

A Progressive Case for a Carbon Dividend

Disrupting the Dirty Economy

ANDERS FREMSTAD

Anders Fremstad is an Assistant Professor of economics at Colorado State University. His research focuses on the environment, inequality, and the sharing economy.

MARK PAUL

Mark Paul is an Assistant Professor of economics at New College of Florida and a Fellow at the Roosevelt Institute. His current research is focused on understanding the causes and consequences of inequality and assessing and designing remedies to address it.

Introduction

Scientists have been ringing the alarm bells about climate change for decades. In 1988, Dr. James Hansen – then a NASA scientist, now a director at the Earth Institute at Columbia University – told Congress that “the greenhouse effect has been detected, and it is changing our climate now.” That was thirty years ago. Since then, our society has paused to think about climate change after catastrophic events like the California wildfires of 2017 and hurricanes Katrina, Harvey, and Maria; still, our climate policy has barely changed.

But what if we took climate change seriously? Carbon emissions are not being curbed nearly fast enough to fundamentally alter our current path, which blows past the international

goal of limiting global warming to between 1.5 and 2 degree Celsius. While carbon emissions were roughly flat for a number of years, recent evidence indicates that emissions are once again on the rise as the economy slowly picks up steam.

If policymakers are to address climate change in a serious way, they must grapple with the fact that major policy reforms must be taken to rapidly change the structure of our economy. Further, policymakers should acknowledge the fact that two of the most pressing issues of our time – climate change and economic inequality – are inextricably linked. Without rapid action to reduce greenhouse gas (GHG) emissions, research has demonstrated that domestically, the poor will bear more of the burden of climate change – losing

homes, livelihoods, and even lives.

It is time for us to think about robust action on the climate front. There is no single policy solution to address climate change, but we must think seriously about what policies would usher in a rapid transition away from fossil fuels. Economists across the political spectrum broadly agree that putting a price on carbon emissions, either through a carbon tax or a carbon cap, would be the most cost-effective policy to rapidly reduce emissions.

However this cannot be a stand-alone policy; rather, it should be thought of as one of the critical z in a Green New Deal to restructure our economy along an ecologically sound and equitable path.¹ In what follows, we describe a carbon pricing policy designed to take the climate

1. While economists and policymakers have largely focused on restricting demand for greenhouse gas emissions, other policies that consider restrictive supply-side actions warrant far more attention. See Green and Denniss (2018).

scientists, and the future well-being of our planet, seriously. We first discuss the basic ins and outs of carbon pricing. Next, we present our distributional analysis of a carbon tax which is large enough to rapidly curtail GHG emissions and substantively help meet the goal of limiting global warming to 1.5 to 2 degrees C.² While there are a plethora of ideas for what to do with the revenue, from tax cuts to renewable energy investments, we advocate devoting the revenues to a carbon dividend. A carbon dividend is essential to providing public rights to the environment and protecting the purchasing power of the majority of people during the transition to a green economy. Finally, we address a series of common questions and concerns about carbon pricing.

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2. The international community has agreed to work to limit global warming to 1.5-2.0 C, but this paper analyzes the distributional implications of a tax that would limit warming to 2.5 C, the strictest carbon budget analyzed using Nordhaus' (2017) model. We view a substantial carbon tax as a necessary but insufficient policy for meeting our climate goals.

Carbon Pricing

We are polluting at a rate which will increase temperatures to catastrophic levels. A major step in addressing this problem is to place a tax on carbon emissions. As things stand, we do not pay for the pollution we release into the atmosphere. A carbon tax is a simple idea. Rather than getting a free pass for polluting – because do not be fooled, the resulting global warming is anything but free – we pay for the pollution that we emit into the atmosphere.

Why charge people for their carbon emissions? If a good, such as pollution, is free, we consume too much of it. Just imagine how much energy you would consume if you did not have to pay for it. You would likely leave

more lights on, leave your computer running, and keep the AC and heat on even when you are not home.

We can think of the carbon sink capacity of our atmosphere as an open access resource. Firms, governments, and individuals dump too much CO₂ into the atmosphere, just as herders add too many cattle to the pasture in Garrett Hardin's "The Tragedy of the Commons." If we do not regulate access, through some form of price or quantity limit, our carbon sink will be rapidly filled, making everyone worse off, especially future generations. This need not be the case.

