

**CLIMATE
LEADERSHIP
COUNCIL**

POLICY ANALYSIS

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A WINNING TRADE

**How Replacing the Obama-Era Climate Regulations
With a Carbon Dividends Program Starting at \$40/Ton
Would Yield Far Greater Emissions Reductions**



**by
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About the Authors



David Bailey has 35 years of experience managing energy-related issues around the world. He has worked at literally every level of the coal and oil and gas industries, from the UK National Coal Board during the economic and labor upheavals under Thatcher to responsibility for ExxonMobil's climate policy.

Mr. Bailey's oil industry career began in 1989, when he became Human Resources Director for Mobil's UK businesses before moving into government relations. He then worked on the creation of a Europe-wide joint venture with BP, oversaw Mobil's EU Relations in Brussels and managed community and economic challenges and business expansion projects in Norway, Saudi Arabia and Nigeria.

Moving to the US in 1998, he worked first on the Exxon-Mobil merger and then in a series of assignments in every part of the merged companies' energy businesses. He managed the full range of energy policy and climate issues both domestically and internationally, as well as multiple organizational redesign and crisis response projects. He has engaged in worldwide policy debates and advocacy on climate issues since 1998. He retired from ExxonMobil as Climate Policy Manager at the end of 2012.

Mr. Bailey is a graduate of Oxford University. He teaches a course on the global oil and gas industry at the Walsh School of Foreign Service. He has served on the boards of the World Affairs Council of America and the National Foreign Trade Council, as well as the State Department's International Advisory Committee on Economic Policy.

Mr. Bailey is Research Director at the Climate Leadership Council.



David Bookbinder has a unique combination of private sector and public interest legal and policy experience. Mr. Bookbinder began practicing law at Paul, Weiss, Rifkind, Wharton & Garrison, where for many years he handled securities, mergers and acquisitions, product liability, white-collar criminal, intellectual property and other matters.

In the public interest sphere, Mr. Bookbinder has litigated cases under all of the major environmental statutes including, as Sierra Club's Chief Climate Counsel, managing the Massachusetts v. EPA case. He then represented environmental groups in both stationary- and mobile-source carbon matters, including the thicket of litigation over California's greenhouse gas vehicle standards.

Dealing with Congress and federal agencies, Mr. Bookbinder helped lead efforts on both global warming legislation and Clean Air Act greenhouse gas regulation, and has testified in front of House and Senate committees on these issues (and he may be the only person ever invited by both Barbara Boxer and James Inhofe). He has also advised states as to their greenhouse gas regulatory authority.

Mr. Bookbinder was trained at Princeton University (summa cum laude) and the University of Chicago Law School. He has designed and taught courses on "Environmental Litigation" at Georgetown University Law Center and "Environmental Law and Science" at the William and Mary Law School/Virginia Institute of Marine Science, and has served on the boards of several nonprofit groups

Mr. Bookbinder is a Senior Policy Advisor at the Climate Leadership Council.

About the Climate Leadership Council

The Climate Leadership Council is an international research and advocacy organization whose mission is to mobilize global opinion leaders around the most effective, popular and equitable climate solutions. As a central part of this mission, the Council develops and promotes new policy frameworks based on carbon dividends — carbon taxes whose proceeds are rebated to citizens — for each of the largest greenhouse gas emitting regions. Currently active in Washington and London, the Council will expand to Berlin, Beijing and New Delhi next.

Find out more at www.clcouncil.org.

EXECUTIVE SUMMARY

We were asked to estimate the emissions reduction impacts of the carbon dividends proposal put forward by the Climate Leadership Council (Council), which is based on a carbon tax starting at \$40/ton CO₂, and to compare this to other policy paths. The current baseline trend, which assumes that most Obama-era regulations are repealed, would only reduce U.S. emissions by less than 10% from 2005 levels by 2025. Had all the policies in place at the end of the Obama Administration been allowed to continue, the reductions would have been approximately 16% by 2025.

In our view, the Council's proposed tax would likely allow the U.S. to reduce emissions by approximately 28% by 2025, almost three times the current "business as usual" scenario, and almost twice the rate that the policies in force on January 19th would have achieved. This means that the Council's proposal, on its own, could meet the high end of the U.S. commitment by 2025 under the Paris Agreement.

