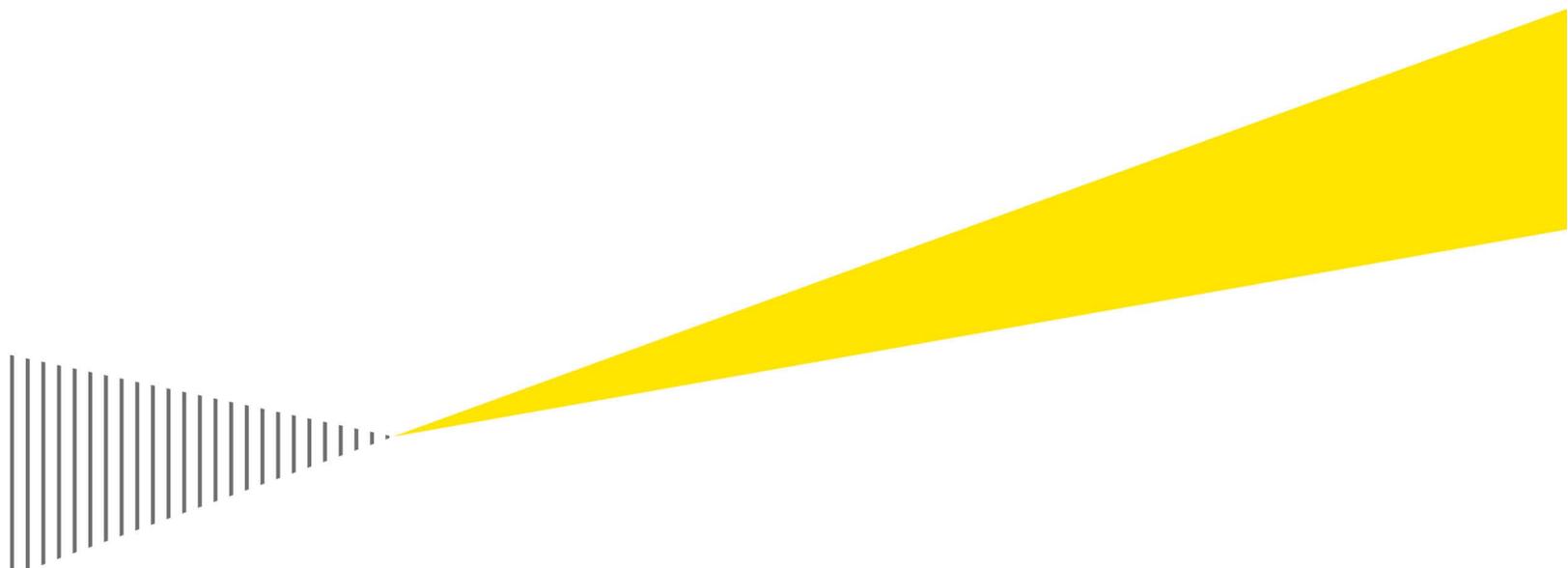


Carbon regulations vs. a carbon tax: A comparison of the macroeconomic impacts

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Executive summary

This report compares the economic impact of replacing a fully implemented version of existing US carbon emission regulations with a carbon tax. The regulatory approach would reduce carbon emissions 22% relative to a baseline that includes no carbon emissions policies. The report finds that placing a uniform price on carbon emissions is a less costly means of achieving the same reduction in carbon emissions.

Specifically:

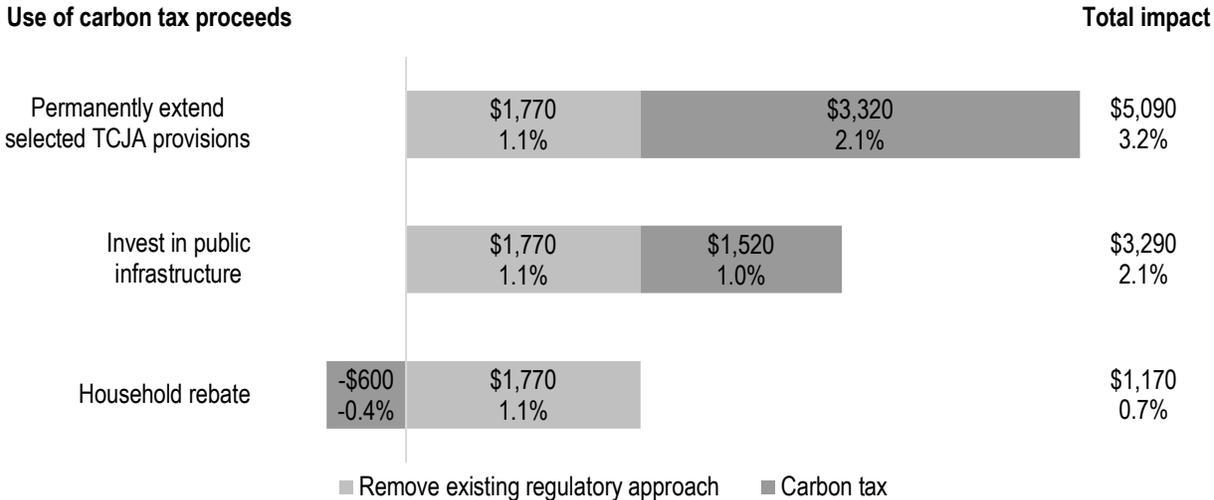
1. The existing regulatory approach is estimated to reduce gross domestic product (GDP) in the long-run by, on average, \$1,770 per household annually.
2. A revenue-neutral carbon tax could increase GDP in the long-run by, on average, as much as \$5,090 per household annually, relative to the existing regulatory approach.