This brings us to an important question: who owns and manages the environment? Specifically, who has the right to emit CO₂ into

the atmosphere, and what property rights should be put in place to manage the collective resource we call the environment? Placing a price on carbon emissions would create new enforceable property rights that empower us to protect the environment by curtailing carbon emissions.

Establishing property rights that recognize the atmosphere as one of nature's gifts to humanity is essential to addressing climate change and managing the limited carbon sink capacity of our biosphere. As we will discuss below, placing a price on carbon through a carbon tax or cap creates new property rights, allowing the state to regulate the amount of CO₂ emitted into the atmosphere. Additionally, a carbon tax will raise

“A sizable carbon tax is going to disrupt the economy. That is a feature, not a bug.”

revenue. A lot of revenue. Of course, the rents that accrue from those property rights are of great importance.

The question then becomes, what to do with the money? Similar to the Alaska Permanent Fund, a carbon dividend is built upon the premise that commonly-held property rights belong to the people equally.³ Thus, we propose that carbon tax revenues should be returned to people in equal per-capita measure as a carbon dividend. Since the environment's carbon sink capacity is an asset that belongs to everyone, we should all get back an equal portion of the revenue raised from selling the right to pollute into the atmosphere – which depletes its future ability to absorb aonal carbon.

HOW DOES IT WORK?

Carbon dioxide is emitted primarily by burning fossil fuels. Right now, CO₂ accounts for about 76% of U.S. GHG emissions. To effectively place a price on carbon, an upstream tax on fossil fuels should be imposed on oil, gas, and coal. What this means is that we would tax coal at the mine mouth, natural gas at the wellhead, and oil at the refinery. All of these would also be taxed at ports when they are imported.⁴ In turn, the price of most goods and services we buy will increase. This is easy to see at the pump, where the price of gas will increase about \$0.01 per gallon for every \$1 per ton of CO₂. But the price of other goods would also rise to the extent that fossil fuels are used in the production

process. For example, food is fertilized, harvested, cleaned, transported, and sold, and the cost of each step would be impacted by the carbon tax.⁵

As prices change, so will our behavior. A carbon tax will significantly change relative prices, meaning goods with small amounts of carbon embodied in them will not see much of a price change, while goods that contain a lot of carbon will become significantly more expensive. As a result, the carbon tax will signal people to alter their behavior. Rather than driving to work, more people will walk, bike, or take public transportation. Further, more people will work to reduce their energy consumption through actions like investing in energy efficiency.

Firms and governments

3. Alaska's fund is a state-owned investment fund created in 1976 by Republican Governor Jay Hammond. The fund is financed from Alaska's oil revenues, and pays out on average \$1,000-\$2,000 to each resident of the state each year.

4. To cover the vast majority of fossil fuels under the tax the government would only need to effectively tax 1,150-2,000 collection points across the US (CBO 2001; Metcalf and Weisbach 2009).

5. In this analysis, we assume the carbon tax will be nominally paid by producers and importers, but the full burden will ultimately be passed on to households in the form of higher prices for goods proportional to their carbon intensity.

will also change their behavior. Firms that are currently investing in coal, oil, and natural gas as their main sources of energy will have an incentive to change production practices and curtail their carbon footprints. Putting a tax on carbon will also increase investments in renewable energy technologies, which will be much more profitable when they compete with fossil fuel technologies on a level playing field. As the cost of emitting greenhouse gas rises, so will the public's demand for clean alternatives to the status quo, such as public transportation. Thus, a sizable carbon tax will result in widespread changes to our economy as individuals, firms, and governments transition away from fossil fuels.

WHAT CARBON PRICE?

Economists overwhelmingly support the adoption of a

carbon tax, but the consensus among economists is that the optimal tax would be on the order of \$37 per ton of CO₂, which they refer to as the social cost of carbon. A tax of this magnitude would raise the price of a gallon of gas by about 37 cents in 2020, and although it would rise over time, it would still allow for global temperatures to rise far beyond international goals (Nordhaus 2017). Thus, while measuring the economic impact of every ton of CO₂ pollution helps us understand its social cost, calculations of "optimality" fail if they cannot keep the world within the limits of the IPCC recommendations.⁶

If policymakers take climate change seriously, the tax on carbon should reflect the goal of staying within the recommended warming limits. The same integrated assessment models used to estimate the SCC suggest that we would need a carbon

tax of approximately \$230 per ton of CO₂ in 2020 to prevent temperatures from rising more than 2.5 degrees C (Nordhaus 2017). Such a tax would raise hundreds of billions of dollars a year.

