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## HOW TO USE CARBON TAX REVENUES

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### ABSTRACT

How should governments use the considerable revenue carbon taxes can raise? There are many options for cutting other taxes, increasing spending, or reducing borrowing. We organize the options into four goals: offset the new burdens that a carbon tax places on consumers, producers, communities, and the broader economy; support further efforts to reduce greenhouse gas emissions; ameliorate the harms of climate disruption; and fund unrelated public priorities. We identify important tradeoffs across the goals and make several recommendations for policy design. Revenue neutrality, for example, can assuage public concerns about expanding government, but spending may be better than tax reductions for achieving some goals. We recommend that governments use some revenue to reduce other taxes and to soften the blow to lower-income households, coal workers, and their communities, that they be cautious about using revenues to pursue emissions reductions the tax itself encourages, and that they avoid tight earmarks. Governments should also pay special attention to using revenue in ways that attract and sustain stakeholder and public support for a carbon tax.

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Carbon taxes are a promising way to reduce emissions of carbon dioxide and other greenhouse gases while avoiding unnecessary costs.<sup>1</sup> One key design element of such taxes is how governments use their potentially considerable revenue. Budget discussions often organize them into the three familiar pillars of fiscal policy: new spending, tax cuts, or lower borrowing. From a broader policy perspective, however, it is useful to organize them into four alternative policy goals: (1) offsetting the new burdens that a carbon tax places on consumers, producers, communities, and the broader economy; (2) supporting further efforts to reduce greenhouse gas emissions; (3) ameliorating the harms of climate disruption; and (4) funding public priorities unrelated to climate.<sup>2</sup>

Each approach reflects a coherent but distinct perspective on how best to use revenues from taxes imposed to achieve climate policy goals. We believe carbon tax discussions will be most productive if policymakers, advocates, analysts, and members of the public recognize this breadth of perspectives and develop strategies for using carbon tax revenues that deliver important social benefits while building the necessary political consensus for implementing and maintaining well-designed carbon taxes. Doing so requires an appreciation for the strengths and weaknesses of each approach.

## OFFSET THE BURDENS OF A CARBON TAX

A carbon tax would give businesses, people, and governments an incentive to efficiently reduce emissions of carbon dioxide and other greenhouse gases. In so doing, however, it would also impose new burdens on consumers, producers, communities, and the broader economy. Using some revenue to offset these burdens could reduce undesired distributional and economic harms. It could also promote public and stakeholder support and assure lawmakers that vulnerable households are held harmless. One advantage of a carbon tax over other climate policies that could achieve the same environmental outcomes, such as regulatory standards, is that it creates revenue that can buffer the burdens on those least able to bear them.

For consumers, the primary concern is that a carbon tax would increase prices for electricity, gasoline, home-heating fuels, and other fossil fuel-based energy sources. Families with lower incomes will be particularly stretched, since energy is often a relatively large share of

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<sup>1</sup> We use “carbon tax” as shorthand for an economy-wide excise tax on all feasibly taxable greenhouse gas emissions, adjusted to reflect differences in radiative forcing.

<sup>2</sup> We introduced this four-part taxonomy for corrective taxes in Marron and Morris (2016). This paper applies that framework to the specific case of taxes on greenhouse gas emissions. Some sections borrow wording from our earlier report.

their budgets. Marron, Toder, and Austin (2015) and Mathur and Morris (2014) find, for example, that a US carbon tax could impose substantially more burden on lower-income families, as a share of their incomes, than on higher-income ones.<sup>3</sup>

If policymakers want to hold lower-income households harmless, the best way to do so is to provide financial assistance, rather than exempt them from the tax or otherwise reduce their energy costs, either of which would undermine incentives to reduce emissions. Options include supplementing existing social safety net systems (in the United States, these include food assistance and refundable tax credits), lowering other regressive taxes, such as sales taxes, or directly rebating some revenues to qualified recipients. In some cases, beneficiaries of existing transfer programs will be protected through the automatic indexing of their benefits to price levels. In other cases, holding low-income households harmless would require targeted benefits.

By shrinking the market for fossil fuels, a carbon tax may fall particularly heavily on workers and communities reliant on coal, the most carbon-intensive fuel (McKibbin et al. 2015). In the long run, workers and economic resources will move into other industries, as others have from declining occupations and industries. In the near term, however, the transition is difficult, particularly in isolated rural areas in which the coal industry dominates the economic base. In regions and nations with significant coal industries, policymakers may want to use some carbon tax revenue to assist the transition of these workers and communities.<sup>4</sup>

Adding even a well-designed carbon tax on top of the existing tax system will increase the overall economic burden of the tax system. Policymakers may, therefore, want to use the revenue in ways that reduce that burden and thus encourage economic growth.<sup>5</sup> One much-studied option would be to recycle the revenues into reductions in other taxes. The most efficient revenue recycling would focus on the most distortionary taxes, meaning the ones that create the greatest economic drag, at the margin, relative to money collected. Such efficient “tax swaps” would limit the macroeconomic harm from a carbon tax policy. They would also make it easier to justify tax levels that more fully reflect the social costs of carbon emissions. The optimal carbon tax would be lower than it otherwise would be because of the “tax interaction” effect, the inefficiency that arises when a carbon tax raises prices in an economy where other taxes are already distorting personal and business decisions about working, saving, investing, consuming, and producing (Goulder 2013; Parry 1995).

