DAY ☑ ONE PROJECT

A Carbon Tax to Combat Climate Change and Support Low-Income Households

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Summary

Putting a price on carbon is fundamental to achieving U.S. climate goals for 2050. Many options for carbon price-setting exist, and in this policy brief we propose a tax-and-dividend approach that mitigates the challenging impacts that carbon policies have on poor and suburban/rural communities, particularly those in Middle America. Such a plan will be a net gain for low-income households, in contrast to other proposed climate change policies which will adversely affect the poor. Furthermore, it has been shown that even a modest carbon tax can have large benefits in terms of cost-effectiveness.

For that reason, we propose the following:

- Introduce a carbon tax-and-dividend plan as part of any federal climate policy.
- Use revenue to offset impacts on low-income households, taking into account enormous regional disparities.
- If political dynamics favor regulatory standards, consider coupling such standards with a modest carbon tax whose revenue can be used to offset their regressive effects.

Challenge and Opportunity

Carbon tax-and-dividend plans have been explored before, but prior versions of such a plan have been unable to overcome two critical economic and political realities: (1) suburban and rural households consume more carbon as a share of their income, and (2) carbon footprints in the middle of the country are much higher than in coastal regions. Our work at the Roosevelt Project highlights that,[1] without reallocation, net gains from carbon tax revenues would be transferred from lower-income, suburban and rural communities in the middle of the country to wealthy communities on the coasts.[2] Furthermore, our recent work also highlights the benefits of a modest carbon tax layered onto a suite of policies that focus on regulatory standards.

To date, climate policy alternatives to pricing carbon have appeared to be more politically viable. Despite the vast literature showing that alternatives to carbon taxes, such as a clean energy standard, fuel economy standards, or low-carbon fuel standards, are much costlier – by as much as ten times – compared to directly pricing pollution, regulatory standards appear to be more political palatable. However, in new work out of MIT that focuses on the distributional effects of climate policies using highly resolved data on household carbon footprints, regulatory approaches because they do not generate revenues that can be redistributed have been shown to disproportionately affect lower-income, suburban and rural communities even more than a

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[1] Information about the Roosevelt Project can be found here: http://ceepr.mit.edu/roosevelt-project/about-the-project.
[2] Tomas W. Green and Christopher R. Knittel, "Distributed Effects of Climate Policy: A Machine Learning Approach," MIT CEEPR Working Paper, Roosevelt Project Special Series WP-3, September 2020.

carbon price.[3] The distributional differences between carbon pricing and regulatory standards present a clear opportunity. The nature of carbon footprints could allow for climate pricing to have *desired* distributional effects. Not only is carbon pricing progressive, but a well-designed program can result in low-income households making money. This is in stark contrast to the highly regressive nature of regulatory standards.

Plan of Action

The next administration should introduce a carbon tax-and-dividend plan as a part of any federal climate policy because new research on the distributional effects of carbon pricing clears a path to change the political viability of carbon pricing. While it is true that low-income households consume more carbon as a share of their income (i.e., spend more on energy as a share of their income), wealthier households consume more carbon in absolute terms. These two facts imply an important opportunity for the administration to decarbonize in a just and fair way. The administration should push for a simple program that taxes greenhouse gas emissions and then distributes the revenues generated equally to households. Such a program will be *progressive* and a revenue *generator* for low-income households; the average low-income household will receive a larger dividend check than the amount they pay in carbon taxes.

In contrast, fuel economy standards, renewable portfolio standards, and clean energy standards are *regressive*.[4] Furthermore, they do not generate any income that can be redistributed to undo this negative distributional feature.

A simple tax-and-dividend plan does share one undesirable feature with regulatory standards: its impact on middle America and rural and suburban areas. The map below shows the average *net* tax payment for all of the roughly 70,000 Census tracts in the US under a simple tax-and-dividend plan. Orange and red colors signify the tract is paying more in taxes than they are receiving in dividends. The second figure shows the net losses for a national clean energy standard. Both lead to large losses in Middle America.
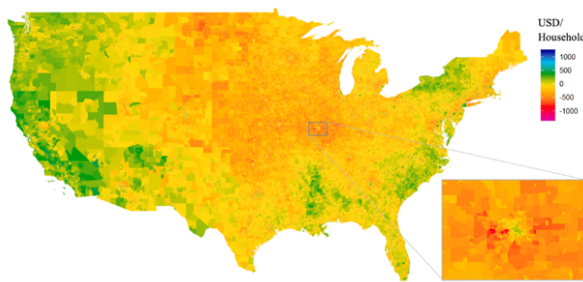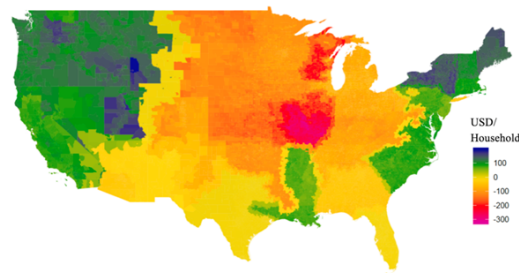

Figure 8: Net Impact of $50 Carbon Price and Dividend

Figure 16: Net Impact of Clean Energy Standard

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[3] Green and Knittel, 2020.
[4] Green and Knittel, 2020.

