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Building Democratic Support for Equitable Carbon Pricing

Raising the price of carbon dioxide emissions would mitigate climate damage by reducing demand for non-renewable energy sources like oil, coal, and natural gas. But can we forestall new economic burdens for Americans with low or middle incomes? SSN experts explore the issues and suggest ways to design economically equitable carbon pricing programs with broad democratic appeal.

The Challenge of Forging Sustainable Climate Policy

James K. Boyce, University of Massachusetts Amherst

Effective climate policy must be sustainable politically as well as environmentally. The environmental requirement – to limit emissions of carbon dioxide and other greenhouse gases so as to prevent massive destabilization of the Earth's climate – is often translated into the policy target of cutting emissions at least 80 percent against their 1990 level by the year 2050. Finding a comparable formula to meet the requirement for political sustainability has proven more elusive.

Establishing an effective climate policy is not just a matter of crafting a bill that can pass Congress. The policy must also win public support wide and deep enough to enable it to endure over the decades needed to complete America's transition to a clean energy economy. In other words, the policy must secure support among voters of all partisan persuasions comparable to that enjoyed by Social Security and Medicare.

To achieve this goal, we must move beyond past strategies that have tried – and failed – to forge a winning political coalition for the clean energy transition. These strategies started from a flawed but widely believed premise: the assumption that effective climate policy necessarily requires the present generation to make economic sacrifices in order to safeguard the climate for future generations. This framing has been espoused by environmentalists and fossil fuel firms alike. By ignoring possibilities to design clean energy policies that can benefit *the present generation in the country* – not only future generations worldwide – this "eat your broccoli" approach fatally undermines political support for effective climate policy.

Benefits Here and Now

Clean energy policy can bring tangible benefits here and now by three avenues:

- *Air quality:* Burning fossil fuels not only releases carbon dioxide, the principal greenhouse gas, but also emits hazardous pollutants – including sulfur dioxide, nitrogen oxides, particulate

matter and carbon monoxide – that harm the health and economic well-being of all Americans, and particularly children whose developing bodies and minds are most susceptible to their toxic impacts. By conservative estimates, Brandon Taylor and I found that an 80 percent reduction in the use of fossil fuels between 2016 and 2050 would prevent 700,000 premature deaths (an average of 20,000 per year), 43 million cases of asthma exacerbation, and 89 million lost school days due to respiratory ailments, with monetized benefits of $56-160 billion per year. By designing policies to target substantial emissions reductions from sources that impact disadvantaged communities who now bear disproportionate pollution burdens, we can protect public health and advance the goal of environmental justice.

- *Employment:* Investments in energy efficiency and in clean energy infrastructure will create millions of new jobs for Americans. The job gains come about for two reasons: first, the technologies involved are more labor-intensive than fossil fuel extraction and processing; and second, the U.S. domestic share of their labor content is higher. In the U.S., investment in energy efficiency and clean renewables generates more than twice as many jobs per dollar than investment in fossil fuels.

- *Family income:* Last but not least, climate policy can directly put more money into the pockets of the majority of American households, protecting the real incomes of middle class and low-income households even in the face of rising fossil fuel prices. However, this can be done if, and only if, most or all of the revenue from carbon pricing is returned to the public in the form of equal dividends to every woman, man and child. How dividends work – and why they are essential for a sustainable climate policy – is the focus of this memorandum.

The Politics of Carbon Pricing

A crucial element of climate policy is to put a price on fossil carbon via a fee or cap-and-permit system, so as to limit demand and provide incentives for energy efficiency and alternative energy investments. Carbon pricing poses a great political challenge: how to sustain public support for a policy that significantly increases fossil fuel prices, including the most visible price in America – the price of gasoline that is advertised in foot-high numbers on street corners across the country.

The good news is that there is a policy design that can meet this challenge – one that returns the money generated by carbon pricing to the people as dividends (or what economists call "lump sum payments"). Dividend payments would be highly visible and would ensure that a substantial majority of Americans benefit from climate policy in sheer pocketbook terms: what they receive in dividends would exceed what they pay in higher prices. In my view, this is essential to build durable public support for the climate policy.

The bad news is that these advantages come with an opportunity-cost flip side: every dollar returned to the people as dividends means one less dollar available for the pet priorities of special interests. Legislators and lobbyists of all stripes may not agree on much, but one thing on which they do agree is that they have better uses for money than simply handing it over to the people. Of course, they disagree sharply on exactly what these "better uses" would be. Environmentalists want to use the money for clean energy and other environmental objectives. Liberals want to use it for social programs and targeted assistance to those who are most in need. Conservatives want to use it to cut the national debt. Energy corporations want to divert it into windfall profits via a cap-and-giveaway (aka cap-and-trade) policy

that gives them free permits. Many economists want to use it to cut "distortionary" taxes on the grounds that this will create a bigger economic pie.

As each champions their own special interests, none champions dividends. Meanwhile advocates for the public interest in a durable climate policy that brings economic benefits to the majority of Americans have been, with a few laudable exceptions, missing in action. Because no lobbyists represent the people, they must represent themselves. This turns out to be a tall order.

Carbon Rent

"By imposing a tax on every American who drives a car or flips on a light switch," House speaker John Boehner declared during the debate on the Waxman-Markey bill in 2009, "this plan will drive up the prices for food, gasoline and electricity." The *Wall Street Journal* dubbed cap-and-trade "the biggest tax in American history." Democrats countered that the proposed cap-and-trade system wasn't really a tax, and that the resulting price increases would be so small they really wouldn't hurt.

A favorite number cited by the bill's supporters was that it would cost American households only 18 cents a day, "less than the cost of a postage stamp." But this claim rested on either confusion or disingenuity. The 18 cents figure came from a Congressional Budget Office (CBO) estimate of the cost of *preventing* emissions—for example, by insulating buildings or switching to clean energy. But carbon pricing means paying for emissions that are *not* prevented. The CBO estimated that the cost of preventing emissions in 2020 would have been about 18 cents per household per day. The same report estimated that the annual cost from fuel price increases would have been about $1000 per household in 2020, increasing subsequently as the emissions cap tightened.[1]

Resources used to prevent emissions, for example by installing insulation or solar panels, are not available for other uses. These resource costs are likely to be modest, as the CBO calculations indicate. Indeed some technologies to reduce emissions would *save* money.[2] The money that consumers pay in higher prices, in contrast is not spent on resources but simply transferred. It is *carbon rent*: payment for use of the limited carbon absorptive capacity of the biosphere.

Who will pay carbon rent is a matter of fairly simple economics. If the price is levied on firms that bring fossil fuel into the economy – an "upstream" system that minimizes administrative cost – it will be passed on to consumers. This is desirable as well as inevitable, since the resulting price signals guide consumption and investment decisions. Because upper-income households generally consume more than middle and lower-income households, they will pay more. But because fuels are a necessity rather than a luxury, middle and lower-income households will pay more as a *percentage* of their incomes. Carbon pricing itself is therefore regressive, hitting the poor harder than the rich.

Who will receive carbon rent depends on the policy design. Underlying this question is the deeper question of who owns the carbon absorptive capacity of the biosphere. The fossil fuel corporations? The government? Or the people?

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[1] CBO, "The Estimated Costs to Households from the Cap-and-Trade Provisions of H.R. 2454," June 19, 2009. For discussion, see James K. Boyce and Matthew Riddle, *Cap and Dividend: A State-by-State Analysis*. Amherst, MA: PERI, November 2010.

[2] See McKinsey & Co., *Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?* December 2007.

Tax or Cap?

A carbon price can be implemented either by means of a tax or a cap. A tax sets a fixed permit price (one permit = one ton of fossil carbon) and lets the quantity vary. A cap sets a fixed ceiling on the quantity of permits and lets the price vary. Apart from this, they are equivalent. Both put a price on carbon and therefore create carbon rent. In both cases, this rent can be returned to the people as dividends. The bills recently introduced in Congress by Representatives James McDermott (D-WA) and Christopher Van Hollen (D-MD) would do this via a carbon tax and a carbon cap, respectively.

