the exigency of deficit reduction and the evidence that this kind of spending is cost-ineffective, this proposal recommends a nearly wholesale revocation of all nonresearch spending on renewable electricity, energy efficiency, and biofuels. Furthermore, in contrast with the proposition by some that carbon tax revenue should be reserved for increasing clean energy subsidies, this proposal would preclude earmarks of the carbon tax revenue for new spending, other than to protect the poor. There is no particular connection between the amount of revenue a carbon tax raises and the appropriate level of spending on research and development, adaptation, or anything else. That spending should go through ordinary budget processes. If policymakers are unsatisfied with the pace of clean energy adoption or emissions reductions, it is generally far more efficient for them to raise the carbon tax than to subsidize alternatives.

Clean energy subsidies are complex, fall across numerous agency budgets, and are subject to a myriad of sunset provisions and caps. This prohibits a simple calculation of potential long-run budget savings. Nonetheless, this proposal estimates that about $6 billion in annual tax and direct spending could be responsibly eliminated with the passage of a carbon tax, for a total of $120 billion in savings over twenty years. Table 11-3 reports the specific proposals. The majority of savings are from reduced tax expenditures for renewable electricity production, renewable transportation fuels, and electric cars. This proposal also would scrap a program in which federal agencies, notably the Department of Defense, purchase high-cost advanced biofuels and invest in biofuel production facilities. Although some of the programs listed in table 11-3 expire within ten years, it is reasonable to expect that, without a price on carbon, Congress would be likely to renew or replace them with similarly targeted subsidies—thus the assertion here that annual savings appearing in table 11-3 accrue over two decades.

REVENUE TRAJECTORY, TAX REFORM, AND ENVIRONMENTAL BENEFITS

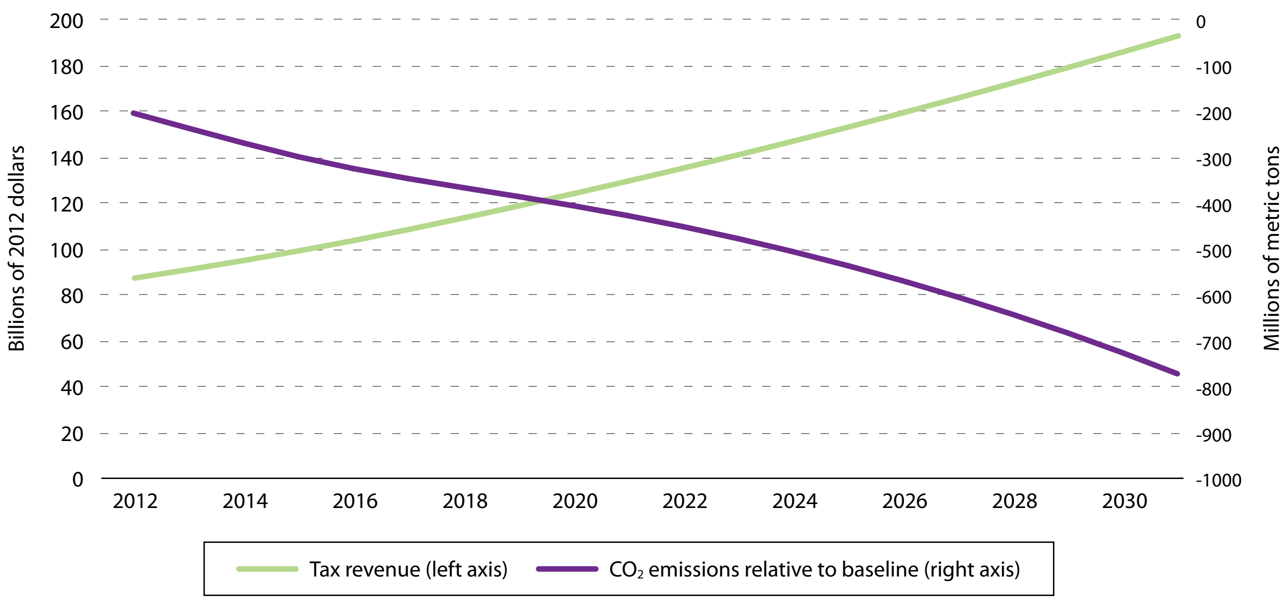
The proposed carbon tax would raise about $88 billion in the first year and rise to almost $200 billion two decades later (figure 11-1), for an undiscounted total of $1.1 trillion in the first decade and $2.7 trillion in revenue over twenty years, according to McKibbin and colleagues (2012).[10] Adding in the proposed subsidy reduction of $6 billion per year, this proposal would provide almost $200 billion in deficit reduction in the first ten years and $815 billion in deficit reduction over the first twenty years. In the very long run, emissions will decline enough to reduce annual revenue, so eventually other sources