A key difference between clean energy standards and the tax-and-dividend plan, however, is that the latter generates revenue. Thus, by adjusting the tax-and-dividend plan, this proposal is able to undo the undesirable effects on middle America and rural and suburban areas. In fact, setting the dividend payments at a regional level can eliminate the flow of money from Middle America to the coasts.[5] The administration could also consider having different dividends for rural and suburban areas, income levels, or the different regions of the country. As an example, the table below reports the average *net* dividend across five states when the dividend varies across the 10 Census regions within the US and income quintiles.[6] We report the average net dividend by income as well as those Census *tracts* that have a majority of residents being African American or Hispanic. Under this fairly simple carbon tax and dividend plan, the lowest two income quintiles (household income below $44,000) receive a net *positive* dividend in all five states. Furthermore, those Census tracts that are predominantly African American or Hispanic also receive positive net dividends (roughly 19 percent of all Census tracts).

Table 1: Net Dividends across Five States for Different Socio-Economic and Racial Groups

	Texas	Georgia	Pennsylvania	Ohio	Montana
Income Quintile 1 (lowest)	$545.00	$647.00	$706.00	$550.00	$655.00
Income Quintile 2	$190.00	$249.00	$291.00	$148.00	$331.00
Income Quintile 3	-$56.00	-$86.00	$33.00	-$106.00	$30.00
Income Quintile 4	-$390.00	-$446.00	-$281.00	-$465.00	-$314.00
Income Quintile 5 (highest)	-$735.00	-$790.00	-$628.00	-$790.00	-$679.00
African American > 50%	$267.00	$298.00	$495.00	$343.00	NA
Hispanic > 50%	$102.00	$204.00	$566.00	$139.00	NA

Notes: From Green and Knittel (2020). The table reports the average net dividend across all US Census tracts analyzed in Green and Knittel (2020), 72,538. Income quintiles are defined based on average Census tract household income. The share of African Americans and Hispanics in each tract comes from the 2015 American Community Survey.

An additional opportunity exists even if the Administration decides that a carbon tax will not play the central role in federal carbon policy. A modest carbon tax could complement national regulatory standards. The revenue from this more modest carbon tax can be used to offset the negative distributional consequences of the regulatory standards. Furthermore, our recent work shows that if you rely on a carbon tax for the last 15 to 20% of carbon reductions, you can reduce economic costs of meeting the decarbonization goal by as much as 60%. This underscores the benefits of **some** form of carbon taxation comprising part of the Administration's carbon policy.

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[5] Green and Knittel, 2020.
[6] In particular, dividends are calculated such that all of the tax revenues collected stay within Census regions and dividends are increased for the bottom two income quintiles by 75% and 25%, respectively, while dividends for the top two income quintiles are reduced by 25% (quintile 4) and 40% (quintile 5).

Conclusion

A carbon tax-and-dividend approach offers the most economically efficient and socially progressive path to meeting our climate goals. If successfully executed, households in regions of the country with higher carbon footprints would, by construction, be subject to higher carbon prices, but the dividend they would receive would be increased at least commensurately with the tax burden. For example, states with households that have higher carbon intensities - for example, those in the industrial Midwest - would receive a larger dividend to prevent capital flows from the heartland to the coasts. Similarly, low-income families could be more adequately insulated from energy cost increases through strategic distribution of the dividend.

Frequently Asked Questions

Why do we need to change the dividend for various regions or socio-economic bands? Shouldn't consumers be able to adjust their consumption based on price signals?

Most consumers do not have choice around energy sources and utilization. A significant portion of a household carbon footprint comes from transportation (driving). As a result, low-income individuals often live farther from expensive urban areas and thus have longer commutes, and more vehicle miles traveled. Simply by economic circumstances, they are relegated to a higher carbon footprint and more exposed to cost increases in, for example, transportation.

How will low-income households benefit?

Under appropriate construction of a tax-and-dividend approach, low-income households would receive a larger dividend than their aggregate carbon tax exposure.

About the Author

Christopher R. Knittel is the George P. Shultz Professor of Applied Economics at the Sloan School of Management, Director of the Center for Energy and Environmental Policy Research, and Co-Director of the MITEI Low-Carbon Energy Center for Electric Power Systems Research at the Massachusetts Institute of Technology. He joined the faculty at MIT in 2011, having taught previously at UC Davis and Boston University. Professor Knittel received his B.A. in economics and political science from the California State University, Stanislaus in 1994 (summa cum laude), an M.A. in economics from UC Davis in 1996, and a Ph.D. in economics from UC Berkeley in 1999. His research focuses on environmental economics, industrial organization, and applied econometrics.

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