Cap proponents worry that a tax will be set too low to ensure adequate reductions in emissions. Tax proponents worry that a cap would be set too loosely to ensure adequate increases in fossil fuel prices. These worries could be addressed by a hybrid policy that combines a price floor (the tax) with a quantity ceiling (the cap). For example, Switzerland's CO2 law sets a carbon tax rate that increases whenever emissions reductions fall short of quantitative targets; the amount of the increase is calibrated to the extent of the shortfalls.

Alternative Uses of Carbon Rent

I have alluded to three reasons why dividends are preferable to other uses of carbon rent. First and foremost, dividends alone can ensure durable public support for climate policy in the face of rising fossil fuel prices. Second, proponents of other uses cannot agree on the best alternative. Third, whatever the merits of other uses, carbon pricing is a regressive way to fund them.

In addition, the merits of many other uses are questionable.

- *Environmental expenditures:* At first blush it may seem that devoting carbon rent to expenditures to wean the economy from fossil fuels would speed the clean energy transition. But as long as the policy puts a hard cap on the use of fossil fuel, this spending would have no effect on total emissions. If we use the money to subsidize the purchase of more efficient electrical appliances, for example, this relieves pressure on the cap and creates more space for emissions from other sources, such as transportation fuels. In other words, earmarking carbon rent for carbon reductions is redundant. Using the money for other environmental purposes not covered by the cap would avoid redundancy but leave open the possibility of fungibility insofar as that spending otherwise would have been funded from other sources.

- *Means-tested payments to households:* Some liberals advocate returning carbon rent only to households who need it. The Waxman-Markey bill, for example, allocated 15 percent of the carbon rent to low-income households. While such a provision would mitigate the regressive impact of carbon pricing, it would raise administrative costs by imposing eligibility tests and raise political costs by excluding the middle class. If, instead of universal coverage, Social Security and Medicare were restricted to low-income households, it is not evident that they would still exist.

- *Reducing debt*: Some conservatives advocate using carbon revenue to pay down the federal government's debt. This is premised on the beliefs that the U.S. debt/GDP ratio is so high that it

weakens the economy. Although the ratio has risen over the past decade, propelled by massive expenditures for the wars in Iraq and Afghanistan, it remains far below the level of the 1940s, when rather than weakening the economy debt-financed government spending stimulated it. This does not mean that the sky is the limit for government debt, only that we are nowhere near the sky.

- *Windfall profits:* The political rationale for free permit giveaways to fossil fuel corporations is that letting them capture the carbon rent as windfall profits will neutralize their opposition to climate policy. How well this works can be gauged from the serial failures of cap-and-giveaway proposals in Washington. Some of the windfall profits would go to foreign firms and shareholders, leaving the U.S. Giveaway requires permits to be tradable, creating scope for speculation and trading profits that drive a further wedge between the carbon rent paid by consumers and the amount available for other uses.

- *Cutting "distortionary" taxes:* Some economists call for using carbon rent to cut personal and/or corporate income taxes on the grounds that this will grow the economy. Apart from the fact that this would replace progressive taxes with regressive ones, the ostensible economic payoff rests on shaky grounds since it is premised on the assumption that by reducing incentives to supply of labor and capital, income taxes reduce GDP. This would make sense in a theoretical economy where labor and capital are fully employed – if we accept the proposition that Americans would be better off working longer hours – but in the real economy, characterized by chronic unemployment (aka excess supply of labor) and capital underutilization, it doesn't.

Keeping Government Whole

There is one alternative use for carbon rent for which a good case can be made, though oddly, few have made it: keeping the government whole. Consumers account for only two-thirds of U.S. carbon emissions, through their direct and indirect consumption of fossil fuel. Most of the rest – about one quarter of the nation's total carbon footprint – is accounted for by local, state and federal government. A reasonable case can be made for using part of the carbon rent to protect the purchasing power of governments, while at the same time giving governments price incentives to reduce their use of fossil fuels, just as in the case of individuals.

On the other hand, small government advocates might view the reduction in real government expenditure by carbon pricing as a desirable outcome. The Van Hollen bill, which would distribute 100 percent of the carbon rent to individuals as non-taxable dividends, would have this effect. Politically, taxing governments and returning the money to the people could be a selling point for Republicans. But as far as I can tell, they haven't noticed.

There are two ways to tap carbon rent to keep government whole. One is to take a slice off the top, allocating 25 percent to government and 75 percent to dividends, as was proposed in the 2009 Cantwell-Collins bill. The other is to make the dividends to individuals taxable. Both would generate roughly the same amount of revenue. An attraction of taxable dividends is that much of the revenue would come from progressive income taxation rather than regressive carbon taxation. A potential attraction of the off-the-top option is that the revenue could be earmarked for certain purposes (the list of eligible uses specified in the Cantwell-Collins bill, for example, included transitional adjustment assistance for workers and communities, and international climate mitigation and adaptation assistance).

In either case, mechanisms would need to be established to share the revenue among local, state and federal governments in rough proportion to their carbon footprints. In designing these, a case can be made for allocating more revenue to states with more carbon-intensive electricity sectors. Retaining 25 percent of the carbon rent for governments would create opportunities to channel funds to local school boards, community benefit funds, and a "worker Superfund" to support a just transition for those now employed in the fossil fuel sector – uses that could broaden the policy's appeal to important constituencies.

Dividends by Democracy

In 2009 I participated in a conference call of progressive climate advocates who were weighing whether to fall into line behind the Waxman-Markey “cap and trade” bill or instead support the Cantwell-Collins bill mandating dividends. The Waxman-Markey proponents insisted that without giveaways to polluters no bill could win backing from the fossil fuel lobby. What about backing from the American people? I asked. They patiently explained that in Washington it is lobbyists who command votes, not voters. My response was, "Let us assume a democracy." This provoked much laughter.

Climate policy advocates appear to face a no-win tradeoff when it comes to carbon rent: pander to special interests to win passage in the short term, or return the money to the public as dividends to secure the durability in the long term. The first choice is a recipe for long-term failure. The second is a recipe for short-term failure.

The only exit from this box, in my view, is to mobilize the American people for a price-and-dividend policy. Unless and until the public demands it, we will never get it. And unless we get it, we will not have a politically sustainable climate policy. The picture is as simple – and as complicated – as that.

We cannot assume a democracy. Nor is democracy secured simply by the words written in our nation's Constitution. For democratic rights to be real, they must be exercised. This is hard work. But if forging an effective climate policy requires the renewal of American democracy, maybe that's not a bad thing.

Building Support for U.S. Climate Reforms with Universal Benefits

Michael Howard, University of Maine

No single reform strategy can reduce greenhouse gas emissions sufficiently to prevent dangerous climate change. To begin to reduce reliance on fossil fuels, America needs policy proposals that many civil society groups can rally around to build a powerful political movement to sustain progress. Recent advocacy undertakings have included work to stop the Keystone XL pipeline and efforts to encourage universities to divest from fossil fuel companies. Here I consider the many benefits – and some questions and concerns about – a proposed carbon fee and dividend policy. This is a broader and more ambitious proposal that could potentially garner support from many climate action advocates.

I am a member of the Maine chapter of one group that already supports this approach, the Citizens' Climate Lobby. As this group envisions, a carbon fee and dividend program would begin with a fee of $15 per ton of carbon dioxide equivalent emissions. The fee would be assessed at any mine, well, or port of entry where the carbon is introduced to the economy. Each year, the fee would ratchet up by $10 or more, as the Department of Energy judges necessary to meet the primary goal of reducing US emissions to ten percent of 1990 levels by 2050. But the fees collected would not go into government coffers. Instead, the program would be "revenue neutral" in that all fees collected, minus small amounts to cover administrative costs, would be returned to citizens as equal per capita dividends. As the prices of fossil fuels go up and carbon fees accumulate, dividend payments to Americans would increase.

