

## What is a carbon tax?

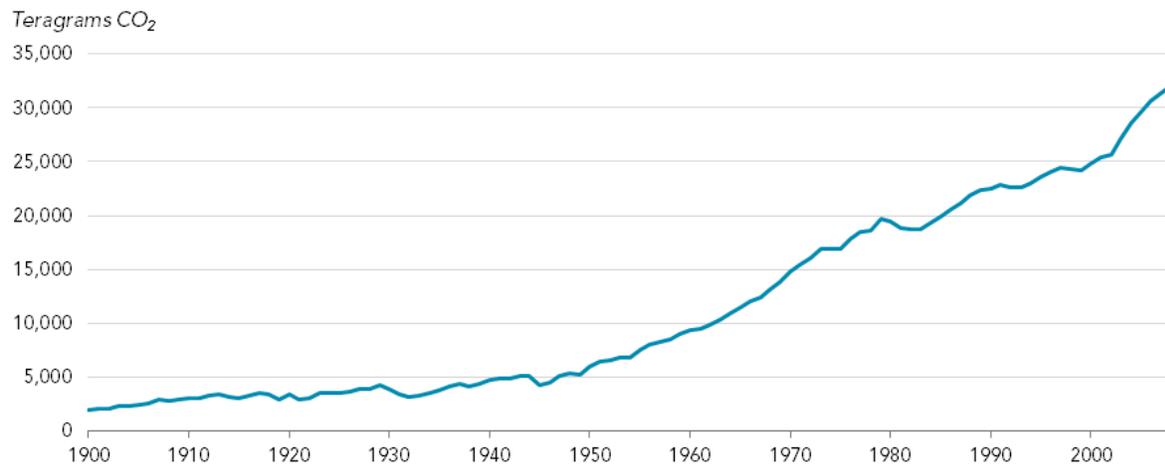
A carbon tax is a tax on carbon dioxide emissions, the primary gas that causes global warming. By raising the cost of burning fossil fuels—the chief source of carbon emissions as well as the source of 90 percent of US energy—a carbon tax would help protect the environment while raising significant revenue. The burden of the tax would fall more heavily on energy-intensive industries and lower-income households. However, the revenues from the tax could be used to offset the regressive impact, to lower the budget deficit, or to cut taxes that reduce incentives to work, save, and invest.

## Why Tax Carbon, and How Much?

If carbon dioxide emissions, which account for almost 80 percent of greenhouse gases' impact, continue to rise in line with historical trends (figure 1), global temperatures will rise by more than 3.5 degrees Celsius from preindustrial levels by 2100. The predicted impact is grave, or perhaps even disastrous. (Environmental Protection Agency 2015; National Aeronautics and Space Administration 2015).

**FIGURE 1**

The Growth of Global CO<sub>2</sub> Emissions from Fossil Fuels  
1900-2008



Source: Boden, T.A., G. Marland, and R.J. Andres, 2010.

Energy prices do not currently reflect the environmental cost of carbon dioxide emissions. Those who benefit from burning fossil fuels generally do not pay for the environmental damage the emissions cause. Instead, this cost is borne by the world population as a whole, including future generations. Imposing a carbon tax would correct this "externality", or cost-benefit mismatch, by raising the price of energy consumption to reflect its full social cost.

Assessments of the environmental cost of carbon emissions are sensitive to several scientific and economic assumptions, but recent studies suggest that a tax of \$30–\$40 per ton would contain global temperatures to within 2.5 degrees of preindustrial levels—a threshold believed to be critical (US Interagency Working Group on Social Costs of Carbon 2012). The Congressional Budget Office estimated that a broad-based carbon tax in the United States starting at \$20 per ton in 2011 and rising to \$34.4 per ton over a decade would have raised \$1.2 trillion during that period (Congressional Budget Office 2013). This is close to the amount that the US currently raises with excise taxes—about 0.5 percent of GDP per year. A carbon tax collected “upstream” from a limited number of fuel producers and utilities would be fairly easy to administer.

### **How Would a Carbon Tax Affect Welfare?**

Introducing a carbon tax by itself would raise the prices of energy and transportation. For example, a tax of \$21 per ton could be expected to increase the price of electricity about 16 percent, with regional variations because the fuel mix varies widely (Burtraw, Sweeney, and Walls 2009). Higher energy prices would raise costs for industry and households, resulting in lower profits, wages, and consumption as well as a slowdown in economic activity, unless the aggregate impact were offset by fiscal or monetary policy. Higher tax revenues would reduce the budget deficit, which would contribute to the near-term economic slowdown but could also spur private investment in the long run by reducing interest rates.

The impact of a carbon tax would differ among economic groups depending on the extent of energy price changes and on regional energy production and consumption patterns. Clearly, a carbon tax would fall more heavily on workers and investors in carbon-intensive industries as well as on regions that depend heavily on carbon-intensive fuels—particularly coal—for energy generation.

The distributional impact of a carbon tax would depend on the extent to which businesses could pass on higher energy costs to their customers. If demand for goods is less “elastic” (that is, responds less) to price changes than the supply of goods, then consumers will bear more of the carbon tax burden than investors and workers.