A sizable carbon tax is going to disrupt the economy. That is a feature, not a bug. In order to combat climate change, we must restructure our economy and rapidly transition from our fossil fuel binge to #KeepItInTheGround. Preserving the planet for ourselves and future generations to come is paramount, but this transition will be hard, and we cannot belittle that fact.

WHAT TO DO WITH CARBON REVENUES?

One of the other pressing issues with the design of a carbon tax is what to do with all the money that is raised. A carbon tax of \$230 per ton will increase the cost

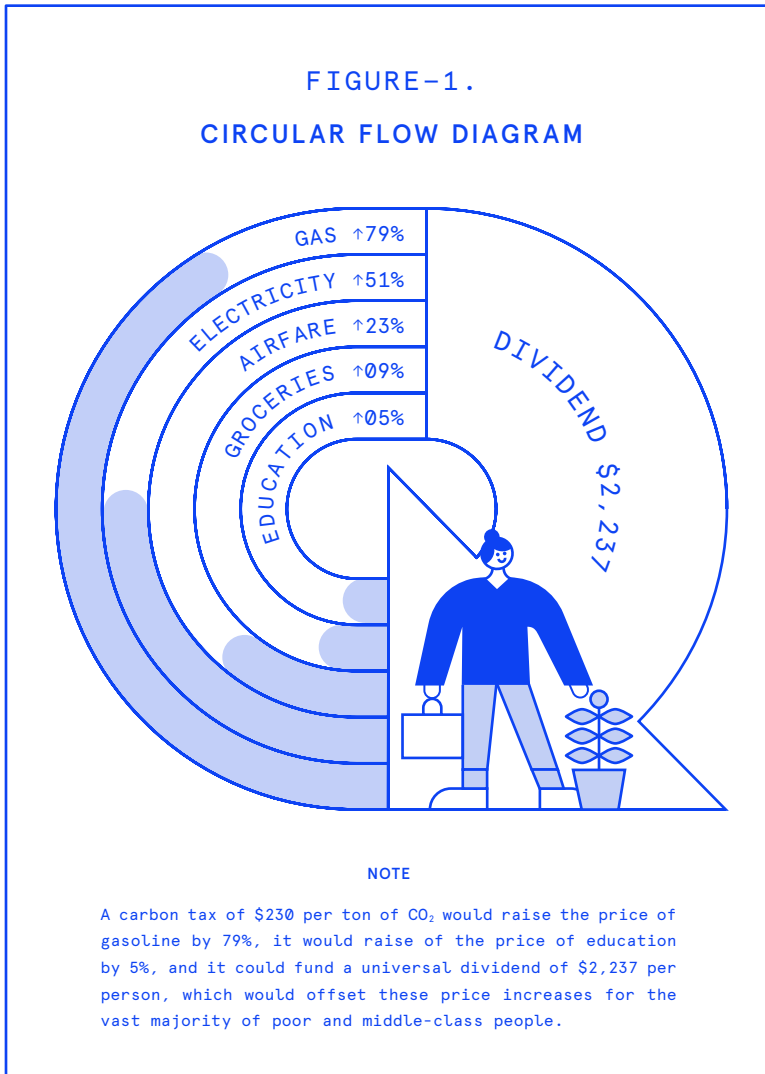
6. For a critique of the social cost of carbon, see Boyce 2018.

of goods and services by approximately \$750 billion for U.S. households.⁷ Since this revenue is raised from cre-

ating enforceable property rights to protect our common assets, there is a strong moral case for rebating the carbon

tax revenue to the public in equal per capita measure via a carbon dividend (Boyce 2011, Barnes 2014).

A carbon dividend is a straightforward and egalitarian policy, creating a social fund that is financed by carbon emissions. Under a \$230 carbon tax, we estimate that each person in the U.S. will receive an annual carbon dividend of \$2,237.⁸ People who emit less carbon than average will end up with a net benefit (paying in less than they receive via a dividend payment) and people who consume more carbon than average will end up with a net loss (paying in more than they receive via a dividend payment). Under this policy, everyone contributes to the carbon dividend based on how much pollution they add to the carbon sink, while everyone receives the same dividend as equal owners of that natural resource.