The Political Advantages of a Universal Dividend

The dividend is key to the political success and durability of the entire carbon pricing effort. Americans in general dislike tax increases, and a tax in the form of carbon fee that raises energy prices could be doubly unpopular. For middle and low-income households, the increase in energy costs would be significant. For example, by year ten of the program gasoline prices would be $1 per gallon higher because of the fee. But if revenues are returned to people through dividends, the picture would change, because most households would see overall financial gains. And a dividend is better than promises of tax relief, because tax relief tends to be complicated and not very visible to most people. With dividend payments, Americans would know the pay-offs they are getting when they receive a check or monthly bank deposits.

The numbers are large for projected dividend payments. For example, if the Citizens' Climate Lobby proposal had been instituted in 2015, the annual dividend for a family of four would amount to $3,456 by 2025, and $4,752 by 2035. Only households – mostly wealthy households – that use significantly more energy than the average would end up paying more for increased energy costs than they would receive in dividends. Widespread, highly visible financial benefits from a fee and dividend program could help climate reformers build public acceptance and a winning political coalition that could enact this reform and sustain it over decades.

Some people who support dividends in principle argue for modifications of the universal, equal payments favored by the Citizens' Climate Lobby. One variant would target low-income people to get larger benefits than others, while another variant would distribute carbon revenues through tax breaks rather than payments to individuals. However, both of these approaches have problems that

make universal dividends preferable.

- Research on earlier government programs has shown that universal benefits tend to be larger and more durable than benefits targeted or tilted toward the poor. When benefits are universal, the poor are not reluctant to claim their share, and lower and middle-income families support the program because they are net beneficiaries. Because of their wide appeal, universal benefits are set at higher levels (or grow to higher levels) than targeted benefits, even though in principle a targeted benefit could be more generous for the small group that receives it. This happens because benefits targeted on the poor, like welfare income supports or food stamps, often come under political assault. Their recipients are vilified and spending on these programs is often cut back, even though such assistance is a small percentage of the federal budget. Social Security and Medicare, by contrast, are very large parts of the federal budget, yet are relatively secure, because their near-universal benefits are widely popular.

- Using the tax code to distributing carbon revenues would also be problematic. Tax breaks tend to be invisible to citizens. A carbon dividend delivered through the tax code would have to be computed with other deductions and credits, and might not be recognized at all by recipients as a benefit linked to the carbon fee. And people who do not file tax returns might not get the benefit at all. In contrast to this convoluted approach, a separate check or monthly deposits to bank accounts would be highly visible to everyone, and people could compare those payments directly to their energy costs. The net gains for most households would be evident for all to see.

Dividend payments would be noticeable in the very first year of the implementation of a new carbon fee and dividend program. Over time, other positive effects would build support. Higher fossil fuel prices would make renewable energy more competitive, encouraging investments and job growth in solar, wind, and other green energy industries. Businesses and employees in these growing industries would support carbon fees and other reforms to further America's energy transition. A study by Regional Economic Models, Inc., found that a policy similar to that supported by Citizens' Climate Lobby would produce 2.8 million new jobs and improved air quality over twenty years. In turn, our country would avoid 230,000 premature deaths and reduce emissions by 50% below 1990 levels. In short, over time a transition to green energy promises widespread economic and social benefits. But to win the reforms needed to spur that transition, and for the initial years when the prices of fossil-fuel-based energy will rise, a program like universal dividends must be used to build public support and create the political will to propel change.

How the Alaska Permanent Fund Delivers Universal Benefits

An example of a dividend program that has proved self-reinforcing can be found in Alaska's Permanent Fund Dividend. In the 1970s, Alaskan policymakers faced a challenge. They needed to convince ordinary Alaskans to save for a future when oil would run out. To do so, they proposed depositing a significant percentage of state royalties from oil production into a permanent fund, and to pay citizens annual checks based on the interest earned by the fund. This dividend, averaging a little over $1,000 per person annually, is now extremely popular and has contributed to reducing poverty and inequality in Alaska. A benefit of substantial size is important. By contrast, when British Prime Minister Tony Blair's Labor government introduced a "baby bond" in 2001, the amount was so small that it was easily repealed by the subsequent Conservative government without much opposition.

Not only must dividends be sizeable; the fee on carbon must also be set at a substantial level to have an impact on energy prices and use and inspire environmental activists. Fees and dividends are linked, of course, so fees set too low would generate only miniscule dividends, which will fail to attract support from those looking for ways to increase the incomes of lower and middle-income households. And fees set too low would have little impact on the economy, or carbon-based industries in a strong position to stall the transition to new green jobs and industries. For all of these reasons, the policy that I believe has the potential to bring together a powerful, durable political coalition is a robust and steadily rising carbon fee (or robust and steadily falling carbon cap), with all or most of the revenue collected distributed as dividends to citizens.

Fee or Cap?

Apart from including sizeable universal dividends, how should policies to reduce carbon emissions be structured? Similar results can be obtained from either a carbon fee and dividend approach or the use of a carbon cap linked to dividends. Using a cap has advantages, as James Boyce has explained, because the cap for total carbon emissions to be allowed in the economy can be set at a definite level and gradually ratcheted down. The quantity of dangerous emissions allowed would be definite, and given that the primary objective is to reduce their quantity, that is a good reason to favor a cap over a fee. Others argue for a cap in order to create an American system that would harmonize with existing cap and trade schemes in Europe.

On the other hand, a carbon fee could be harmonized with existing carbon taxes that already exist in a small but growing number of nations. A border tariff on the carbon content of imports, which would be part of a U.S. carbon fee program, could serve as an inducement to other countries to impose their own carbon fees. Unlike a cap, a fee sends a clear, simple message to the market about prices, and consequently could accelerate the development of renewable energy alternatives. A carbon fee also would require little or no additional administrative regulation, whereas caps require the creation and administration of a carbon permit market or auction system.

Each of these approaches, in short, has strengths and weaknesses – and each can be subverted in various subtle ways. In the final analysis, I suspect that the policy choice between fees or caps is less important than the strength of the social movement that can be built for some form of carbon limits linked to universal dividends.

A policy that groups can rally around must be the goal. In my view, a clear and easy to explain plan, like the carbon fee and dividend proposed by Citizens' Climate Lobby, helps to draw attention and support. But it would be a pity if advocates became so committed to a carbon fee rather than a cap, that they could not throw their support behind a cap alternative that would achieve the same overall ends. A strong, universal benefit – the dividend – is more important than whether the dividend is funded by the annual sale of carbon permits or the administration of a carbon fee.

Why It is Time to Build a Broad Coalition

Congress is not about to pass any climate reform legislation tomorrow, but certain legislators are introducing bills for a carbon fee and dividend or a carbon cap and dividend. And back in 2009, a carbon cap and dividend bill, the CLEAR Act, had bipartisan co-sponsorship from Maine's Republican Senator Susan Collins and Washington's Democratic Senator Maria Cantwell. Before the next opening for national legislation appears, now is a time for environmental and other groups to meet and agree on long-term policy proposals like a carbon fee and dividend program. Strategists need to identify potential allies as well as reluctant constituencies like organized labor that might be

won over. The failure of the 2009-10 Waxman-Markey cap and trade reform, which never reached a Senate vote, shows that purely inside-the-beltway deals between energy companies and national environmental organizations will fail. To avoid a similar failure next time, climate reformers must build broad popular support by investing resources in organizing, movement building, and education.

Carbon pricing alone may not be sufficient to meet the challenge of climate change, but it is the single policy most likely to further substantial reductions in greenhouse gas emissions across the entire economy. Environmentalists can join in support of this step without abandoning other important reform efforts. More challenging is to sell climate reforms to groups that place a priority on other challenges. For this task, a proposed program that marries carbon fees to universal dividends has many merits.