TABLE 11-3.
Budget Saving Proposals

Tax Expenditure Reductions	Annual Potential Savings (billions of US$)
Renewable electricity production credit[a]	1.2
Tax credits for investment in advanced energy property, such as property used in producing energy from wind, the sun, or geothermal sources[b]	0.7
Tax preferences for nuclear energy[c]	0.9
Excise tax credits and outlay payments for alternative fuel and excise tax credits for alternative fuel mixtures[d]	0.3
Income tax credits for biodiesel fuel, biodiesel used to produce a qualified mixture, and small agribiodiesel producers[e]	1.8
Credit for energy-efficient appliances[f]	0.07
Tax credit for plug-in vehicles and certain alternative vehicles[g]	0.4
Renewable energy credit (Section 48)[h]	0.5
Direct Spending Reductions	
Biofuel subsidies via the Department of Defense and other agencies[i]	0.17
Total	**6.04**

Notes:
a. Average annual tax expenditure, 2013–2022 (Joint Committee on Taxation [JCT] 2013, 6).
b. Tax expenditure in 2011. CBO (2012b) notes that this credit is capped at $2.4 billion.
c. Tax expenditure in 2011 (CBO 2012b, 3).
d. Estimated 2013 tax expenditure (JCT 2013, 7).
e. Estimated 2013 tax expenditure (JCT 2013, 6).
f. Average annual tax expenditure, 2013–2022 (JCT 2013, 6).
g. Average annual tax expenditure, 2011–2015 (JCT 2012, 34).
h. Average annual tax expenditure, 2011-15, (JCT 2012, 33).
i. Estimate of 2012 appropriation for Defense Production Act expenditures on biofuels and related industry investments (CRS 2012b, 10).

FIGURE 11-1.
Carbon Tax Revenue and Emissions Effects by Year of Policy



Source: McKibbin et al. 2012.

of revenue or spending reductions would be necessary to replace revenue from the carbon tax.

Initial effects on households are likely to be modest. Mathur and Morris (2012) analyze an analogous tax and find that if the tax is passed fully to households, then retail prices of electricity, gasoline, and home heating oil would rise in the short run by 5 to 6 percent. Natural gas prices to households would rise somewhat more, by about 19 percent, at the outset of the policy. Mathur and Morris (2012) estimate that 11 percent of the revenue would be necessary to hold the bottom 20 percent of households by income harmless, and 18 percent would be enough to protect the bottom three deciles. This proposal recommends that policymakers reserve about 15 percent of the revenue (about $161 billion in the first decade and $405 billion over twenty years) to protect households with income below about 150 percent of the poverty level.[11] These reserved funds could bolster programs that serve the poor (e.g., Medicaid, the Earned Income Tax Credit, and food stamps), or could go to qualifying households through electronic debit cards. In no case should the revenue be used to directly offset higher energy prices to consumers because that would blunt the incentive to conserve energy and would undermine the environmental performance of the tax. Indeed, the carbon tax law should instruct utilities to pass through to consumers any increased input costs arising from the tax.

TAX REFORM

After holding harmless low-income households, about 85 percent of the revenue and all of the savings from subsidy reductions could be used for efficiency-enhancing tax reform and deficit reduction. Marron and Toder (2013) estimate that cutting the corporate tax rate from 35 percent to 28 percent would reduce corporate income tax revenues by about $800 billion, or roughly 18 percent, over the next ten years. For comparison, the CBO's projection of total corporate income tax revenue in 2014 is about $430 billion (Statistica 2013). Some of that loss could be made up by expanding the corporate income tax base, for example by reducing tax preferences. Nonetheless, corporate tax reform will clearly require increased revenue elsewhere in the budget. A carbon tax is a natural fit.

In the early years of the carbon tax, particularly during this protracted sluggish economic recovery, policymakers should target the carbon tax revenue predominantly toward pro-growth reform of the corporate income tax (Marron and Toder, 2013). This maximizes the near term efficiency gains of the tax reform by focusing the revenue on lowering one of the most distortionary tax instruments while preserving its role in long-term deficit reduction. Several scholars have analyzed the cost-lowering potential of reducing other distortionary taxes with carbon tax revenue. For example, Dinan and Lim Rogers (2002) found that using carbon revenues to reduce corporate income taxes could reduce the economic cost of limiting carbon emissions by 60 percent. In a general equilibrium modeling analysis, McKibbin and colleagues (2012) find that using the carbon tax revenue to reduce taxes on capital income could slightly boost GDP, employment, and wages through the first few decades of the tax, in part as a result of the tax swap's salutary effect on U.S. investment. In another modeling study, Rausch and Reilly (2012) also find that introducing a carbon tax and using the revenue to reduce corporate income tax rates would produce a net welfare gain for American households.[12]

ENVIRONMENTAL GAINS

In addition to the positive budgetary impacts of a carbon tax, there are significant environmental benefits as well. Results predict the policy would reduce taxed emissions relative to baseline by about 12 percent after twenty years and by a third by mid-century, producing a cumulative reduction of 9.2 billion metric tons of CO_2 in its first two decades. As shown in table 11-2, if the present value of those emissions reductions is, say, at least $16 per ton, the first twenty years of the tax would produce at least $148 billion in climate benefits. Further benefits could arise from increased GHG abatement by other countries in response to U.S. climate action and diplomacy.

