

Submission on the Use of Carbon Fees To Achieve Fiscal Sustainability in the Federal Budget

Gilbert E. Metcalf
July 26, 2010

Executive Summary

The National Commission on Fiscal Responsibility and Reform should consider a carbon fee as an instrument to enhance the federal budget's fiscal sustainability. A carbon fee would provide significant environmental and efficiency benefits for the U.S. economy in comparison to alternative revenue raising tools available to the federal government. A carbon fee is a predictable source of revenue that could substantially contribute to reducing the federal debt. A carbon charge that begins in the neighborhood of \$30 per ton of carbon dioxide equivalent (nominal dollars) could raise revenue between 2015 and 2050 that in present value terms equals roughly 40 percent of the projected net government debt in 2015.

I recommend a phased implementation of a carbon fee that grows over time in a predictable manner. Revenue from the fee should initially be targeted to transition assistance to households with particular focus on low-income households and workers in carbon-intensive industries. Over time, the use of revenue should shift from transition assistance to debt reduction.

A Carbon Fee to Contribute to Fiscal Sustainability

In pursuit of its charge to identify policies "to improve the fiscal situation in the medium term and to achieve fiscal sustainability over the long run" the National Commission on Fiscal Responsibility and Reform will need to consider a wide range of revenue raising initiatives and spending reductions. A carbon fee is an ideal initiative to contribute to enhanced fiscal sustainability while improving the environment. Structured properly, it is a win-win policy tool that could achieve strong bipartisan support.

A carbon fee is a charge levied on substances that lead to the release of carbon dioxide and other greenhouse gases. The major source of greenhouse gases is fossil fuels and a carbon fee should be levied on all fossil fuels without exception along with certain other greenhouse gases. Metcalf and Weisbach (2009) document that including all fossil fuels in a carbon fee would capture 80 percent of greenhouse gases in the fee base and 90 percent of greenhouse gases could be made subject to the fee at modest administrative cost. In their analysis, Metcalf and Weisbach recommend implementing a carbon fee upstream at the first sale of fossil fuels and other sources.¹

¹ Metcalf, Gilbert E. and Weisbach, David. "The Design of a Carbon Tax." *Harvard Environmental Law Review*, 2009, 33(2), pp. 499-556.

Most taxes and charges have negative economic impacts that are only offset by the revenue they raise for important government functions. A carbon fee, in contrast, has efficiency enhancing benefits while it raises revenue to address the U.S. federal budget deficit. Greenhouse gas emissions are a classic externality whereby firms and individuals do not take into account the social cost of their activity. Unlike most economic transactions where the full social cost of a good or service is reflected in the market price, externalities lead to market prices that are below the social cost associated with producing or consuming the externality-generating product. Economists have long understood that levying a tax or fee on an externality can improve economic efficiency.²

In this case, levying a carbon fee would not only contribute to a reduction in harmful greenhouse gas emissions but also raise substantial revenues to contribute to fiscal sustainability. In contrast to a cap-and-trade program, it raises revenue in a predictable manner that avoids the problems of short-run price fluctuations that contribute to volatility in carbon revenues.

An analysis I did with colleagues at MIT's Joint Program on the Science and Policy of Global Change illustrates the potential for a carbon charge to raise revenue.³ A carbon price beginning at \$31 per ton carbon dioxide equivalent (CO₂e) in 2015 and rising at a growth rate of four percent plus inflation is projected to have the following fiscal impacts.

Projected Carbon Fee Revenues				
Year	Rate (per ton CO₂e)	Emissions (million tons CO₂e)	Gross Revenue (billions)	Net Revenue (billions)
2015	31.22	6,424	200.6	137.7
2020	37.99	6,013	228.4	163.2
2025	46.22	5,748	265.6	175.3
2030	56.23	5,644	317.3	226.0
2035	68.41	5,650	386.5	272.9
2040	83.23	5,612	467.1	311.7
2045	101.26	5,357	542.5	314.2
2050	123.20	5,015	617.8	307.1
Rausch, Metcalf, Reilly, and Paltsev (2010). Figure 4 and Table 7. All prices and revenues are in year 2015 dollars. An inflation rate of 2.5 percent per year is assumed.				