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<sup>3</sup> Studies generally find a carbon tax is less regressive as a share of consumption (as opposed to income) and when accounting for how the tax affects households’ sources of income as well as their use of income.

<sup>4</sup> Different regions of the country may be impacted differently by climate policy, with the heaviest new burdens applying where electricity is currently least costly, in areas with the largest share of coal in the electricity mix.

<sup>5</sup> A carbon tax may also cause some specific industries—those that use energy intensively and face foreign competitors—to be less competitive in world markets. It is likely best to address such concerns through border adjustments. If that is not feasible, however, policymakers could soften any harm to competitiveness by subsidizing these firms based on their output (Fischer and Fox 2012).

Studies often find that the most distortionary taxes are those on capital income, especially corporate income (Johansson et al. 2008). Reducing corporate income taxes, particularly in countries like the United States where statutory rates are high by international standards, may be a particularly effective way to offset some of the economic drag from a carbon tax (Marron and Toder 2015; McKibbin et al. 2015; Tuladhar, Montgomery, and Kaufman 2015). Doing so would be regressive, however, with the largest benefits going to people with high incomes. Rebating revenue to people through per person dividends or similar mechanisms, on the other hand, would be extremely progressive, but it would not reduce distortions from the existing tax system and thus not offset any drag from a carbon tax (Marron, Toder, and Austin 2015).

Other options to promote growth include investing in infrastructure, education, research and development, and other activities that expand the productive capacity of the economy. Using revenue to reduce government borrowing could also boost growth, but that effect may currently be attenuated by persistently low interest rates in much of the developed world.

## **REDUCE GREENHOUSE GAS EMISSIONS MORE THAN THE TAX ALONE**

Even a substantial carbon tax will not eliminate emissions of carbon dioxide, methane, and other greenhouse gases. Some emissions will continue because people and businesses believe the price is worth paying for benefits of fossil fuels. Other emissions will continue because of inevitable gaps, such as sources that cannot be brought feasibly into the tax regime.

Using some revenue to pursue further emissions reductions could thus amplify the climate benefits of the tax. Doing so could also build support for a tax among stakeholders and members of the public who especially prioritize climate relative to other policy concerns, who are skeptical that price signals work, or who doubt the political process will impose a sufficiently large price.

In considering efforts to further reduce emissions, it is important to distinguish between “belt and suspenders” policies aimed at the same behavioral changes the tax is intended to bring about and “filling the gap” policies aimed at behavioral changes the tax misses. Belt-and-suspenders approaches include policies like subsidies for consumers to install rooftop solar panels or for power companies to build and operate renewable electricity sources, both of which the tax itself encourages. Using revenues this way may reduce emissions somewhat more than the tax alone, but the net benefit will likely be less than proponents would hope. Many of the subsidies may go to people and businesses that would have chosen cleaner energy sources because of the tax. The subsidies may thus end up as transfers rather as inducements for additional emissions reductions.

If subsidies do induce additional emissions reductions, moreover, their cost may exceed the benefits they provide. Subsidies are often much less efficient at correcting externalities than a corresponding tax. McKibbin, Morris, and Wilcoxon (2011) found, for example, that a US carbon tax would provide 20 times as much emissions reductions than a comparable subsidy for energy efficient household goods. If a tax does not do enough to reduce greenhouse gas emissions, it will likely be better to raise the tax than to subsidize belt-and-suspenders alternatives. Indeed, the introduction of a tax may allow policymakers to repeal existing subsidies that are made largely redundant by a tax. Morris (2013), for example, argues that the revenue gains from introducing a carbon tax in the United States could be modestly amplified by the budget savings from rolling back duplicative clean energy spending and tax credit programs.