The United States should use its new carbon price policy to become an international leader for pricing GHG emissions globally. It should encourage carbon pricing by other major emitters. In particular, the United States should launch a vigorous carbon pricing dialogue within the Major Economies Forum, the United Nations Framework Convention on Climate Change, or the G-20, or more than one of these.[13] The dialogue could focus on administrative and technical aspects of carbon pricing and help build GHG tax administration capacity in developing countries. These diplomatic efforts would help address climate risks, protect energy-intensive American industry, limit the need for border carbon adjustments, and signal to the international community that the world's largest economic power is taking positive and transparent steps to curb its emissions.

Conclusion

At a time when the country is facing serious long-term budget difficulties, this proposal is arguably the most efficient way to reduce the deficit over the next few decades. It offers three powerful ways to improve the well-being of future generations. First, it allows the United States to adopt more-efficient tax and regulatory policies. Revenue from the carbon tax funds a permanent reduction in the United States' statutory corporate income tax rate, currently the highest in the developed world, to a more internationally competitive level. Evidence suggests this tax swap will expand investment and improve welfare in the United States. A price on carbon also can supplant more-costly and less-effective measures to reduce emissions, promote clean energy and energy efficiency, and drive innovation, saving both budget and regulatory costs.

Second, a carbon tax spurs serious cost-effective efforts by the United States to address the global threat of climatic disruption. Economists widely agree that a price on carbon in the United States is necessary to reduce GHG emissions efficiently across a wide range of activities; with effective diplomacy, the United States can leverage its efforts into broader and more ambitious efforts abroad. This proposal would produce about $150 billion or more in climate benefits in the first two decades.

Third, this proposal creates a new source of revenue that will reduce the federal budget deficit by almost $200 billion in the next decade and about $815 billion over the next two decades, even while protecting the welfare of the poorest households.

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Endnotes

1. This proposal is very similar to the approach described in Marron and Toder (2013).
2. See Interagency Working Group on Social Cost of Carbon (2010).
3. For example, see Metcalf and Weisbach (2009, 519).
4. Congress also would have to decide whether to tax carbon in exported primary fuels. Taxing exports would increase revenue over the estimates here. However, depending on export market characteristics, it may disadvantage U.S. firms to little climate benefit.
5. This proposal does not address the important issue of mitigating net emissions from agricultural soils, forests, and other terrestrial carbon pools, nor does it contemplate taxing methane from manure or ruminant livestock or industrial GHGs. Policymakers should consider whether and how these sources could be taxed or otherwise cost-effectively controlled.
6. For more on this issue see, Fischer and Fox (2009/2011).
7. Gayer and Viscusi (2012) argue that many energy-efficiency standards do not pass a properly designed benefit cost test.
8. The RFS mandates that 35 billion gallons of ethanol-equivalent biofuels and 1 billion gallons of biomass-based diesel be consumed in the United States by 2022. The National Academies of Science concludes that this standard "is not likely to be met," and that "it may not be effective in addressing global greenhouse-gas emissions," because its performance depends on how the biofuels are produced and the land changes that occur in the process. See Committee on Economic and Environmental Impacts of Increasing Biofuels Production (2011).
9. Morris, Nivola, and Schultze (2012) critique other economically weak arguments for clean energy subsidies in the presence of a carbon tax, including energy security and job creation. This proposal does not address options to eliminate subsidies that accrue to fossil fuel companies.
10. Those estimates do not include the proposal's tax on CO_2 from nonenergy industrial processes and some non-CO_2 GHG emissions, about 3 percent of U.S. GHG emissions (see CRS 2012a, 6). With those emissions under the tax, the revenues and emissions reductions could be slightly higher. Border carbon adjustments also could raise revenue. On the other hand, the federal government will face higher energy prices.
11. Rosenbaum, Stone, and Shaw (2010) argue that policymakers should reserve 15 percent of allowance value under a cap-and-trade system (another way to price carbon) to protect low-income households.
12. Their analysis modeled a carbon tax of $20, rising annually at 4 percent over inflation. They find that even greater welfare gains could accrue if half the revenue is applied to lower corporate tax rates and half is used to fund an investment tax credit.
13. Morris and colleagues (2013) outline a proposal for such an initiative.

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