Reaching Out to Labor

Environmentalists neglect workers at their peril. The labor movement can be a powerful ally, able to mobilize millions of members, despite recent union declines in the private sector. If the stakes workers have in any energy transition are ignored, unions can become powerful opponents of climate reforms, as fossil fuel companies have long realized. From this perspective, carbon dividends could have a disadvantage, because workers are likely to be more enthusiastic about jobs programs than about programs to hand out cash to everyone, whether or not they are members of unions. This makes ongoing alliances between environmentalists and labor groups even more important. Labor groups already committed to addressing climate change, such as the Labor Network for Sustainability, should be part of the discussion to fashion reform proposals. This group has devoted years of work to bringing together environmentalists and workers, and has a wealth of knowledge about how to work with unions.

Whether workers are unionized or not, resistance to carbon pricing is likely to be especially strong in the mining, drilling, and fossil fuel processing industries that would be hurt by higher prices for their products. Some revenues could be used to help employees in these industries find new employment or bolster retirement funds. But if those funds come at the expense of generous universal dividends, the appeal of that program would be weakened.

Funding for renewable energy, including green jobs programs, has benefits. Even with a carbon fee, price signals will be insufficient to bring about the transition to a fossil fuel free economy with the speed necessary to avert significant climate change. Basic fairness argues that the cost of the transition should be borne equally, not unfairly loaded onto workers in the fossil fuel industry. But such funding need not come from the carbon fee. It can come from current general tax revenue or bonds, or from specific borrowing against the future savings that investment in low-carbon, energy efficient technologies will bring. Nevertheless, because it may not be possible to enact two separate bills for carbon pricing and programs to further a just transition to a green economy, some balance may need to be struck between fully revenue-neutral uses of carbon fees and devoting some of the revenue to programs compensating those who would bear extra costs during the transition away from the production and consumption of fossil fuels.

Towards a Basic Income for All

Overlapping with workers who happen to be in unions are those that Guy Standing and others have called “the precariat,” – workers whose employment is uncertain because it is temporary, part-time, or subject to outsourcing or technological displacement. Many in the precariat are also poor, but others are skilled people who cannot count on a steady paycheck. For all workers in the precariat, an

unconditional basic income would bring many benefits, giving them something to rely and fall back on. This policy has recently been endorsed by former Secretary of Labor Robert Reich and Nobel economist Joseph Stiglitz, not just because of the increasing numbers of people with precarious employment, but also because more and more employees are being displaced by automation.

In recent decades U.S. income inequality has increased, with owners of capital taking an increasing share of national income compared to those who work for a living. Universal dividends from carbon revenues would be an excellent way to supplement the declining share of all U.S. income going to labor. Carbon dividends should therefore not be considered merely an "environmental" policy or a climate change remedy. A substantial carbon tax could be an important reform for environmentalists and egalitarians alike, because it not only would cut demand for fossil fuels across the U.S. economy, it would make it possible to boost basic incomes for all Americans.

Incremental Progress

While national politics remains stalemated, can progress toward the reforms I have discussed be made at the local, state, or regional level? I can only touch on the issues and possibilities here, but it is worth noting that the Obama administration's Clean Power Plan, although limited to the electricity-generating sector, has implications for states and regions as they develop compliance plans. As this happens, environmental and other groups could converge to support regional cap and trade agreements such as the Regional Greenhouse Gas Initiative in the Northeast; or they could rally behind proposals to institute a carbon tax similar to the one in British Columbia. To be sure, any state or regional cap or carbon tax is going to be far short of what is needed to push the entire U.S. economy into a new energy era. But incremental victories can create momentum for reform movements. Arguably, even a small dividend program at the state level could help pave the way for a federal fee and dividend policy. What is more, regional cooperation between environmental groups and unions to insure a just transition for workers and communities adversely affected by the Clean Power Plan could forge alliances to support broader national reforms when they become possible.

 

The Politics of Equitable Climate Policy

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Climate change will dramatically exacerbate social and economic inequalities across the globe – and climate change is also likely to impose disproportionate harm on low and middle-income Americans. These citizens will face climate-related damage with minimal safety net protections. For example, their households will find it hard to recover from storm damage, especially as insurers increasingly decline to cover housing assets against coastal flooding and other climate impacts.

Ironically, however, many policies intended to mitigate climate change could *also* exacerbate existing social inequalities. The reason is straightforward: Low and middle-income Americans depend on cheap energy, transport, food and consumer goods; yet, many of these goods are relatively inexpensive because their prices do not include the cost of ongoing damage unregulated carbon pollution imposes on the global environment. This creates a perverse dynamic: low and middle-income Americans are simultaneously the most at risk from climate change *and* the most sensitive to the climate policies that would protect them from these catastrophic risks. For instance, climate change is likely to impact food prices. Agricultural input costs will rise, especially fertilizers, with some climate policies, leading food prices to increase. This will occur while more frequent climate-linked droughts cause volatility in food prices. Household heating and cooling costs may also rise. And, of course, carbon pricing reforms might indirectly bring dislocations for workers in carbon-dependent industries. In sum, reforms to discourage carbon pollution may squeeze struggling American families that have already been squeezed by wage stagnation over recent decades.

As the country moves toward a greener, low-carbon economy, we will see a second wave of electrification as households install solar panels and energy storage devices, and as more people buy and drive electric cars. This trend could benefit poor communities, which are more likely to be located near polluting electricity plants. This also means that poor communities could see extra benefits over the long run as the country closes down polluting power plants and transitions to clean energy sources. Beneficial as these trends will be overall, adoption of new energy technologies could exacerbate inequalities if these policies are not structured with equality in mind. Wealthier households are more likely to invest in new energy-saving technologies because they need more electricity and have more capital to invest.

In this memo, we explore the challenge of designing climate reforms to reduce America's already large social and economic inequalities. We emphasize that strategies to increase the price of carbon pollution should include programs to raise living standards for low and middle-income households. Many reformers advocate doing this through rebating carbon taxes' revenue. We recognize the possible political value of that approach. However, we also emphasize the importance of directing a significant portion of carbon price revenues towards making it easier for all U.S. households, especially less privileged households, to access new kinds of low-carbon energy and new consumer products that rely on cleaner energy sources.

The Political Challenge

The fact that some policies to reduce carbon pollution could exacerbate inequalities complicates efforts to build climate reform coalitions. Even as proponents correctly argue that climate reforms

will protect the economic position of working families in the medium and long-term, it provides an opening for opponents to frame climate reforms as harmful for working families in the short-term. We have seen this political drama again and again.

In early 1993, the Clinton Administration proposed a British Thermal Unit ("BTU") tax as part of an economic reform package. This tax was designed, in part, as a response to the emerging threat of climate change. Opponents quickly mobilized to highlight the higher prices it might spur, suggesting that the tax would disproportionately harm less privileged Americans. Utilities successfully pressed legislators to amend bills to allow the new tax as a separate line item on household energy bills – which would have shifted blame for higher electricity prices to the government and undermined public support for the policy.

Efforts to brand the BTU tax as anti-poor greatly frustrated the Clinton administration, which had deliberately coupled the BTU tax proposal with an expansion of the Earned Income Tax Credit, Food Stamps, and the Low Income Home Energy Assistance Program. This broader package ensured that low-income households would gain, not lose, economically from the policy reform. However, opponents were able to make policy costs selectively salient. In the face of fierce opposition, Clinton officials were not able to defend their approach, and Congress jettisoned the new energy tax, delaying any U.S. move toward discouraging carbon-intensive energy production.