A key determinant of the long-run economic impact of a carbon tax is the use of the revenue. This analysis estimates three alternatives:

1. Permanent extension of the Tax Cuts and Jobs Act (TCJA), which would produce the largest estimated GDP impact, a 3.2% increase in long-run GDP.
2. Investment in public infrastructure, which would yield an estimated 2.1% increase in long-run GDP.
3. Rebate to households, which would result in an estimated 0.7% increase in long-run GDP.

The total macroeconomic impact of each policy package computes the combined effect from (a) removing the existing regulatory approach (the lighter bar in Figure ES-1) and (b) imposing the carbon tax paired with one of the three specified revenue uses (the darker bar in Figure ES-1).

Figure ES-1. Long-run change in annual per-household GDP from emissions-equivalent carbon tax relative to existing regulatory approach, by use of carbon tax proceeds



Note: Economic impacts are scaled to the size of the 2018 US economy. The long-run is defined as when the US economy has fully adjusted to the change in policy. The estimated impacts from an increase in public infrastructure could differ depending on the details of a specific policy proposal but the stylized scenario modeled here assumes an increase in physical capital (e.g., highway spending). The provisions included in the permanent extension of selected TCJA provisions are the expiring individual income tax provisions and expensing of equipment investment. Figures are rounded.

Source: EY analysis.

Existing regulations targeting carbon abatement

To reduce carbon emissions, the United States relies primarily on regulations that target specific sectors or types of activities and that mandate the use of different technologies and processes. In one form or another, the regulatory approach places restrictions on or limits the choices of consumers and producers. This analysis includes a stylized modeling of the following regulations:

- ▶ **Corporate Average Fuel Economy (CAFE) standards.** CAFE standards require that a manufacturer's model year of vehicles meet a fleet-wide average fuel-efficiency level. CAFE standards apply to light-, medium-, and heavy-duty vehicles.
- ▶ **Clean Power Plan (CPP).** The CPP aims to reduce carbon emissions in the power sector. It requires that states choose one of three approaches: (1) a national emissions rate for each electricity-generating unit (in CO₂/MWh), (2) a state-specific emissions rate for the state's overall electricity portfolio (in CO₂/MWh), or (3) state-specific mass-based limits (in CO₂/year).
- ▶ **Renewable Fuel Standards (RFS).** The RFS require that motor fuel distributors include a specific percentage of renewable fuels in their total sales.
- ▶ **Appliance and equipment efficiency standards (AEES).** AEES regulate more than 60 categories of appliances and equipment in both the residential and commercial sectors. The program sets energy efficiency standards for appliances and equipment to reduce energy consumption.

While the CPP explicitly targets carbon emissions, CAFE standards, RFS, and AEES instead target reduced fossil fuel consumption, thus reducing carbon emissions indirectly. None of these regulations reflects a comprehensive, economy-wide approach to reducing carbon emissions.

Some of these policies are, to date, only partially implemented, and some may never go into effect. But, to fully capture the potential effect of the existing regulatory approach, this analysis models each policy and any recently planned expansion as if it were in full force. This report estimates that regulatory carbon controls, if fully phased in, would reduce carbon emissions by approximately 22%, while also reducing GDP in the long-run by 1.1%, or approximately \$1,770 per household annually. More than 90% of this impact is attained within 10 years. These impacts are primarily driven by CAFE standards and the CPP.

Emissions-equivalent carbon tax

This analysis also models the impact of a carbon tax, a market-based alternative to the regulatory approach. The carbon tax is set to achieve the same absolute reduction in carbon emissions as the regulatory approach by imposing an economy-wide, uniform price on carbon emissions.¹

¹ The long-run carbon price is \$55/ton when the carbon tax revenue is used to fund the permanent extension of expiring individual income tax provisions in the TCJA and permanent 100% bonus depreciation. It is \$52/ton when the carbon tax revenue is used to fund public infrastructure investment, and \$48/ton when the carbon tax revenue is used to fund a household rebate. Generally, an increase in the size of the economy results in an increase in carbon emissions, so an increase associated with the use of carbon tax revenue then requires a higher carbon price to achieve the same amount of carbon emissions reduction as under the existing regulatory approach.

To illustrate the range of potential benefits associated with the use of revenue from the emissions-equivalent carbon tax, this analysis considers three alternatives:

1. *Permanent extension of expiring individual income tax provisions in the TCJA and permanent expensing of investment in equipment.* This use of carbon tax revenue would (1) increase the after-tax reward to work, resulting in higher real wages and/or increases in the US workforce, and (2) increase the after-tax return on savings and investment, which would encourage more capital investment and contribute to higher labor productivity.
2. *Investment in public infrastructure.* This use of carbon tax revenue would boost private-sector productivity and, consequently, increase private-sector output.
3. *Rebate to households.* This use of carbon tax revenue would, on average, offset the impact of the carbon tax on household incomes.

This report finds that, relative to the existing regulatory approach, a carbon tax with the same emissions reduction would increase annual GDP by \$1,170–\$5,090 per household in the long-run (depending on the use of the revenue, as seen in Figure ES-1).