

Carbon Pricing 102: Revenue Use Options

An overview of how different carbon pricing policies generate revenue, the options for revenue use, and the implications of each option.

Explainer by **Marc Hafstead** — September 26, 2019

Carbon Pricing Revenue

Carbon pricing revenue consists of the funds generated by **carbon pricing policies** (carbon taxes and cap-and-trade programs). Carbon pricing policies are implemented to limit the amount of carbon dioxide (CO₂) emitted into the atmosphere. The socioeconomic effects of a carbon pricing policy vary substantially depending on how the revenue from the policy is used. As such, revenue use is a significant aspect of policy design. This explainer will outline how different carbon pricing policies generate revenue, the options for revenue use, and the implications of each option.

Overview

There are two types of carbon pricing policies: carbon taxes and cap-and-trade programs. The way revenue is generated and the amount of revenue generated depend on the type of policy.

A carbon tax is a price set per ton of carbon or, more commonly, per ton of CO₂ emitted. The amount of revenue generated is determined by the fixed price per ton of emissions and how responsive demand for fossil fuels is to the price: revenue generation will be higher if demand for fossil fuels that emit CO₂ are not very responsive to the tax.

A cap-and-trade program limits the total amount of CO₂ that can be emitted by covered entities. (See the **Carbon Pricing 101** explainer for more details on cap-and-trade programs.) Covered entities are required to submit allowances equal to their emissions each

year; the total number of allowances determines the cap on emissions. How allowances are allocated determines the amount of revenue generated by the policy; free allocation of allowances to firms generates zero revenue for the government whereas auctioning generates similar revenues as a carbon tax. For cap-and-trade programs with auctions, the amount of revenue generated is determined by the price of the allowances sold and the number of allowances sold each year.

There are several options for revenue use, and these options can be used individually or in a hybrid combination with other options. The options—and the ways they affect a policy's overall impacts—are described below.

Progressive Policy vs. Regressive Policy

Many public policies affect households differently; these differences are described as the **distributional effects** of a policy. When considering the distributional effects on households with different levels of income, policies are often described as **progressive, proportional, or regressive**. A policy is progressive if the costs constitute a larger proportion of income for high-income households than for low-income households and regressive if the costs constitute a larger proportion of income for low-income households than for high-income households. It is proportional if the policy's costs constitute the same proportion of income for households with different income levels.

Carbon Dividends

A carbon dividend distributes the revenue from a carbon price back to households, typically in the form of a check, a tax credit (annually or through adjustments to employer tax withholding), supplements to existing payments from federally administered benefit programs like Social Security, or through payments using the electronic benefit transfer system (used to deliver food stamp benefits). In its simplest form, a carbon dividend would divide the amount of revenue generated by a carbon price over the course of a year evenly among all households. However, a carbon dividend does not need to be divided in equal amounts (it can be divided based on one's income, tax returns, or other factors), and the details of a carbon dividend vary among policies. A carbon dividend has been used to redistribute revenues in a number of climate policy proposals, including the [Energy Innovation and Carbon Dividend Act](#), the [Healthy Climate and Family Security Act](#), the [Climate Action Rebate Act](#), and [Climate Leadership Council's Carbon Dividend Plan](#).

Carbon dividends are an especially progressive, or equitable, use of the revenue, as the dollar amount of a carbon dividend **will likely** exceed the increased costs incurred by the average low- and middle-income household. A study by the [US Treasury](#) predicted that approximately 70 percent of households would be better off with an equal per capita dividend.

Tax Swaps

A tax swap uses the revenue from a carbon price to reduce taxes deemed “distortionary”—taxes that can result in a decrease of economic output, because they tax labor or capital. **Distortionary taxes** may unintentionally encourage individuals to work fewer hours by taxing their income (labor), or they may encourage businesses to produce less output by taxing the equipment they use to create products (capital). These types of taxes can include payroll, individual income, or corporate income taxes.