This 1993 episode is not an isolated case. Opponents of climate reforms have continued to use similar arguments. The U.S. coal industry claims that efforts to impose costs on pollution-spewing coal-fired power plants will raise prices and reduce incomes for low and middle-income Americans. In addition, the uneven adoption of low-carbon technologies – because upper-income households usually move first to install improvements such as solar panels – gives extra political ammunition to utilities and other reform opponents. In many states, opponents claim that solar installations shift electricity costs from wealthier to poorer customers. Absent policies that promote solar adoption in multifamily and less privileged communities, these arguments may become increasingly persuasive.

No matter what climate reforms are proposed, it would be naïve to assume that opponents will ever stop framing them as harmful to low- and middle-income Americans. This reality means that proponents of new policies to slow climate change and mitigate its effects must be prepared. Programs must be included in all proposed climate reforms that offset adverse effects on low and moderate income households. And proponents must be prepared to explain those offsetting programs loud and clear in ongoing public debates.

Why a Simple Cap and Dividend Approach is Insufficient

It is tempting to channel all revenues collected from carbon taxes or fees into straightforward cash rebates designed to give proportionally more to low and middle-income Americans. This approach would certainly provide ammunition against claims that climate policies are bound to hurt the less privileged, and in principle this kind of proposal could help reformers pull together a broad-based, grassroots coalition to push legislators to enact climate reforms.

But dividend proposals typically have at least two design weaknesses. In the first place, even if carbon revenues are rebated in ways that give proportionately more to lower income people and even if the dividends are distributed uniformly across the country, they risk exacerbating regional economic inequalities. States with more carbon-intensive economies could end up paying higher taxes or fees. Even if many of their residents would still, on balance, come out ahead after the rebates

are distributed, this regional imbalance could be exploited by opponents to generate politically explosive resentments. Opponents in carbon-intensive states could argue that the entire national system is unfair, amounting to a geographic wealth transfer.

A second difficulty may be even more important. In itself, simply rebating dividends to all citizens will not directly mitigate the inequalities that climate reforms could exacerbate. Using carbon-intensive energy is not a lifestyle choice for low and middle-income families, who have to buy gas to get to work and use electricity from whatever sources their state and community make available. As wealthier households move rapidly to adopt low-carbon forms of transport and home energy, America's less privileged households may find themselves stuck paying more for continued use of carbon-intensive energy that is the only energy option available to them. Rebates from carbon taxes or fees would not entirely make up for that extra economic burden.

A Two-Pronged Approach

In our view, new revenues raised from reforms that hike carbon energy prices to spur America's transition to clean energy and account for carbon pollution must be deployed in ways that further two purposes at the same time.

First, any proposal for using carbon revenues must be politically savvy. It must be designed to improve public understanding and support for climate reforms, which are not worth much if they cannot be made politically viable. New taxes or fees must go hand in hand with a distribution of the revenues that reformers can use to counter predictable claims from opponents that climate policies will hurt low and middle-income Americans. In addition, carbon revenues should be allocated in ways that improve the quality of life for low and middle-income communities during a rapid U.S. transition to a low-carbon economy.

We believe that a carbon revenue rebate program can address the first of these goals – and should be included in any ambitious climate reform proposed to the American public. Rebates could be delivered either through tax breaks or dividend payments but, whichever policy instrument is selected must be highly visible and high profile. Citizens need to understand that their dividend payments or tax breaks are specifically linked to new climate change reforms.

But meeting the second goal we have outlined – ensuring equitable access to low-carbon technologies – requires more than rebates alone. Portions of the newly raised carbon revenues should be invested in to bring down costs of low-carbon technologies. This includes aggressive investment in energy storage, demand-side management, and techniques to balance intermittent energy resources through transmission. Revenues should also be invested in programs to deploy these technologies in vulnerable communities and expand technology access to lower-income households. Unless we take these further steps, new tax breaks or rebate payments alone could leave less privileged Americans still struggling with higher energy costs during a national transition to a clean-energy economy. Climate reforms that raise the price of dirty energy need to distribute new electricity and energy technologies to low and middle-income households. That is the only way to protect and enhance these households' standards of living during the energy transition.

How to Do It

The government will play a key role carrying through the second prong of our plan – equalizing access to low-carbon technologies. Public investment in research and development is necessary to

ensure that all Americans get quick access to the resulting breakthroughs. The federal government has taken on this role before. The New Deal's Rural Electrification Act brought electricity to parts of America that utilities had neglected, including poor rural areas with homes and farms. As a side benefit, the program also created a considerable number of jobs.

Today, the federal government should undertake a similar effort using revenues from a carbon tax to bring new energy technologies to low and middle-income households. These technologies include household solar panels, electric vehicles, and home energy storage systems. Widespread deployment of these technologies will be necessary to reduce low and middle-income families' dependence on fossil fuels without compromising their quality of life. Each of these technologies supports a reduction in household-level fossil fuel dependence. Each buffers individuals from the increased costs of energy and transport associated with pricing carbon pollution. Each comes with significant health benefits. Each supports improved household-level economic autonomy. And in the case of solar power, using this technology can directly provide new revenues for low-income households, because solar installations allow households to become electricity *producers* who can sell their power into the national electricity grid.

Government intervention has been necessary in every U.S. energy transition since the 19th century. This time, new energy policy must include at least two components. First, it must fund aggressive investments in clean energy research and development. Second, it must include significant government incentives to deploy low-carbon technologies, especially in disadvantaged communities.

For example, the current federal solar investment tax credit, which is slated to expire at the end of 2016, provides an opportunity for action. The law now provides for a 30 percent tax credit for solar systems on residential and commercial properties. A "Clean Electrification Act" would extend this tax credit with revenues from a carbon price. Rather than extending the policy in its existing form, the program should couple a basic credit, perhaps 20 percent, for most solar projects, with an additional tax credit of 10% for projects that benefit poor and low-income communities. Overall, this would deploy carbon tax revenues to leverage private sector investment within low-income communities. Further, this policy could be designed to ensure benefits reach both homeowners and renters. For example, if projects are built on low-income housing, the tax credit could require 50% of the benefits go to renters, with 50% to the project developer and building owner.

Here are several other examples of spending initiatives that would use carbon revenues to promote the emergence of sustainable low-income communities:

- When funding for low-carbon technology projects is limited, prioritize projects in disadvantaged communities.

- Electrify public transportation systems in urban areas, and support the development of affordable housing near clean transit.

- Build electric vehicle and energy storage infrastructure within low-income communities to ensure they can access new technologies as costs come down.

- Following the example of California's cap-and-trade program, allocate a portion of carbon price revenues to municipal or county-level governments to spend on local projects to reduce greenhouse gas emissions.

Additional spending initiatives should be designed that are tailored to the specific needs and investment communities of local communities.

The Political Benefits of Subsidizing New Technologies

Efforts to deploy revenues from carbon pricing to support an equitable transition to a clean energy future can be politically beneficial. In the first place, such efforts can strengthen the long-term political power of climate policy supporters. Consider the case of household solar energy, which is primarily facilitated by investment tax credits and net metering policies that compensate solar customers for the electricity they provide to the grid from their household panels. Relying on these programs, new businesses, called solar leasing companies, have grown quickly and installed significant solar projects over a very short period. When opponents try to reduce net metering programs, these new companies mobilize to protect and advance clean energy policies in the states, increasing the clout of the climate reform coalition over time.

Using carbon tax revenues to encourage technology deployment also spurs clean energy jobs. Some of the new jobs will expand the U.S. manufacturing sector. Others will be community-level jobs for workers, including low-skilled workers, who install clean-energy technologies. Like solar companies, workers in these newly expanding occupations may become active proponents for the continuation and expansion of the relevant government programs, further bolstering "green energy" coalitions.

Finally, delivering local benefits to disadvantaged communities can make it harder for opponents of climate reforms to get a hearing in those places. That could be vital for climate reformers, because low-income households are highly sensitive to changes in their cost of living. If energy costs for low-income households go up too much as the price of carbon energy rises, then those households could swing against climate reforms. These households will be more sensitive to opponents' arguments about the short-term costs of climate policy than proponents' arguments about the long-term catastrophic risks of climate policy inaction. Helping them take advantage of green technologies can guard against this possibility.