Climate Leadership Council Proposal

We assume that the carbon tax proposed in the Council's carbon dividends plan would be introduced in 2019 at the rate of \$40/ton CO₂ and increase annually at the rate of inflation as measured by the Consumer Price Index (CPI) plus 2%. It would apply to all fossil fuels and non-fuel CO₂ emissions, to imported fossil fuels and fossil fuel products and to energy intensive manufactured products. It would be rebated for exports of these fuels and goods.

The Council's proposal would return the revenue raised from the tax to all households through flat-rate quarterly dividend checks, administered by the Social Security Administration. The Council also proposes eliminating much of the Obama-era climate regulations once that a new carbon tax is in place.

This analysis shows how the U.S. emissions reductions arising from this carbon tax might compare to:

1. Our 2025 baseline, which assumes that most major Obama-era regulations are undone;
2. Our assessment of the 2025 outcome assuming all Obama-era policies had remained in place, including implementing the Clean Power Plan (CPP) as per EPA's original schedule;
3. The U.S. Paris commitment - a 26-28% reduction from 2005 levels.

Detailed modeling was beyond the scope of this study. Our analysis is therefore based on extrapolations from several important recent papers whose authors did conduct such modeling.¹

Scope of Analysis

While CO₂ emissions² (mostly from burning fossil fuels) are roughly 80% of greenhouse gas emissions, for various reasons the tax approach is not ideal or practical for the other gases such as methane and hydrofluorocarbons (HFCs), and the proposed regulations addressing these gases are or likely will

soon become defunct. As a matter of simple math, if the measure applies only to four-fifths of emissions, the tax to achieve a given level of overall reduction will have to be higher than if the tax or equivalent measures also applied to the other 20%

Where are we headed?

The most comprehensive listing of current and historical greenhouse gas³ (GHG) emissions performance is the EPA’s annual Inventory of Greenhouse Gas Emissions, and previous expectations for 2025 are contained in the U.S. Government’s bi-annual report to the UNFCCC. The most recent data including the last U.S. submission

(2016)⁴ are summarized below, together with our assessment of the outlook for 2025 on current (post-election) policy.

How would the Council’s Carbon Dividends plan reduce emissions?

The carbon tax would increase the relative price of fossil fuels according to their CO₂ emissions. In 2019, bituminous coal without carbon capture technology, for example, would incur a tax of \$90 per ton of coal (around 150% of the average 2016 delivered price); each thousand cubic feet (MCF) of natural gas would be taxed about \$2.10 (around 80% of typical 2016 Henry Hub prices); and each barrel of crude oil

Table 1: U.S. Greenhouse Gas Emissions, Actual and Projected

	2005 Actual [baseline for U.S. Paris pledges]	2014 Actual	Obama-era 2025⁵ [assuming all Obama-era policies remain]	2025 Baseline⁶ [assuming most Obama-era policies are repealed]
Energy-related CO ₂	5,747	5,208	4,934	5,348
Non energy related CO ₂	376	348	332	332
Methane	717	731	650	755
Nitrous Oxide	398	404	335	335
Hydrofluorocarbons	120	167	250	167
Perfluorocarbons	7	6	5	5
Sulfur Hexafluoride	14	7	9	9
Total emissions	7,379	6,871	6,578	6,951
Sinks [Land use, Land use change & Forestry Sequestration]	-699	-763	-908	-908
Total net emissions	6,680	6,108	5,670	6,043
Change from 2005		-572	-1,073	-637
% Change from 2005	n/a	-8.6%	-16%	-9.5%

[All figures are in Millions of Metric Tons (MMT) CO₂-equivalent.]

would be taxed about \$17 (around 40% of the 2016 average price). While some of these increased costs of the tax would ultimately be reflected in the prices paid by consumers (a \$40/ton carbon tax could translate into an increase at the pump of approximately 36 cents per gallon), these are substantial impacts at the wholesale level, and they would have three main effects:

1. The overall cost of energy would increase, thereby encouraging **more efficient usage**.
2. The tax would encourage **fuel switching**. It would immediately increase the relative attractiveness of natural gas to coal in the power sector, and nuclear and renewables to all fossil fuel sources.
3. Over time, the most significant impact would be **increased investments** to reduce energy use, and to replace facilities using higher carbon fossil fuels with those using lower- or zero- carbon fuels.