Source:Fremstad and Paul (2017)

7. This estimate, along with the distributional estimates provided in the next section come from the model developed in Fremstad and Paul (2017). For details of the model, please refer to that paper. Additionally, estimates are built to “keep government whole.” In other words, we recycle the carbon tax revenue collected from the government back to the government in order to protect the purchasing power of local, state, and federal governments.

8. The dividend is an estimate using the static model from Fremstad and Paul (2017). Depending on the behavioral response and the price increase of carbon permits.

Distribution of Pollution & Money

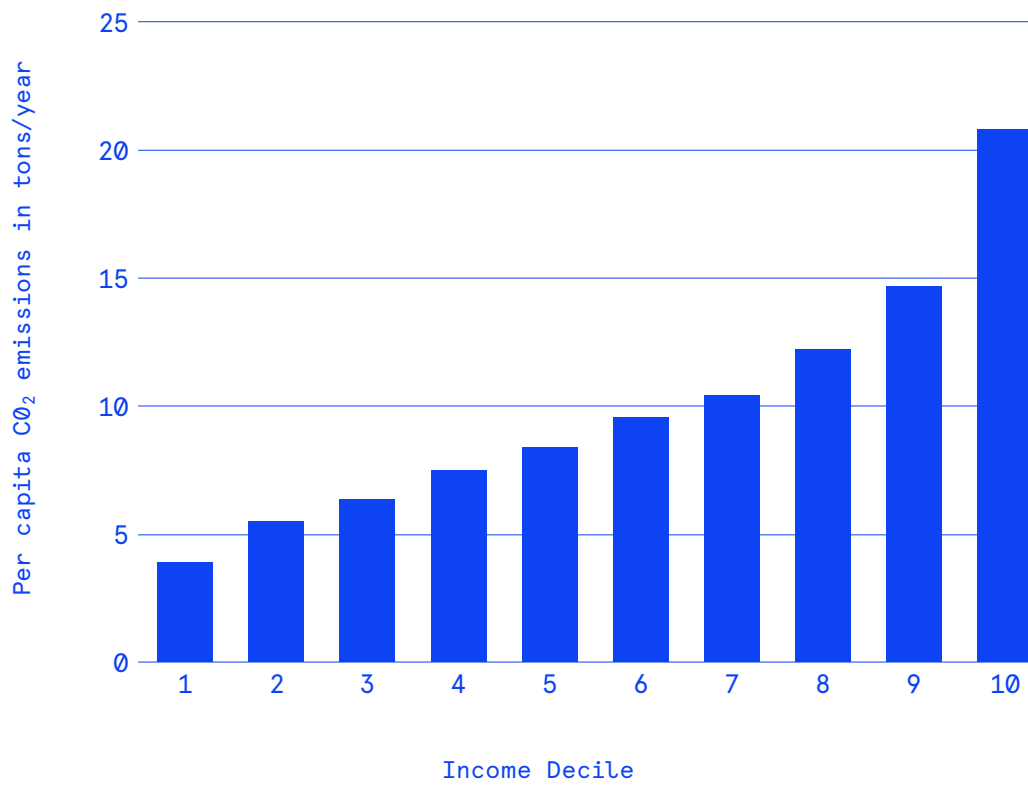
Few things are distributed equally in our society, and pollution is no different. We all emit carbon when we drive, heat and cool our homes, and eat our meals – but some of us pollute far more than others. Some of us fly regularly for work or pleasure, live in large single-family homes, and drive SUVs. Others travel little, live in dense apartments, and use public transportation.

While individual carbon footprints depend on a host of behaviors, wealthy people consume many more goods than poor people, which means that they tend to have significantly larger carbon footprints. Globally, the richest 10 percent of the population is responsible for about half of global emissions related to consumption (Oxfam, 2015). Within the U.S., the average person

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in the richest decile (the top 10%) pollutes nearly six times as much as the average person in the poorest decile (the bottom 10%). In other words, a single rich person pollutes about as much as 5.5 poor people. Figure 2 shows that affluent Americans use more than their fair share of the carbon absorption capacity of the atmosphere.