Of course, various federal and state programs have already been in place for the past two decades to subsidize renewable energy and alternative transportation technologies, and some programs already target low-income Americans. However, such efforts must be quickly and substantially expanded to support the broadest climate coalition.

In short, we should recognize that subsidies for low-carbon technologies can be a powerful social policy. Such subsidies are more than a way to reduce the risks of climate change. They also have the potential to equalize access to new technologies and reduce economic inequality. For that reason, part of the new revenues raised from a carbon price should be channeled into these valuable programs – to ensure that economically disadvantaged Americans gain the same access to new green technologies as all others, and are not left behind in the emerging low-carbon economy.

A Citizens' Approach to Carbon Equity: Voting on Rebates and Collective Investments

Peter Dorman, Evergreen State College

Climate policy activists are deeply divided about what to do with carbon revenues generated from either a carbon tax or the auction of carbon permits. One camp prefers to return the money to the public and the other side wants to dedicate it to green investments. Both claim that their approach is more equitable and likely to win wide acceptance, but disputes of this sort can undercut progress toward any limits on carbon emissions.

This dispute is currently playing out in the state of Washington. One alliance of green groups has placed an initiative on the ballot for the fall of 2016 that would impose taxes on certain carbon-intensive activities and devote the revenue primarily to tax offsets. That initiative is opposed by a second coalition, which is getting ready to submit its own next year. Theirs would also include a carbon tax, but would earmark the revenues raised by that tax for public investment and distributions to community organizations.

I have long been an advocate of the rebate approach, because carbon taxes or permit revenues are effectively sales taxes whose harmful effects on low and moderate-income people need to be counteracted. The macroeconomic drag of a massive fossil fuel tax is best offset by returning the revenues to consumers in ways that give those with more modest incomes a greater rebate. Moreover, I believe that core carbon pricing measures should be kept separate from controversial questions about the overall size and scope of public spending, and simply rebating the revenues helps to avoid such controversies. Nevertheless, I do recognize at least one argument that pulls in the opposite direction: Investments in public services like transportation and energy can help people sustain living standards even as energy prices rise, and public investments can often meet household needs more efficiently than fragmented private solutions. If it makes sense to expand mass transit, for example, many households would benefit if their rebates were reduced somewhat and the extra revenues used to improve such transportation.

Ideally, carbon revenues should just be rebated to citizens, and government would allocate public funds separately to pay for important transportation and energy projects. Households would receive their rebates and, at a different time and place, voters would express preferences for tax and spending policies that could finance green investments. In the real world, however, possibilities for good policy initiatives may be limited, so it might be far easier to combine a carbon tax or fee with commitments to fund environmentally friendly investments.

How, then, to design a package that combines wise collective investments with rebates that are economically fair and stimulate the economy to counteract any negative effects from taxing carbon? In this paper I propose a way for citizens to design the combination democratically, rather than just have policy specialists impose a design.

A Plan to Maximize Citizen Choice

The underlying principle remains "pay it back" – to mitigate climate change, citizens are asked to support a policy that requires them to pay much higher prices for fossil fuel energy to mitigate

climate change, but the price increases will generate revenues that go back to citizens rather than into the pockets of energy companies or the governments of countries that export oil. But the repayments to the public can take various forms: cash, subsidies for climate-friendly services, or investments to expand the range and quality of such services over time. For instance, the extra money collected from auto drivers at the gas pump could be returned to consumers as cash rebates or in the form of subsidies for existing transit services or to fund investments in more convenient mass transit opportunities. In short, people can be compensated for paying higher energy prices with money in their pockets or by giving them new individual consumption options or improved access to collective consumption goods like mass transit.

What is the "right" mix of individual and shared options? I propose that the mix be democratically chosen by the people themselves. At regular intervals, the public would vote on the mix they prefer and carbon revenues would be allocated according to the average of the percentages people assign to various options. If the average choice is for 90% of revenues to be rebated in cash, this will be allocation until the next scheduled vote. In this way, carbon revenues will be allocated – and perhaps reallocated over time – toward a mix of public projects and rebates to individuals. The public will retain maximal control over the size of these allocations.

For such a plan to work, a number of operational details have to be worked out:

- **The number and types of options:** At a minimum there could be only two, rebates and investments. This is procedurally straightforward, but might be perceived as giving the public too little control over the use of funds not directly rebated to individuals. In practice, non-rebated funds could be invested in various projects, ranging from transportation improvements to upgrades in the electric grid. Or people's use of already existing services could be subsidized. Offering two or three options in addition to cash rebates might convey a sense that there are alternative forms of useful collective consumption citizens could choose.

- **The frequency of voting:** Votes scheduled frequently, for instance annually, might reinforce the perception of democratic control, but could also prove unnecessarily expensive and likely to produce on and off funding for public projects. Greater intervals between votes could encourage more consistency and long-term planning.

- **Limits on immediate reallocations?** Voting could set allocation rules de novo in each cycle, but there could also be limits on reallocations. For instance, changes in allocations could be limited in any one cycle to no more than a certain percent (5% or 10%) of the previous share. The goal would be to prevent large swings in allocations due to temporary shifts in public opinion at the time of the election. Only if a shift in opinion persists over several election cycles would a radical alteration in allocations take place. A drawback of this approach is that the first election becomes especially important, because it sets a baseline, but that election would happen when people are least familiar with the choices to be made. If limits on sudden reallocations are not considered a good idea, then some of the same benefits can come from making elections less frequent.

- **Transparent audits:** If spending on energy, transportation or other such services is to be credible, the public needs independent, objective monitoring of the programs funded by carbon revenues. Auditors would need to assure citizens that all funds are fully accounted for and no private enrichment is occurring. In addition, auditors would need to determine that

> funds are being spent efficiently on effective programs – and consider whether new investments in services are achieving an equitable outcome, actually offsetting the higher energy prices people have to pay.

Once again, since carbon pricing functions in practice as the equivalent of a sales tax, the immediate hit is hardest on people with low or modest incomes. Rebates to everyone correct for that unfair impact, and any allocations away from rebates to fund public provision of services should also produce results that helps low and moderate-income people the most. Or perhaps, extra help should go to people who are hardest hit by higher energy prices, such as those whose livelihoods or residential locations require them to drive more.

The only way that audits can consider all of the dimensions that go into equitable use of carbon revenues is if those revenues are kept apart from general government budgets. That way, auditors would be able to produce regular reports on carbon-funded projects, to be made available prior to scheduled votes on possible reallocations.

The plan I have just described is meant to apply at the federal level, for the entire United States. But a workable citizen choice plan could allow people in each state to hold their own votes on how to allocate and periodically reallocate carbon revenues returned to each state according to its population size. In this variant, projects would be administered at the state level, so that, say, Kentucky's voters would vote on how to allocate revenues for rebates and/or public projects in their own state. There would have to be some nationwide rules because the carbon revenues would be collected nationwide, but auditing could be conducted at either the state or federal level. Giving each state some independent say in this fashion could lead to greater public acceptance. However, the state by state approach would also make it more difficult to fund projects like improvements in the electrical grid that necessarily cross state borders.

Why Not Just Earmark Carbon Revenues for Green Investments?

An obvious alternative to a plan such as the one I've described is to simply devote some fixed proportion of carbon revenues to an investment program, but I see two problems with this approach. Proponents presume that carbon revenues slated for green investments would be added on to other government investments in good projects. But of course it is difficult to ensure that this would happen, because various pots of revenue are fungible. In practice, public officials would almost certainly shift at least some of the new carbon funding away from its earmarked uses to cover regular government expenses. Officials have strong incentives to do this, because they would gain new general budget funds to allocate as they choose.

