



The Impacts of a Carbon Tax

Select Findings from Research by RFF Experts

Experts at Resources for the Future (RFF) are examining the potential impacts of a federal carbon tax to help leaders better understand the economic and environmental costs and benefits. Below are highlights from recent research at RFF, specifically about how a carbon tax impacts the following:

- Emissions
- Federal revenue
- Low income groups
- Households
- States
- Employment
- Industry competitiveness

How a Carbon Tax Impacts Emissions

A carbon tax can result in significant emissions reductions, depending on the amount of the tax.

“Research shows that a **tax of \$25 per ton of CO₂ would reduce emissions by roughly 10 percent per year** (based on projections that energy-related CO₂ would be about 5.5–5.8 billion tons annually for the next decade.”¹

“Under the carbon fee scenario [at \$45 per ton of carbon emissions], emissions in 2030 are projected to be 64 percent of the business-as-usual baseline—that is, emissions fall almost 36 percent from 2016 to 2030.”²

“The US pledge under the UN Framework Convention on Climate Change promised emissions levels 26–28 percent below 2005 by 2025. Modeling suggests the [\$45 carbon tax] would yield considerably more reductions in 2025 than outlined in the pledge.”²

How a Carbon Tax Impacts Federal Revenue

The amount of potential revenue that can be raised by a carbon tax depends on the level of the tax and how broadly it is applied, among other factors.

“The amount of revenue raised depends on the level of the tax, how broadly it is applied, and other factors. Most experts suggest a tax of around \$25 per ton of CO₂, which would **raise approximately \$125 billion annually**.”¹

How a Carbon Tax Impacts Low Income Groups

The impact on low income groups depends on how the revenue from a carbon tax is used.

“Well-designed carbon-tax legislation can generate enough revenue to fully offset the hit to the most vulnerable households’ budgets from higher energy prices, cushion the impact for many other

households, and leave plenty to spare for other uses whether deficit reduction, tax reform, or spending for other public purposes). **Lump-sum rebates are the best way to provide low-income protection.**³

“[I suggest] a three-pronged delivery mechanism for reaching virtually all the target population, especially those with the very lowest incomes. All households of a given size would receive the same lump-sum amount. Lower-income working households would receive rebates through a refundable income tax credit similar to the Earned Income Tax Credit, beneficiaries of Social Security and certain other federally administered benefit programs would receive them as supplements to their regular payments, and very low-income families would receive them through state human services agencies using the electronic benefit transfer (EBT) system already used to deliver SNAP (food stamp) benefits.”³

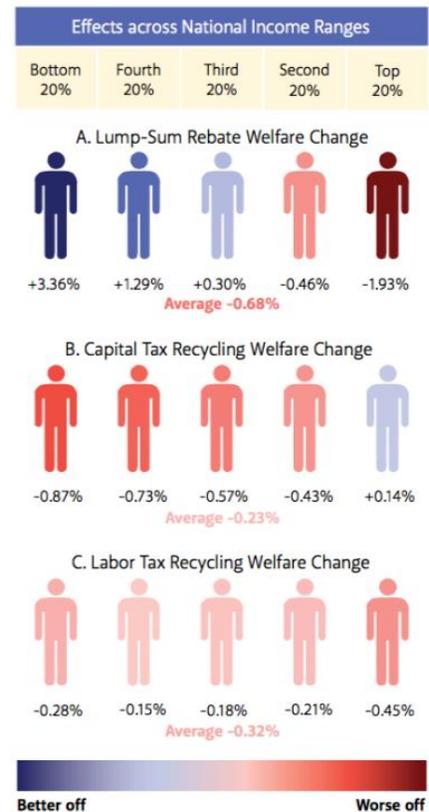
How a Carbon Tax Impacts Households

There is a wide difference in how a carbon tax impacts income groups and households, depending on how the revenue is used and how the policy is designed.