FIGURE-2.
PER CAPITA CARBON EMISSIONS



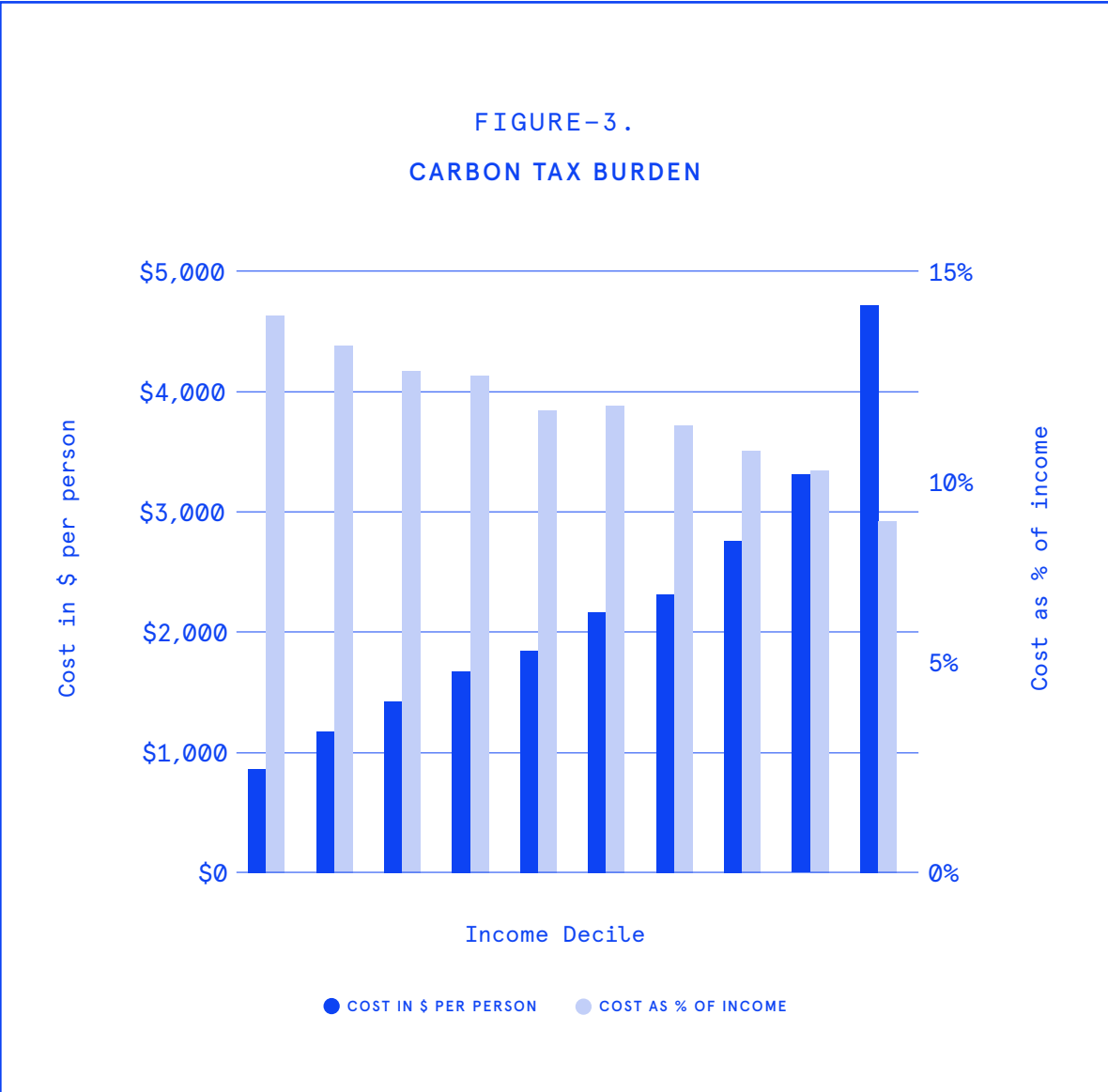
By placing a tax on carbon, everyone will pay for each ton of carbon they emit into the atmosphere. In general, the rich will contribute much more to a carbon fund than the poor, but the story is not that simple. Although the rich pay more than the poor, they also have much higher incomes, which would make a carbon tax a regressive tax.⁹ This reflects the fact that necessities tend to be more carbon intensive than luxuries. We all need to heat

and cool our homes and commute to work, so putting a tax on carbon disproportionately burdens low-income people. Figure 3 shows that a tax of \$230 per ton of CO₂ would cost the average person in the poorest decile \$866 or about 14% of income, while it would cost the average person in the richest decile \$4,738 or about 9% of income.¹⁰ Without rebating revenues, a carbon tax will especially disrupt the lives of the poor.