Cumulative emissions between 2015 and 2050 covered by the carbon fee are projected to fall by roughly one-third (with additional reductions arising through offsets).

² This insight goes back over seventy-five years to Pigou, Arthur C. *The Economics of Welfare*. London: MacMillan and Co., 1932.

³ Rausch, Sebastian; Metcalf, Gilbert E.; Reilly, John M. and Paltsev, Sergey. "Distributional Implications of Alternative U.S. Greenhouse Gas Control Measures," Cambridge, MA: National Bureau of Economic Research Working Paper No. 16053, 2010. Subsequently published in *The B.E. Journal of Economic Analysis & Policy*: Vol. 10: Iss. 2 (Symposium), Article 1. Available at: <http://www.bepress.com/bejeap/vol10/iss2/art1>

Gross carbon revenues begin at \$200 billion in 2015 and rise to over \$600 billion by 2050 (in year 2015 dollars). Revenues available for reducing the national debt are lower. Carbon pricing raises the costs of business and reduces income tax revenue (relative to a reference scenario with no carbon fee in place). Netting out those reductions in tax revenues still leaves substantial revenue for debt reduction – on the order of \$140 billion in 2015.

In its most recent long-term budget outlook, the Congressional Budget Office (CBO) projects net debt of \$12.796 trillion under its extended baseline and \$14.174 trillion under its alternative fiscal scenario (in year 2015 dollars).⁴ Assuming a five percent nominal discount rate (the CBO estimate of the government borrowing rate), the present discounted value of net carbon revenue between 2015 and 2050 is \$5.492 trillion (in year 2015 dollars). This amounts to 43 percent of net government debt under the extended baseline and 39 percent of net debt under the alternative fiscal scenario. If net carbon revenues are only considered through 2030, they account for 18 and 16 percent of net government debt in 2015 under the extended baseline and alternative fiscal scenario respectively. Whether one counts carbon revenue through 2030 or 2050, it can make a significant inroad into net government debt.

This fiscal analysis assumed a carbon fee applied to all greenhouse gas emissions. Reducing the base of the carbon fee to remove difficult to monitor greenhouse gas emissions would reduce net revenue as a percentage of net public debt in 2015 to either 33 or 36 percent over the 2015 to 2050 period (depending on the CBO fiscal scenario assumed) and to 14 or 15 percent over the 2015 to 2030 period. This assumes ten percent of greenhouse gas emissions cannot be brought under the carbon charge. Clearly the ability of a carbon fee to help reduce the national debt is not contingent upon one hundred percent coverage of emissions.

Additional Benefits

A carbon fee has additional benefits beyond reducing greenhouse gas emissions and raising revenue to contribute to deficit reduction.

- A carbon fee obviates the need for costly subsidies through the tax system for carbon free energy investment thereby providing additional avenues for deficit reduction.
- A carbon fee will reduce emissions of small particulate matter that occur from the burning of fossil fuels and which are a source of public health concern.
- A carbon fee can be the centerpiece of U.S. efforts to reduce greenhouse gas emissions.

⁴ Congressional Budget Office, *The Long-Term Budget Outlook*, Washington, DC: CBO, June 2010.

- A carbon fee ensures that the U.S. need not put in place inefficient and cumbersome regulations to reduce greenhouse gas emissions.
- A carbon fee would help the U.S. take leadership in the international arena in the area of climate change and help it meet its commitments in international agreements to reduce emissions.
- A carbon fee can border adjust in ways that are more likely to be WTO compliant than cap-and-trade systems thereby preserving the competitiveness of U.S. carbon-intensive industries.

Specific Proposal

I would recommend a carbon fee rate starting in 2015 at \$30 per ton CO₂e and growing at an annual rate of 5 percent plus inflation. This initial rate is consistent with the social cost of carbon in that year reported in a recent Administration Interagency Working Group.⁵ This rate would be applied to all energy-related carbon dioxide emissions (80 percent of total greenhouse gas emissions) as well as those emissions that could be brought into the fee base at reasonable administrative cost (approximately 10 percent of total greenhouse gas emissions). If desirable the rate could be phased in over a two to three year period beginning in 2012 or 2013.