“When the carbon tax revenue is recycled to reduce the capital income tax, the mean cost is \$291 per household; by comparison, reducing the labor income tax yields a mean cost of \$407 and rebating the revenue in equal (lump-sum) payments yields a mean cost of \$866.”⁴

“The mean household does the worst under a lump-sum rebate, but we find that this policy will create a double dividend for the bottom three quintiles of the US population in the first year.”⁵

“Recycling revenue to reduce capital taxes is the most efficient policy, but we caution that it makes carbon pricing, which is already regressive, even more so (at least in the short run). Meanwhile, using carbon tax revenue to reduce taxes on labor is a clear middle-of-the-road option: while it is less efficient than recycling revenue to cut capital taxes, the efficiency difference is relatively modest, and cutting labor taxes offsets some of the natural regressivity of a carbon tax. The distributional effects are close to even across the income distribution, when measured as a percentage of income, which could have political advantages.”⁵



How a Carbon Tax Impacts States

A carbon tax impacts states differently depending on existing means of electricity generation in the state.

“The differences across states are relatively small compared with the variation across income quintiles.”⁴

“[Impacts] are more heavily concentrated in places where the electricity price is most likely to increase (due to a combination of the carbon intensity of existing electricity generation, the pricing regime of the electricity market, and the potential for renewable generation), that are less urbanized, and where spending on energy represents a higher proportion of total income (often due

to extreme weather); these areas include the South, Appalachia, the Midwest, and the Great Plains.”⁴

“The lump-sum rebate is the least efficient policy in the aggregate: at the national level and in many states, aggregate welfare is lower under this recycling option than under labor or capital tax recycling. But the distributional effects of lump-sum recycling are sufficient to reverse the pattern of relative welfare losses across states, causing smaller losses in the southern and eastern Midwest states than in affluent states on the East Coast. This policy, however, creates the widest gap in welfare losses across states.”⁴

“The labor tax recycling policy, while preserving the pattern of relative outcomes, narrows the geographic differences and produces a fairly even distribution of outcomes across states. This approach could be appealing if the goal is to have welfare effects that are relatively similar across different states.”⁴

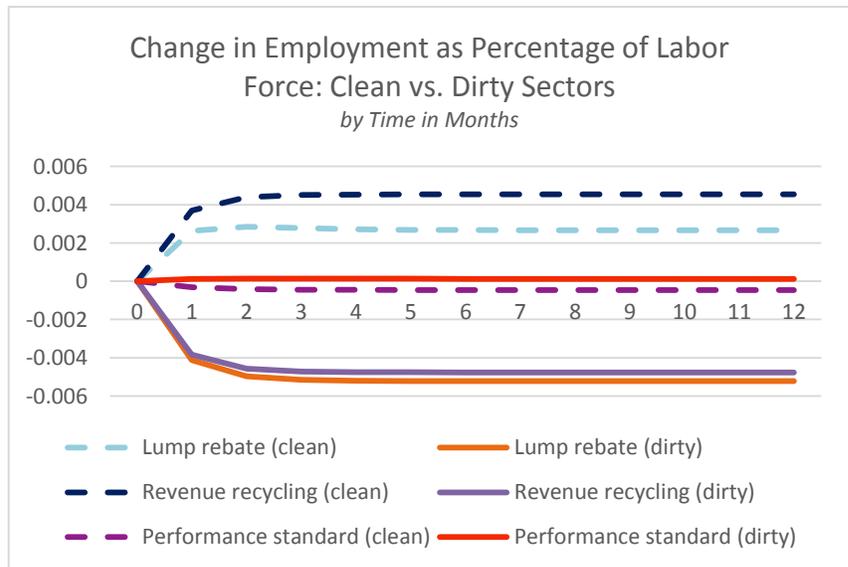
“Recycling revenue to reduce capital taxes is the most efficient policy, but it makes carbon pricing, which is already regressive, even more so (at least in the short run). In this case, the poorest states in the South and Midwest bear a disproportionate share of welfare loss.”⁴

How a Carbon Tax Impacts Employment

A carbon tax tends to shift employment between sectors, but has less of an effect on overall employment.