9. The model, following the tax incidence literature, uses consumption, rather than income. For simplicity, we refer to levels of consumption as income throughout the paper. The same model has been run using income, and the results are robust.

10. Household income varies considerably year-to-year and over the life cycle. Following the bulk of the literature on the incidence of a carbon tax, we use households' annual expenditures as a proxy for their permanent income. Fremstad and Paul (2017) demonstrates that we arrive at very similar results when we sort households by income rather than consumption.

FIGURE-3.
CARBON TAX BURDEN



But pricing carbon emissions is only half the equation. The ultimate distributional impact of the carbon tax depends critically on how carbon revenues are used. Figure 4 presents the net impact of a carbon dividend on people across the income distribution.¹¹ The black bars show that every person receives an equal per capita dividend of \$2,237. The net impact of the policy depends on how much

people pay into the carbon fund, based on their carbon footprints. The green bars in the graph represent the net benefit to individuals under a carbon dividend policy, while the red bars represent the net cost. Our analysis finds that the average person in the poorest decile will see the cost of their consumption basket increase by \$866, leaving them with a net benefit of \$1,371 a year. Meanwhile,

the average person in the richest decile will incur a net cost of \$2,501, because they are responsible for high levels of carbon pollution. Figure 4 makes it clear that a dividend turns a regressive policy into a progressive policy that protects the purchasing power of the most vulnerable members of society.¹² The average person in the bottom six income deciles (the poorest 60%

WHY NOT SPEND CARBON TAX REVENUES ON RENEWABLES? ←

We are at a point where the policymakers must take action on multiple fronts. While we see a carbon tax as an effective means of rapidly curtailing emissions, it should be viewed as one tool in the policymakers' toolkit. Other complementary policies such as bans on new fossil fuel infrastructure, reductions in the leasing of public lands for fossil fuel

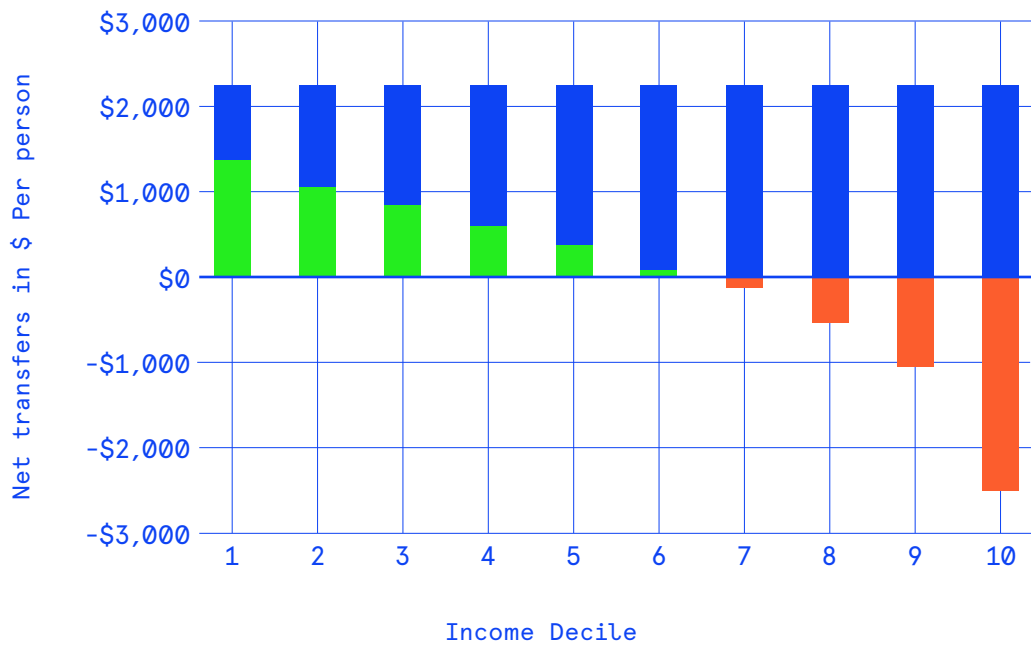
extraction, and outright cutting off the supply fossil fuels can also be pursued, and deserve far more serious attention than they have gotten to date.ⁱ For example, placing a substantial tax on carbon will decrease the profitability of fossil fuel extraction and increase the power of activists working to #KeepItInTheGround.