The relationship between reductions in emissions and the carbon tax rate is not linear. As the tax rate increases, the percentage reduction for each additional dollar of tax is lower – mainly because the existing capital base becomes a bigger factor in changing fuel sources the greater the amount of emissions reduced. In addition, a much higher tax rate is needed to secure emissions reductions in the transport than power sectors.

Impact on emissions

To determine an indicative estimate of the impact of the \$40/ton rate on emissions, we developed consistent estimates of the emissions impact of a carbon tax based on the following three highly regarded analyses.

Chen & Hafstead (RFF 2016)

Chen and Hafstead use the E3 computable general equilibrium model to estimate the tax required to meet the upper end of the U.S. Paris commitment (28% reduction vs. 2005 by 2025). To achieve the Paris target, a tax starting in 2019 would need to begin at just under \$21/ton CO₂ and rise annually

by CPI plus 3%. This analysis assumed that the tax would apply only to CO₂ emissions, and that other then-proposed policies would reduce non-CO₂ emissions. If those complementary policies were not implemented, meeting the 2025 target by taxing only CO₂ emissions would require a tax of \$37.68/ton or around \$40/ton in 2019 dollars.

Hafstead and Kopp (RFF 2016)

In 2015, Senators Whitehouse and Schatz introduced the American Opportunity Carbon Fee Act (AOCFA), which would levy a \$45/ton tax on CO₂ emissions starting in 2016, rising by 2% above CPI each year. Hafstead and Kopp evaluated AOCFA using the same E3 model. The tax applied to all fossil fuels, but emissions from other greenhouse gases were not included in the analysis. The tax (which in 2019 dollars would be about \$47/ton) produced CO₂ reductions of about 1.81 billion tons vs. business-as-usual in 2025. Our assessment is that this would amount to a net reduction of 37% in 2025 vs. 2005 on a comparable basis to the other analyses.

Treasury Department Office of Tax Analysis (OTA) (2017)

Immediately before the change in administration, the Office of Tax Analysis issued a paper focused mostly on the administration of a possible tax, which it assumed to be set at \$49/ton beginning in 2019. The tax would apply to CO₂ emissions from fossil fuels and (after a phase-in period) to emissions from non-fossil fuel sources from 2021, and would escalate at “roughly” CPI plus 2% each year. In OTA’s modeling, based on EIA and EPA data, the tax would produce emissions reductions of around 37% vs. the 2005 baseline on a comparable basis to the other analyses.

Findings

The close alignment of these studies’ outcomes is not surprising. The impact of taxes at these levels has been well studied and indeed many major companies assume the legislative or regulatory environment will produce “carbon penalties” at these levels in their investment processes.⁷ The broad consistency between the three studies defines the likely impacts

Table 2: Comparisons and Conclusions

The emissions “bottom lines” of these studies are summarized below.

	2025 baseline [“Where We Are Headed Now”]	Obama Policies	Hafstead & Kopp [\$47]	OTA [\$49]	Chen & Hafstead “Paris” Tax [\$21/\$40]
Total Net 2025 emissions	6,043	5,607	4,194	4,207	4,837
Change vs. 2005 base	-9.5%	-16%	-37%	-37%	-28%

Note - In each case sinks are adjusted or set to the low sequestration figure in the Second Annual Report (see Annex)

of the Climate Leadership Council’s proposal. The Chen and Hafstead paper shows that a \$40/ton tax, applied only to CO₂ emissions, would be likely to deliver the 28% reduction contained in the Paris Commitment, or roughly double what regulatory policy as of the end of the Obama Administration would have achieved. It is also over three times what can be expected under the emerging Trump Administration policy position. The other studies with higher tax rates reinforce that this 28% is a reasonable estimate of the reductions that could be expected from the Council’s proposal.

Conclusions

Our findings support the following conclusions: (1) that collectively all of the Obama-era regulatory measures would only result in a 16% reduction in greenhouse gas emissions from 2005 levels by 2025; (2) that reversing the major Obama-era regulatory measures will result in a 9.5% reduction below 2005 levels by 2025; and (3) that a \$40/ton carbon tax would allow the United States to meet the upper end of its 2025 Paris commitment (28% reduction from 2005 levels).