“While there is a substantial shift in employment between industries, **the net effect on unemployment is small, even in the short run.**”⁶

“While imposing a pollution tax leads to substantial reductions in employment in the polluting sector of the economy, those losses are offset by an employment increase of similar magnitude in the nonpolluting sector, driven both by consumer substitution from polluting to nonpolluting goods and by decreased competition for workers from the polluting sector, which makes it easier for the nonpolluting sector to hire.”⁶



“Under all three policy scenarios [a carbon tax with lump sum rebates, a carbon tax with payroll tax reductions, and a performance standard], the employment effects represent much more of a shift in employment—fewer jobs in one sector but more jobs in the other—rather than a change in overall employment. This is particularly true for the carbon tax with payroll tax cuts and the performance standard, where the net effect on employment is very small.”⁶

“The employment shifts are much smaller under the performance standard than under either carbon tax policy, because the relative output price effects are much smaller under the performance standard. To the extent that policymakers view industry-level employment contractions as undesirable—even if they are offset by employment gains elsewhere—this will make performance standards relatively attractive compared with carbon taxes.”⁶

“Overall effects on unemployment should not be a substantial factor in the evaluation of environmental policy. These effects are small and likely to be greatly outweighed by the other effects of the policy. However, because emissions taxes cause substantial sectoral shifts in employment, those effects could matter.”⁶

How a Carbon Tax Impacts Industry Competitiveness

Energy-intensive, trade-exposed industries may need special treatment under a carbon tax, depending on how the policy is designed.

“The economic and environmental impacts of competitiveness [policies] appear relatively modest. ... I have proposed two frameworks by which policymakers could evaluate competitiveness policy options. First, one could weigh the benefits and costs of various options with the aim of maximizing net social benefits. Second, one could focus on political revealed preference, whereby the objective is to select the policy option that ensures passage of the broader carbon pricing bill in Congress (and subsequent signing into law by the president).”⁷

“To capture most of the likely impacts and to avoid needless complexity, it appears that [border trade adjustments] should be limited to [energy-intensive, trade-exposed] industries and products. However, doing so raises questions concerning the distributional impact of, in effect, providing a subsidy to [energy-intensive, trade-exposed] industries at the expense of other options.”⁸

Further Reading

1. Considering a Carbon Tax: Frequently Asked Questions | RFF Issue Brief 12-09 | Joseph E. Aldy et al.
2. Analysis of the American Opportunity Carbon Fee Act of 2015 (S. 1548) | RFF Policy Brief 15-01-REV | Marc Hafstead and Raymond J. Kopp
3. The Design and Implementation of Policies to Protect Low-Income Households under a Carbon Tax | RFF Issue Brief 15-02 | Chad Stone
4. The Initial Incidence of a Carbon Tax across US States | RFF Discussion Paper 14-25 | Roberton C. Williams III, Hal Gordon, Dallas Burtraw, Jared Carbone, and Richard D. Morgenstern
5. The Initial Incidence of a Carbon Tax across Income Groups | RFF Discussion Paper 14-24 | Roberton C. Williams III, Hal Gordon, Dallas Burtraw, Jared Carbone, and Richard D. Morgenstern
6. Unemployment and Environmental Regulation in General Equilibrium | RFF Discussion Paper 15-11 | Marc Hafstead and Roberton C. Williams III
7. Frameworks for Evaluating Policy Approaches to Address the Competitiveness Concerns of Mitigating Greenhouse Gas Emissions | RFF Discussion Paper 16-06 | Joseph E. Aldy
8. Carbon Taxes, Trade, and Border Adjustments | RFF Policy Brief 16-02 | Brian Flannery

This research is part of RFF’s initiative, *Considering a US Carbon Tax: Economic Analysis and Dialogue on Carbon Pricing Options*

Learn more at www.rff.org/carbontax.