Filling-the-gap policies, in contrast, attempt to encourage emissions reductions that a tax misses. The tax might apply to only some pollution sources, leaving room for new policies aimed at other sources. For example, it may not be feasible to extend a carbon tax to agricultural emissions of nitrous oxide, a potent greenhouse gas, so there may be benefits from using revenue to promote environmentally friendly cropping practices (Millar, Doll, and Robertson 2014). Or there might be untapped opportunities to correct market failures that lead to too little investment in basic energy and climate research.<sup>6</sup>

Such opportunities still face challenges, however. There is no natural relationship between the revenue that a carbon tax raises and optimal spending on other ways to reduce emissions. As a result, it would not make sense to earmark a particular percent of the revenue for a specific spending purpose. Moreover, the best ways to reduce emissions further may not involve much public spending. For example, it may be difficult to tax methane leaking from old or poorly constructed oil and gas wells because the emissions are hard to find and quantify. In theory, this could raise the case for using carbon tax revenues to find and fix the faulty wells. In practice, however, it may be more efficient to adopt regulatory policies that mandate green well completion, assign liabilities for leaky wells, and use federal dollars only for enforcing the regulations. Given these challenges, it would usually be best to address the gaps the carbon tax leaves under normal regulatory and appropriations processes, recognizing that new revenues are available to ameliorate any budgetary impacts.

## AMELIORATE THE HARMS OF CLIMATE DISRUPTION

Atmospheric concentrations of greenhouse gases have risen substantially in past decades and are on track to rise further, even as many nations increase efforts to reduce emissions. Some

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<sup>6</sup> Funding mitigation efforts in other countries would be another way to use carbon revenue to reduce emissions more than the tax alone. Doing so would likely confront particularly high political challenges as well as the practical challenges that arise in carbon offset efforts.

climate change is inevitable and, indeed, has already occurred (IPCC 2014). Nations will thus face a growing need to assist people and communities that suffer the resulting damage and displacement and to invest in measures that will reduce potential harms.

Governments could invest in coastal protection and other infrastructure that would reduce damages from sea level rise and extreme weather events. They could set aside resources to respond to damages as they occur, for example to assist flood victims. Developed nations could also provide financial assistance, through the Green Climate Fund or other means, to developing nations that are likely to bear particularly heavy costs from climate disruptions.

Many such assistance and adaptation efforts may make sense on economic, ethical, and diplomatic grounds. Governments could use carbon tax revenues to help pay for them (Chancel and Piketty 2015). However, there is little practical reason why carbon tax revenue should be spent differently than revenue from other sources.<sup>7</sup> Optimal spending for compensation and adaptation would not be a direct function of carbon tax revenue levels, and there will be differences between which countries raise the revenue and which countries experience the damages. Significant assistance from relatively wealthy large emitters to poor countries, particularly if it is linked to climate change, will face political hurdles domestically. How best to help poor countries become more resilient to climate change is likely to remain an active question across and within countries for the foreseeable future.

## FUND PUBLIC PRIORITIES UNRELATED TO CLIMATE

A final approach is to treat receipts from a carbon tax like any other revenues. Governments could use revenues for any public purpose—whether higher spending, lower taxes, or reduced borrowing—without regard to any link to the climate or the effects of the tax. In fact, it may be those other purposes that create the potential for a carbon tax in the first place. If the United States undertakes significant business tax reform with an eye to reducing the top corporate statutory rates, for example, it would be difficult to broaden the base enough to avoid worsening the deficit (Marron and Toder 2015). A carbon tax could help make the budget numbers work.

Public finance experts and budgeting officials often endorse treating all revenue sources similarly because their uses can then be evaluated on their own merits. Members of the public are typically skeptical, however, of new taxes if proponents are not clear about how the revenue will be used (Agrawal Weinstein, and Nixon 2010; Amdur, Rabe, and Borick 2014; Kallbekken and Aasen 2010; Soares 2012). People appear to worry that any new tax may really be a ploy to

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<sup>7</sup> In other contexts, it may make sense to have a direct link between levying a corrective tax and using the revenue to compensate people who bear harms; one good example is the US tax on coal to fund assistance to coal miners who suffer from black lung disease (Marron and Morris 2016). That logic is harder to apply to climate change, however, because many damages and adaptation needs are driven by the accumulation of past emissions.



increase the size and scope of government. To allay that concern—and thus reduce opposition to a tax—policymakers typically specify revenue uses when a tax is first created and use most or all of it for offsetting tax reductions. For example, some attribute much of the favorable reception to the carbon tax in British Columbia to the handling of the tax revenues. The proceeds fund cuts in the province’s individual and business taxes, and a tax credit assists low-income households (Komanoff and Gordon 2015). By law, each year the BC government must show how it will return the revenue to taxpayers in tax reductions.<sup>8</sup>

## CONCLUSION

In deciding how to use carbon revenues, policymakers, analysts, and advocates must consider both policy goals and political realities. Policy goals can differ widely. Environmental advocates often believe that revenues should be used to support further efforts at cutting greenhouse gas emissions (Cottrell et al. 2013; Esch 2013). Analysts worried about the poor want to ensure some revenues are used to offset their burdens (Stone 2015). Tax reformers may see the revenue as a way to reduce business and personal taxes (Marron and Toder 2015). Budget hawks may see the revenue as a way to reduce government deficits (Gale, Brown, and Saltiel 2015). And so on.