These conclusions support the idea that trading most greenhouse gas regulatory authority for a robust carbon tax would produce greater emissions reductions, at a lower cost, and provide a far more stable business environment.

“Trading most greenhouse gas regulatory authority for a robust carbon tax would produce greater emissions reductions, at a lower cost, and provide a far more stable business environment”

Annex – Important Assumptions

2025

We confined our analysis to the impact in one year – 2025 – because that is the year to which the U.S. Paris commitments apply. Broadly speaking, the longer the tax is in effect the greater the expected emissions reduction impact would be, as capital equipment and facilities are replaced by those selected with the tax impact on energy prices in mind.

Distribution impacts

How the tax revenues are used can potentially have a positive or negative secondary impact on emissions reductions, depending on the economic growth impact of the redistribution method (or methods) chosen. Broadly speaking, the higher the tax, the greater the difference between the impacts of the chosen methods. Given the generally assumed limited impact on emissions⁸, we have excluded this consideration from our analysis.

Costs

This analysis addresses only emissions, and so does not discuss the net GDP or welfare cost of the policy, which depends on tax scope, redistribution method and assumed cost of the regulations they replace. These considerations are discussed in the papers we analyzed.

Notes

1. *Methodology for Analyzing a Carbon Tax*, Treasury OTA Working Paper 115, 2017; *Using a Carbon Tax to meet U.S. International Carbon Pledges*, Chen & Hafstead, RFF 2016; *Analysis of the American Opportunity Carbon Fee Act of 2015*, Hafstead & Kopp, RFF 2016.
2. Some of these reasons are described in Treasury OTA, op. cit., pp. 8-9.
3. <https://www.epa.gov/ghgemissions/us-greenhouse-gas-inventory-report-1990-2014>
4. *Second Biennial Report of the United States of America Under the United Nations Framework Convention on Climate Change*, U.S. Department of State, 2016; available at : https://unfccc.int/files/national_reports/biennial_reports_and_iar/submitted_biennial_reports/application/pdf/2016_second_biennial_report_of_the_united_states_.pdf
5. In addition to the current regulatory measures listed in the *Second Biennial Report*, Appendices 2 and 3, we also include federal regulations finalized after its publication:
 - EPA's oil & gas methane standards, updated landfill methane standards, second round of heavy-duty vehicle standards, and BLM's methane rule.
6. With the exception of the 2017-2025 light-duty vehicle standards, the HFC SNAP standards, and DOE's appliance efficiency standards, we assume that all of the major Obama-era greenhouse gas regulations (such as the Clean Power Plan and the MY 2021-2027 heavy-duty vehicle standards) will be reversed, but that the Kigali Amendment to the Montreal Protocol will be ratified.
7. <https://www.cdp.net/en/articles/media/press-release-major-multinationals-at-forefront-of-drive-to-price-carbon-and-meet-climate-targets-but-many-companies-still-unprepared/>
8. See, for example the discussion at Chen & Hafstead, op. cit., pp 9-12.
9. <https://niskanencenter.org/blog/new-epa-data-casts-more-doubt-on-obamas-climate-promises/>

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Border Adjustments

We also assumed for simplicity that the border adjustments broadly cancel each other out in terms of emissions – i.e. rebated emissions tax payments in the U.S. are matched by emissions that occur overseas but are taxed in the products made from them when they enter the U.S.

Escalation

There is nothing magical about the CPI +2% assumed escalation factor – it has become a conventional assumption in carbon tax modelling. Higher escalation rates would be expected to have somewhat higher impacts on emissions, mostly beyond 2025. Very high escalation rates would increase the risks of economic disruption, and potential hoarding issues around the annual increase times.

Carbon Sinks

We have accepted at face value the lower end of the Obama Administration's assumptions of changes in carbon sinks through 2025 (these are sources like forests, which absorb CO₂ from the atmosphere) in our analysis. We have previously expressed skepticism about these assumptions and nothing that has happened or been said subsequently changes our view of this.⁹ As this number is held constant through the scenarios we assessed, it does not significantly impact the overall analysis.

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