Since low-income households consume a more energy-intensive basket of goods than wealthier households do, a carbon tax would be regressive; it would cost poorer households a higher share of their income than wealthier households (Morris and

Mathur 2015). A carbon tax of \$20 per ton would account for about 1.8 percent of pretax income for households in the lowest income quintile, as compared to 0.7 percent in the highest income quintile. However, a carbon tax's impact would be less regressive to the extent that it reduced business profits rather than increasing goods prices.

The welfare impact of a carbon tax would depend critically on the total package of fiscal measures of which it is a part. And accompanying measures could be chosen to mitigate the distributional effects of the tax as well as to achieve other economic goals. Using some of the revenues to increase transfers, reduce Social Security contributions from low-income households, or compensate workers in carbon-intensive industries could soften the regressive impact of the carbon tax. Revenues from a carbon tax could also be used to finance cuts in taxes that act as a disincentive to growth, such as the corporate income tax. However, because tax cuts on profits would largely benefit the wealthy, this would exacerbate the regressivity of the carbon tax. Finally, using some of the revenues from a carbon tax for deficit reduction could free resources for private investment or consumption.

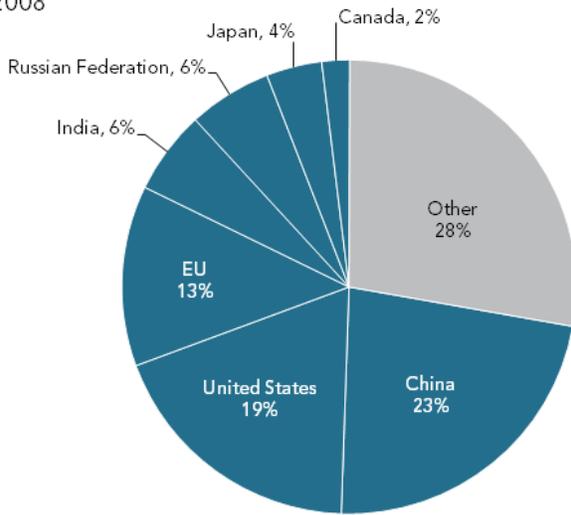
### **International Cooperation**

Because carbon dioxide emissions cause the same climate damage regardless of where they originate, ideally all countries would tax carbon at the same rate. However, countries face poor incentives to enact carbon taxes because most of the cost of the tax would be borne by individuals and businesses in that country, while most of the benefit of reduced emissions would go to other countries. International cooperation is thus necessary to prevent global warming; the United Nations Framework Convention on Climate Change leads this project.

Although most countries impose excises on fossil fuels (often to finance transport infrastructure or reduce fuel imports) few have introduced broad-based carbon taxes, although the European Economic Area (comprising European Union member states plus Iceland, Liechtenstein, and Norway) does have a "cap-and-trade" system for limiting emissions that achieves similar ends. Universal participation in a carbon tax is not necessary to achieve substantial progress, however. Cooperation among the major carbon-producing nations would cover more than 70 percent of greenhouse gas emissions (figure 2).

**FIGURE 2**

**Major Producers of Greenhouse Gas Emissions<sup>a</sup>  
2008**



Source: Carbon Dioxide Information Analysis Center.  
Note: EU data does not include Estonia, Latvia or Lithuania.  
(a) Emissions from fossil fuel combustion and some industrial processes.

## Data Sources

Boden, T.A., G. Marland, and R.J. Andres. 2010. [“Global, Regional, and National Fossil-Fuel CO<sub>2</sub> Emissions.”](#) Oak Ridge, TN: Carbon Dioxide Information Analysis Center.

Carbon Dioxide Information Analysis Center. [“Fossil-Fuel CO<sub>2</sub> Emissions by Nation.”](#) Oak Ridge, TN: Carbon Dioxide Information Analysis Center.

## Works Cited and Further Reading

Congressional Budget Office. 2013. [“Effects of a Carbon Tax on the Economy and Environment.”](#) Washington, DC: Congressional Budget Office.

Burtraw, Dallas, Richard Sweeney, and Margaret Walls. 2009. [“The Incidence of U.S. Climate Policy: Alternative Uses of Revenues from a Cap-and-Trade Auction.”](#) Washington, DC: Resources for the Future.

Environmental Protection Agency. 2015. [“Climate Change.”](#) Updated October 7, 2015.

Interagency Working Group on Social Costs of Carbon. 2013. [“Technical Update of the Social Costs of Carbon for Regulatory Impact Analysis.”](#) Washington, DC: Interagency Working Group on Social Costs of Carbon.

Marron, Donald, and Eric Toder. 2015. "[Carbon Taxes and Corporate Tax Reform](#)." In *Implementing a US Carbon Tax*, edited by Ian Parry, Adele Morris, and Robert Williams III, 141–58. New York: Routledge.

Morris, Adele, and Aparna Mathur. 2015. "[The Distributional Burden of a Carbon Tax: Evidence and Implications for Policy](#)." In *Implementing a US Carbon Tax*, edited by Ian Parry, Adele Morris, and Robert Williams.

National Aeronautics and Space Administration. 2015. "[Global Climate Change: Vital Signs of the Planet](#)." Updated October 7, 2015.

United Nations Framework on Climate Change. 2015. "[United Nations Framework on Climate Change](#)." Accessed October 9, 2015.