There is no foolproof mechanism to ensure that budget-shifting does not occur. The only recourse is to put a system in place that can respond to shifting by altering the amount of earmarking. In a way, regular votes to possibly reallocate the uses of carbon revenues can serve this purpose – because if audits show that budget-shifting is happening, citizens might well conclude that it would be better to allocate a higher share of revenues to individual cash rebates rather than try to earmark them for public investments.

Why Citizen Choice is Worth Considering

My proposal is a concept that, if adopted, would need many specifics to make it fully workable. Some may ask: why go to all this trouble? Why not just rebate all the carbon revenues to each person

equally – an approach which will tend to deliver the most money to lower-income people who would be hardest hit by higher energy prices?

My response starts by pointing out that simply asserting the superiority of revenue rebates is not likely to neutralize opposition from important environmentalists who insist that revenues should go, at least in part, to important public green investments. Endless arguments among supporters of policies to mitigate climate change undercut momentum to act, so finding ways to forge compromises among supporters of carbon pricing is important.

In addition, although the case for rebates is compelling, particularly in a time of rising income inequalities, I recognize that devoting some share of carbon revenues to fund public needs can also help people sustain their standards of living during the transition to decarbonized economy. Crucially, however, programs touted as such public investments must produce truly equality enhancing results – both actually and in public perception. Otherwise, citizens will be disillusioned about how funds are spent, even as they must pay higher prices for energy.

If supporters of rebates can accept some of the logic behind allocating funds to public investments, then the proponents of investments should also recognize that even the best-designed and best-intentioned public programs can never address all of the varied needs individuals and families experience – and never correct for all effects of higher energy prices that people in different circumstances will face. Rebates allow individuals to adjust in their own ways, to sustain their standards of living by making climate-friendly choices that fit their own circumstances and preferences.

My plan to let citizens make choices about allocations between rebates and public projects rests on a philosophy of climate policy that activists will have to embrace if they want to build broad public understanding and support for measures to curtail carbon emissions. Idealistic or scientific appeals will not alone suffice, because the economic fortunes of working and middle-class Americans have been steadily eroded in recent decades. People need to be protected from further blows to their income and living standards. That cannot be an afterthought.

Of course, climate change, if unchecked, will devastate the most vulnerable communities here and around the world, and this is an important reason for taking mitigating steps. But it is politically and morally unacceptable for climate reformers to downplay the reality that most households would be vulnerable to rapidly rising energy prices propelled by any new carbon pricing scheme. Carbon pricing policies must include, from the start, plans for the equitable distribution of revenues. To that end, good intentions from experts are not likely to be enough to build public faith. A better way to proceed is to let all citizens know that revenue uses will include rebates as well as public investments – and that the public will have regular opportunities to audit investment programs and to vote periodically to shift carbon revenue allocations in ways acceptable to the majority. This approach could spread benefits and build public faith for the long haul.

The Challenge of Putting a Price on Carbon Emissions in the United States

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Carbon pricing policies face many obstacles in the United States. Inaccurate information about emissions trading systems leads many to believe that policies like cap and trade would reward businesses for polluting. That is not true, but straightforward carbon taxes may not be politically viable either. Strong political forces in the United States reject climate science. And a successful carbon pricing policy would need support from big business to survive the legislative process. In addition to these obstacles, history has shown that environmental problems are difficult to address through legislation. New laws tended to be over-negotiated as they are passed, but suffer from lack of funding and follow-through once it comes time to implement the new legislation.

The challenge of limiting global warming is nevertheless inescapable. To address the challenge, the United States – as the second largest generator of carbon emissions worldwide – must devise an economy-wide strategy for raising the price of carbon emissions that is both effective and equitable.

The Question of Pricing Carbon

Putting a price on carbon pollution is important because this would lower overall greenhouse gas emissions and help to mitigate climate change. Instead of using regulation to say who should reduce emissions, raising carbon prices gives an economic signal and prompts businesses and others to decide for themselves whether to reduce emissions or pay to continue polluting. Setting a price on carbon dioxide and other greenhouse gases helps stabilize the energy and fuel sectors. This approach encourages clean technology development and market innovation, stimulating non-polluting forms of economic growth.

How can we price carbon? The process involves creating a market for greenhouse gases and the formalizing standards for their removal and costs. There are two alternative approaches: emissions trading systems and carbon taxes or fees.

- "Cap and trade" is the most commonly discussed **emissions trading system,** but there are many variations. To ensure that reductions will take place, all policies of this sort place a "cap" on the amount of greenhouse gas emissions allowed in the market. Companies that produce less than their allowance can sell their remaining emissions allowance to other companies that are willing to pay to emit more. Despite the trading, overall pollution is reduced because both sellers and buyers of allowances operate under a steadily lowered emissions cap. The key advantage is that, if this kind of policy is well designed, it ensures that specific reduction goals will be met.

- A **carbon tax or fee** directly sets a price on emissions – theoretically, a carbon tax is the most efficient way to send a price signal to the market and encourage emissions reducing investment. The carbon tax or fee is placed on fossil fuels as they enter the supply chain, for example at extractions sites such as mines or wells, and the added costs are then passed through market interactions down the supply chain to consumers. The advantage of a tax is

that the price of carbon can be determined in advance. Some experts laud this approach as simple and therefore less conducive to cheating. On the other hand, the outcomes are less predictable – both in terms of revenues produced and actual reductions in emissions – because it is hard to know how businesses and people will respond to the carbon tax or fee.

Since the 1990s, efforts have been made to better understand these policy approaches – emissions trading and carbon fees or taxes – but serious efforts to test and model them are still required. The realities of the political process also influence what seems feasible, as we can see by looking at experiences with each approach in turn.

Emissions Trading Systems

Many critics of emissions trading systems worry about using market mechanisms to address shared problems. However, there is reason to be optimistic. Emissions trading systems like the ones the United States instituted in the 1990s to limit sulfur dioxide and nitrous oxide emissions have shown that they can achieve positive outcomes. The goal back then was to reduce acid rain related emissions to 50 percent below 1980 levels. According to the Environmental Protection Agency, the policy far exceeded these expectations, allowing the United States to reduce the targeted emissions by 65 percent in just twelve years and at lower than expected cost. Markets were regulated to limit emissions by internalizing the cost of pollution. In other words, polluting companies had to make decisions about how to incorporate the societal costs of acid rain that they had previously ignored. As the acid rain case illustrates, emissions markets have the potential to achieve large-scale results quickly and at a reasonable (although not inconsequential) cost.

But since the 1990s, difficulties have emerged in ambitious emissions trading systems, such as the European Emissions Trading System covering 11,000 emissions producers in 31 countries. Complexity led to problems with monitoring and large-scale cheating, and the European system also suffered from market instabilities and weaknesses in implementation. Abrupt, mid-course changes in policy created unnecessary risks and losses for those who invested in emissions reductions. A global crash in the price of carbon further disrupted carbon trading and incentives.

Recent struggles have led to improved designs for emissions trading systems and provided valuable experience in managing such policies. In 2013, California implemented a state cap and trade system that aimed to correct and overcome the design failures found in past policies. Notably, the California system focuses on a small number of large emitters that account for a majority of emissions. Many experts believe that the California program meets the highest standard of success, efficiency, and equity.

Critics of cap and trade systems say they reward businesses for not polluting, something they should already be doing. In effect, critics argue that the benefits of emissions reductions should not be returned to the firms that generate the reductions. But this approach is central to any incentive-based policy. Reducing emissions is costly and requires that companies make large capital investments well before they receive any benefits. Cap and trade systems can help bridge this gap. They also make it possible for smaller firms to compete with larger ones that are better able to absorb the cost of emissions reductions.

Despite its many advantages, the emissions trading approach has many opponents. Environmentalists continue to oppose it as an approach that rewards businesses for reducing pollution. At the same

time, conservative groups reject emissions trading on the grounds that it involves excessive government intervention in the market.