In previous work I have argued that carbon pricing should be enacted in a revenue and distributionally neutral fashion.⁶ My argument for revenue neutrality – offsetting the carbon revenue with equal reductions in other taxes – stemmed from a desire not to confound issues of climate policy with the issue of the appropriate size of government. That argument is not relevant when carbon pricing is considered for purposes of reducing the federal debt. Concerns with the impact of carbon pricing on specific groups – low-income households for whom energy costs represent a disproportionately high share of their household budgets as well as workers in certain carbon-intensive industries – remain.

Adverse distributional impacts arise because of the inability of households or industrial sectors to rapidly adjust to a low-carbon economic environment. Thus it would be desirable to use carbon revenues initially to ease the adjustment to a low-carbon economy and gradually shift the use of revenues from transition assistance to debt reduction. The following table illustrates one possible approach. The moneys reserved for transition assistance could be targeted in part to low-income households, to workers in carbon-intensive sectors adversely affected by carbon pricing, with the remainder

⁵ Interagency Working Group on Social Cost of Carbon, United States Government, *Appendix 15a. Social Cost Of Carbon For Regulatory Impact Analysis Under Executive Order 12866*, Washington, DC, 2010.

⁶ See Metcalf, Gilbert E. "A Proposal for a U.S. Carbon Tax Swap: An Equitable Tax Reform to Address Global Climate Change," Washington, DC: The Hamilton Project, Brookings Institution, 2007.

returned to all households in a lump-sum fashion in the form of a Climate Security Dividend.⁷

Year	Transition Assistance	Debt Reduction
2015	100%	0%
2016	90%	10%
2017	80%	20%
2018	70%	30%
2019	60%	40%
2020	50%	50%
2021	40%	60%
2022	30%	70%
2023	20%	80%
2024	10%	90%
2025	0%	100%

Transition assistance should be short-run in nature to provide appropriate incentives to households and firms to make the necessary adjustments to avoid the harm of carbon pricing.

It is important that a carbon fee be implemented in a fashion that provides a predictable and consistent price signal to the market. Such a signal is essential for firms to make the long-term investments in capital that will be required to move us to a low-carbon economy. Predictability is also important for fiscal planning purposes.

Conclusion

A carbon fee could have the dual benefit of reducing harmful greenhouse gas emissions and returning the United States to a global leadership position in this fight to protect our planet while also addressing serious fiscal shortfalls in the federal budget. A carbon charge could begin at a modest rate - \$30 per ton in 2015 (nominal rate) – and grow at a stable and predictable growth rate. It should be applied to all energy-related carbon dioxide emissions and as much of the remaining domestic greenhouse gas emissions as is administratively practicable. The revenue should initially be used for transition assistance but quickly – within a decade – shift over for debt reduction.

* * *

⁷ Tax rate reductions are another possibility in place of a household dividend. These have the advantage of providing potential efficiency gains; a quarterly household dividend, on the other hand, is highly visible and may build political and popular support for the carbon fee initiative.

Gilbert E. Metcalf is a Professor of Economics at Tufts University and a Research Associate at the National Bureau of Economic Research. He is also a Research Associate at MIT's Joint Program on the Science and Policy of Global Change. Metcalf has taught at Princeton University, the Kennedy School of Government at Harvard University, and MIT.

Metcalf has served as a consultant to numerous organizations including the U.S. Department of the Treasury, the U.S. Department of Energy, and Argonne National Laboratory. He recently served as a member of the National Academy of Sciences Committee on Health, Environmental, and Other External Costs and Benefits of Energy Production and Consumption. In addition he serves or has served on the editorial boards of *The Journal of Economic Perspectives*, *The American Economic Review*, and the *Berkeley Electronic Journals in Economic Analysis and Policy*.

Metcalf's primary research area is applied public finance with particular interests in taxation, energy, and environmental economics. His current research focuses on policy evaluation and design in the area of energy and climate change. He has published papers in numerous academic journals, has edited two books, and has contributed chapters to several books on tax policy. Metcalf received a B.A. in Mathematics from Amherst College, an M.S. in Agricultural and Resource Economics from the University of Massachusetts Amherst, and a Ph.D. in Economics from Harvard University.