The costs of distortionary taxes can be partially (or even fully) offset if the revenue generated from these taxes can be “swapped” with the revenue generated from a

carbon price. This swap can allow distortionary taxes to be reduced, which can produce economic gains. For example, [Chen and Hafstead](#) estimate that a carbon tax of \$43.40 (in 2019 dollars) would decrease real GDP by 0.59 percent in 2025. However, if the revenues are used to reduce distortionary taxes, then GDP loss **could be lowered to as little as 0.35 percent**. So, a tax swap can reduce the economic costs of a carbon price by reducing other economic distortions.

These economic effects from a tax swap are called the **revenue-recycling effect**, and the size of the effect depends on which particular tax is reduced. If revenues are not used to reduce preexisting tax rates, or if revenues are used to finance new spending, then there is no beneficial revenue-recycling effect.

Green Spending

Carbon pricing revenue can be used to finance “green spending” programs aimed at reducing emissions through non-pricing methods. For example, it can be used to subsidize electric vehicles or clean energy generation, fund **weatherization programs**, invest in energy efficiency improvements, and more. Using the revenue for green spending may not be as beneficial as one might think, however. First, most evidence suggests that green spending programs would increase total carbon pricing policy costs and exacerbate distributional issues (making the policy more regressive). For example, [Borenstein and Davis \(2016\)](#) find that US tax credits for clean energy investments have gone disproportionately to higher-income households. Second, there is increasing **evidence** that green spending programs may deliver smaller environmental benefits than projected. Further, the foregone use of revenues to either increase economic efficiency (through tax swaps) or address distributional issues (carbon dividends) is an additional cost of green spending.

General Spending

Apart from spending specifically intended to reduce emissions, carbon pricing revenue can also be spent in other ways. Policymakers could choose to spend the revenue on programs aimed to make the overall policy effects more progressive; for example, universal

healthcare, student debt relief, and free college are spending programs that would benefit lower-income groups more than higher-income groups. Policymakers also may choose to spend revenue in other ways, unrelated to the environment or progressive policies; for example, spending on infrastructure improvements. General spending may make the policy more or less regressive, depending on how the money is spent. Again, using all of the carbon revenues on general spending eliminates the opportunity to use the revenues to increase efficiency or address distributional issues.

Deficit Reduction

The **federal deficit** is the amount of money the federal government has spent above and beyond the revenue generated within a given time period. For example, if the federal government generates \$3 trillion in revenue in one year and spends a total of \$4 trillion that year, the deficit would be \$1 trillion. Policymakers may decide to use carbon pricing revenue to decrease the deficit and reduce future interest payments on that debt.

Why Revenue Use Matters

As discussed above, there is an inherent equity-efficiency trade-off when it comes to revenue use. In terms of dividends versus tax swaps, dividends make the policy more progressive and more expensive, and tax cuts make the policy less progressive and less expensive. This trade-off between equity and efficiency requires policymakers to strike a balance between competing goals. And there may be a further trade-off between equity, efficiency, and political popularity: green spending, perhaps more regressive and more expensive than dividends or tax swaps, **polls well** among the general public.

Economics aside, the political feasibility of a carbon price may ultimately depend on whether or not the revenue use addresses the concerns of key stakeholders.

In The Weeds: Is Carbon Pricing Progressive?

A **common argument** against carbon pricing is that a price on carbon is regressive because, compared to high-income households, low-income households spend a larger share of their incomes on carbon-intensive goods, such as electricity and motor vehicle fuels (source: **consumer expenditure survey**). However, **recent research** has shown that the impact of carbon pricing on household income is actually progressive and that the overall impact of carbon pricing, in the absence of revenue use, is progressive as well. Two mechanisms drive this result. First, low-income households receive a greater share of their income from government transfer payments. Because most of these payments (such as Social Security benefits) are linked to inflation, any policy-induced increase in the price of carbon-intensive goods is accompanied by higher transfer payments, which directly offsets higher energy costs for households that receive these payments. Second, carbon-intensive industries are also capital-intensive industries, and capital income—received primarily by richer households—is more adversely affected by carbon pricing than labor income.

Resources for the Future (RFF) is an independent, nonprofit research institution in Washington, DC. Its mission is to improve environmental, energy, and natural resource decisions through impartial economic research and policy engagement.



Marc Hafstead is a Fellow and Director of the Carbon Pricing Initiative at Resources for the Future.