In considering those options, policymakers, advocates, analysts, and the public should keep in mind that carbon taxes can raise substantial revenue, at least until the economy is largely decarbonized. British Columbia, for example, raises about C\$1 billion annually from its carbon levy (about \$700 million in US dollars), a substantial amount for a province with a population of less than 5 million people. The United States could raise on the order of \$100 billion or more annually from a carbon tax (McKibbin et al. 2015).

Such large amounts leave plenty of room to address multiple concerns. In the United States, for example, providing assistance to the roughly 80,000 coal workers and their communities for a decade would cost a tiny share of the \$1 trillion or more that a tax could bring in over the same period.<sup>9</sup> Offsetting burdens on lower-income families would be more costly, but it would still require only about 15 percent of net carbon revenues (Stone 2015; Morris 2013).<sup>10</sup> Thus, even after offsetting harms to lower-income households and coal workers and communities, policymakers would have plenty of revenue to pursue other policy goals, to build political support for the carbon tax, or a combination of the two.

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<sup>8</sup> British Columbia’s Ministry of Finance explains how the carbon tax funds cuts in other taxes: <http://www.fin.gov.bc.ca/tbs/tp/climate/A2.htm>.

<sup>9</sup> US Coal Mine Employment data from 2013 from the National Mining Association.

<sup>10</sup> Mathur and Morris (2014) estimate that about 11 percent of the tax revenue would hold the bottom two income deciles harmless on average, assuming the carbon tax burden falls only on the uses of income. A few extra percentage points of revenue could account for uncertainty in the estimate, cover slightly higher income households, or ensure that households in the lowest two deciles that have higher-than-average energy expenditures are held harmless.

One way to build support among constituencies who express little concern about the climate is to use carbon revenues to pursue other goals these constituents value. Lowering corporate income taxes could build support among business-oriented groups, for example, who might otherwise be skeptical of new taxes. Rebating revenues to lower-income households well in excess of their carbon tax burden could similarly build support among groups focused on reducing inequality. Likewise, some may argue that regional disparities in the incidence of the tax warrant transfers to harder-hit states. Taking this political logic too far, however, can turn the development of an efficiency-enhancing carbon tax into a festival of rent-seeking behavior. That is arguably what happened in the 2009 US debate over a cap-and-trade system, where stakeholder squabbling over allowance allocations helped lead to the collapse of the legislative process.

Pulling these considerations together, we have five general pieces of advice for developing proposals to use carbon tax revenue.

First, requiring that a carbon tax be revenue neutral can assuage public concerns that such taxes are a way for policymakers to expand government and can leave some scope for pursuing other policy goals. Cuts in corporate income taxes may offset some of the macroeconomic drag from a carbon tax, for example, and tax credits for lower-income families could make the overall tax system more progressive. But requiring strict revenue neutrality poses challenges as well. Some policy goals would be better pursued by spending the money directly, rather than indirectly deploying it through the tax system. Assistance to displaced coal miners, for example, might work better through a specific spending program rather than jury-rigged tax credits. People who generally oppose wholesale revenue increases from taxing carbon should thus be open to modest deviations from revenue neutrality if it results in a more effective way to accomplish policy goals.

Second, softening the blow to lower-income households and the transitory burden on coal workers and their communities makes sense on both policy and political grounds. Doing so will reduce opposition to a tax, both before and after enactment, and will leave substantial revenues that can be used for other purposes.

Third, dedicating revenue to further emissions reductions should be done with caution, if at all. A well-designed carbon tax will reduce the potential benefits of many—but not all—ways of reducing greenhouse gas emissions. If policymakers want to use revenues to further pursue climate goals, they should focus on filling in gaps—reducing emissions the tax may miss—rather than funding belt-and-suspenders measures that may already occur because of the tax or are otherwise not cost effective. Indeed, policymakers should be open to rolling back existing regulations and subsidies that may be made largely redundant by a tax.

Fourth, targeting the revenue for any specific new spending, such as infrastructure or research, would best be done notionally rather than through earmarks so as not to circumvent



the appropriations process that disciplines the use of taxpayer dollars. Earmarking risks overspending on any one line item, deploying resources inefficiently, and fueling concerns that the tax would create a slush fund for politicians' pet projects.

Finally, climate policy advocates should recognize that reductions in greenhouse gas emissions depend not just on the policies that get enacted, but on the policies that remain in place. Many emissions-reducing investments involve large expenditures on long-lived capital, such as power plants and industrial facilities. A carbon tax package that bolsters the expectations of businesses and people that the tax will endure in the long run will be more environmentally successful than one that people think may not survive the next election. Australia's experience illustrates how unpopular climate policies can be rescinded by future governments. Policymakers should thus give special attention to identifying revenue uses that build ongoing support for a carbon tax.

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