- i. We can think of a carbon tax as a demand-side policy, as it is aimed at changing prices and restricting demand for fossil fuels. Policies on the supply-side, such as restricting the flow of fossil fuels in the economy, should also be implemented. Additionally, we can think of government policies that "support" substitutes for fossil fuels rather than "restrict" the use of fossil fuels. For instance, a supportive supply-side policy would be government investment in R&D for renewables, while an example of a supportive demand-side would be government subsidies to consumers for energy efficiency investments.

11. These results are based on the model developed in Fremstad and Paul (2017). For details of the model, please see the paper at <https://www.peri.umass.edu/component/k2/item/985-a-distributional-analysis-of-a-carbon-tax-and-dividend-in-the-united-states>

12. In Fremstad and Paul (2017) we also break down the results across racial/ethnic groups and urban/rural groups. Those results bolster the claim that the dividend policy protects the most economically disadvantaged groups.

FIGURE-4.
NET TRANSFERS UNDER CARBON DIVIDEND



of Americans) would have a higher standard of living under a carbon dividend policy than they would under business as usual. This is because the poor and middle class tend to have carbon footprints that are smaller than the mean carbon footprint, because carbon emissions are heavily skewed towards the top of the income distribution.¹³

The net transfers among households are quite large when a sufficiently high tax is put on carbon. The net benefits and costs in Figure 4 are calculated in per capita terms. The average person in the poorest decile would receive a net transfer of about \$1,371 and lives in

a household of 3.7 people, so their household's net benefit would be over \$5,000 annually. A carbon dividend of this magnitude would enable the poorest households to increase expenditures by 13% and force the richest households' to cut expenditures by 3%. It is important to recognize that these effects are temporary. Over time, the carbon tax will rise and emissions will fall, which will eventually reduce the size of the carbon dividend. While a carbon dividend mitigates the short-run regressivity of a carbon tax, a carbon tax cannot provide a long-run funding source for a Universal Basic Income.

13. These are averages, and some poor people (with exceptionally large carbon footprints) will lose under the policy, while some rich people (with exceptionally small carbon footprints) will gain. However, our analysis suggests that a carbon dividend would result in net transfers to 61% of people, including 88% of people in the bottom half of the income distribution.

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Conclusion

A carbon tax can play an important role in helping the U.S. make sharp cuts in GHG emissions. However, a carbon tax is a regressive tax that disproportionately burdens low-income households. While the distributional impact of a small carbon tax is modest, a carbon tax of the magnitude needed to substantively help us meet our emission goals would represent a massive redistribution of income, significantly harming low-income people. Our solution is to use carbon revenues to fund a universal carbon dividend.

A carbon dividend would be similar in many ways to creating a sovereign wealth fund, though it would have

“A carbon dividend would be similar in many ways to creating a sovereign wealth fund, though it would have a limited time horizon, as the ultimate goal is to reduce the revenue entering the fund by sharply curtailing CO₂ emissions.”

a limited time horizon, as the ultimate goal is to reduce the revenue entering the fund by sharply curtailing CO₂ emissions. The carbon fund would ensure that our atmospheric commons is shared equitably, which also protects the purchasing power of households during a challenging transition to a low-carbon economy. Additionally, the idea of a carbon tax-and-dividend already has the support of the majority of Americans.

We estimate that a carbon tax of \$230 per ton of CO₂ would raise hundreds of billions of dollars and could fund a carbon dividend of \$2,237 per person. This dividend would fully offset the cost of a carbon tax for the vast majority of poor and middle-class households. In a time of growing inequality, persistent poverty, and woefully insufficient social insurance programs, a carbon dividend provides a climate solution that is both environmentally and socially sustainable.

Common Questions about the Carbon Tax

1

Does a carbon tax commodify the environment?

No.

Putting a tax on carbon does not turn the environment, or the carbon sink capacity of the atmosphere, into a commodity. The point of carbon tax legislation is not to create a market for pollution (there is no need for tradable pollution permits), but to create property rights to protect the environment that incentivize people, firms, and governments to reduce emissions.

2

Have carbon prices ever been successfully implemented?

Yes.

Carbon taxes have been used in multiple states across the United States, as well as in many international cases such as the European Union, China, and British Columbia. In the U.S., the two most significant cases are in California and in the Northeast. The first carbon cap or tax program went into effect in California in 2013. The Regional Greenhouse Gas Initiative (RGGI) is an agreement amongst Northeastern nine states to cap carbon emissions in the electricity sector via a carbon price mechanism (implemented through a permit and auction system).¹⁴ While these have been important steps in the right direction, none of them have been close to the magnitude of what society truly needs to actually curtail CO₂ emissions to meet international warming goals.

14. States include Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont.

3

What is the difference between a carbon tax and a carbon cap?

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While both a carbon tax and a carbon cap effectively put a price on carbon, there are important differences. A carbon tax places a known price on a given unit of CO₂, while a carbon cap sets an emissions goal, provides a certain number of permits to meet that goal, and allows the price to fluctuate through an auction for carbon permits. Since scientists have reasonable estimates for how much carbon we can emit while still reaching our emissions goals, a carbon cap could be a superior policy tool. The distributional result of a carbon dividend funded by a tax of \$230 per ton of CO₂ is identical to that of a dividend funded by a carbon cap in which permits auction for \$230 per ton of CO₂. Additionally, When the government creates regular auctions for carbon permits, there is no need to introduce a secondary market for trading. Trading is only “necessary” if the permits are given away to firms for free, which they certainly should not be.

4

Isn't a carbon dividend a conservative policy?



While some conservative groups and business leaders now support a carbon dividend, such groups support a small carbon tax, of around \$40 per ton of CO₂, which is far below the price we need to meet our warming targets. Conservatives also often propose a carbon tax as a replacement for current and future environmental regulations. Additionally, the proposed legislation from conservatives would protect fossil fuel companies from future climate-related lawsuits, a measure we strongly oppose.

We see a carbon tax as a policy as one tool in the policymakers toolkit. It is a policy which is complementary to other environmental policies aimed at altering the structure of our economy and rapidly transitioning away from fossil fuels. If we are to truly take the scientists seriously and tackle global warming, a comprehensive suite of legislation, such as a Green New Deal is in order.

5

Should carbon permits be given away free of charge?

No.

Time and again carbon legislation has been designed, often with heavy fossil fuel industry input, to provide free pollution permits to firms. This allows firms to reap extra profits as they bear no additional cost but are still able to pass on higher prices to their consumers. Under a carbon tax or a permit auction, nobody gets to pollute for free.

6

What about carbon offsets?



One of the most controversial aspects of carbon legislation in the U.S. has historically been inclusion of carbon offsets. Carbon offsets should be off the table, to prevent firms from gaming the system by purchasing fraudulent offsets. Polluters should have to pay the price for their pollution. Eliminating offsets is particularly beneficial to environmental justice communities that have received more than their fair share of pollution. This is because firms located in environmental justice communities will be forced to reduce their emissions, like everyone else, and cannot purchase offsets to avoid direct benefits from local emissions reductions.

7

Why not spend carbon tax revenues on renewables?



First, while we strongly support government spending on investment in renewable energy technologies, energy efficiency, and green infrastructure, we do not think these efforts should be funded by a regressive carbon tax. Large-scale investment in renewables and carbon dividends are not mutually exclusive. While some environmentalists see carbon tax revenues as a slush fund for renewables, there are better ways to fund green investments. For instance, the government should simply fund a Green New Deal through borrowing or progressive taxes. Second, the point of a carbon tax is to reduce emissions through a price mechanism. While economists disagree about most things, they overwhelmingly agree that pricing carbon is more cost-effective than other policy options (Fischer and Newell 2008). If climate activists worry that a carbon tax is unable to spur sufficient action unless the revenues are devoted to green investments, we suggest fighting for a higher tax, coupled with a larger dividend.

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