Taxing Carbon Fuels

Carbon taxes raise the price of fossil fuels, such as coal, oil, natural gas, and biofuels, by amounts that can be determined by policymakers. Carbon taxes discourage cheating and are often touted as a simple approach to reducing emissions dangerous to the environment. In practice, however, carbon taxes are politically controversial and unpredictable in their economic impact.

Even if taxes are relabeled as "fees," they are obviously politically controversial. This is especially true in a country like the United States where many people argue that climate change is not real or not amenable to government response. Without widespread citizen understanding and support, a large new tax on consumers and businesses is not likely to be enacted, even if it makes it onto the agenda of public discussion.

Australia shows the political difficulties a carbon tax can run into. In Australia, leaders with strong public support imposed a carbon tax and used the new revenues to fund dividends to compensate citizens. Following the best practice approach, the Australian program also targeted only the top polluters in certain industries and exempted agriculture and transportation, industries where a new tax and higher prices would have had the most disruptive impact. Australia's tax program was very well designed from a theoretical standpoint and heralded as cutting edge because it even provided assistance to businesses that might be unfairly impacted. Slated tax increases were also very gradual, to allow people and businesses to adjust each step of the way. Nonetheless, despite the many ideal features, Australia's carbon tax remained politically vulnerable. When a new, conservative government took office, it repealed the tax just two years after it was instituted.

A carbon tax will be difficult to enact without the support of corporations, whose lobbying associations invariably exercise huge clout. In general, businesses like the predictability of taxes. But when it comes to carbon pricing, most of them prefer policies like cap and trade. Business groups, consequently, may fight to block carbon tax legislation. Or if a tax somehow passes, business opposition may prevent proper implementation.

Any U.S. carbon tax will face another challenge: international trade. Imported goods from nations with a lower carbon tax, or no carbon tax, would have an advantage over domestic goods, undermining the effectiveness of the carbon tax. To prevent this, a carbon tax policy might include border adjustments, which are taxes on imports used to ensure that all goods in the United States, whether made at home or abroad, are taxed in a similar way. Without these adjustments, domestic producers would be unable to compete with foreign, non-taxed goods. Under current international law, however, border adjustments are illegal.

A nationwide carbon tax that included border adjustments on foreign imports would raise several issues. The World Trade Organization would likely consider the tax to be a direct violation of international trade agreements. International bodies might force the United States to roll back the carbon tax on all imported goods. And other nations would likely take actions of their own, levying retaliatory fees on American exports. The impact on U.S. competitiveness could be dramatic. A trade

war could ensue and gravely damage the global economy, like the trade war a century ago that contributed to the Great Depression.

Political challenges aside, carbon taxes do not assure the attainment of climate-related goals. Carbon taxes can be calibrated to affect the price of dirty fuels in predictable ways, but they cannot assure specific levels of emissions reductions. That is because taxes influence choices in the marketplace in unpredictable ways. Policymakers cannot know in advance how consumers and businesses will react to any price increase caused by imposing carbon taxes.

What is more, carbon taxes do only part of the job. Carbon taxes target fossil fuels according to how much carbon dioxide is emitted when the fuel is burned. But emissions dangerous to the environment do not come from carbon alone. Other gases such as methane, nitrous oxide, and hydrofluorocarbons can be exponentially more harmful than fossil fuels. Carbon dioxide accounted for 82 percent of U.S. emissions in 2013, but according to the Environmental Protection Agency, the other harmful gases are 25 to 14,800 times more powerful drivers of global warming than carbon dioxide. Clearly those gases will also need to be managed if climate change policy is to be successful.

Finally, carbon taxes can make economic inequality worse. That can happen because any carbon tax impacts the poorest parts of society most. Consumers and households with lower incomes spend a higher proportion of their incomes on transportation, heating and cooling, and so forth, so as prices rise, these consumers and households will feel the effect much more than high-income consumers and households.

The negative impact of taxes on lower-income people is greatest when consumers cannot easily turn to alternatives. The impact of sugar taxes on the price of soda, for example, could be avoided by consumers who buy other, less sugary drinks. However, unlike sugar, which has many substitutes, gas is considered “inelastic” in the sense that people cannot quickly turn to other fuels for their cars or other forms of transportation they need to get to work and manage daily life. Poorer people, especially, can be trapped because they cannot afford large investments upfront such as fuel-efficient cars or new insulation or solar panels for their homes. Fossil fuel producers know that many of their consumers are trapped, and so they often simply pass along new costs in the form of higher prices charged to consumers.

Proponents of carbon taxes have pushed back, arguing that the poorest people do not have cars and thus would be less affected by the tax. Although public transport may be available in many cities, people who live in spread-out, less urban areas often must drive long distances to get to work. Furthermore, rural people in many areas, like the Midwest, will already face higher energy prices because industries and utilities in those areas are more carbon-intensive and, therefore, will be disproportionately burdened by a carbon tax. The higher costs imposed on many middle-class people who cannot stop filling their tanks or heating their homes with fossil fuels would exacerbate growing income inequality in the United States. In addition, since most food is transported by trucks, higher transportation costs could increase food prices everywhere, impacting low-income families the most. Dividend payments from a carbon tax would only mitigate, not erase, such inequities.

Rebates or Dividends to Accompany Caps or Taxes

Reformers who worry about equity often promote the idea of returning revenues from caps or taxes to all citizens in the form of rebates or dividends. The most straightforward versions of this approach

call for revenues from carbon pricing to be recycled back to the public on an equal per person basis. Attractive as this may seem in the abstract, some concerns are worth exploring.

First and foremost, such proposals can be overly reliant on the assumption of rational behavior. Dividend proponents often point to the popularity of Social Security, as a relatively universal social program where everyone benefits and most Americans strongly support the program as a result. But there are countervailing considerations. Putting more money in consumers' pockets may lead to greater spending that undercuts important public policy goals. For example, some environmentalists have expressed the worry that Americans would spend dividend checks on consumer goods that would waste carbon-intensive energy.

Another issue in rebate systems is the cost of administering them. Should program costs be funded by the carbon pricing revenues, or should 100 percent of collected fees be returned to Americans? Even if existing government offices are used to manage such refunds, administrative costs would not be inconsequential and would need to be covered in some way.

A potentially large expense for the cap and rebate system is the cost of the price floor. A price floor, that is, a minimum price guaranteed through government subsidies, is necessary to ensure that businesses will have a consistent market incentive to invest in projects that will reduce carbon pollution enough that the nation can meet it emissions reduction goals. Normally, the price of a good is based on supply and demand in the market. However when an artificial price floor is introduced to assure a certain price, as would be required under this policy, then the government must subsidize the difference in price.

For example, if a cap and rebate policy promises a price floor of $25, but the world market price is $10, then the U.S. government would need to subsidize the difference. And costs could rise over time. Indeed, to the extent a U.S. price floor reduces demand, the amount of excess supply in the world market will increase, and, as a result, the world price could continue to decline, pushing the cost of maintaining the price floor higher. Due to these unknown costs, all types of dividend systems should be implemented on smaller scales in advance of a national roll out and then scaled slowly over time.

An Equitable and Feasible Plan – in Three Phases

In light of the challenges and obstacles just explored, the best strategy for pricing fossil fuels in the U.S. economy will have two parts. Support must be mustered to get a new program through Congress. And at the same time, proponents must pay careful attention to issues of policy design and implementation, because environmental policies always face the threat of roll back. Any well-designed carbon pricing policy must be equitable, feasible, and phased in gradually to give all actors time to adapt. This brief recommends a multipronged approach that rolls out in three main stages.

The first, preparatory stage must lay the groundwork for carbon pricing in a series of ways:

- Public understanding must be enhanced and supportive coalitions put into place. To begin, public service messages about climate science and policy must raise awareness about the impacts of climate change here in the United States, not some far off place. And efforts must be made to encourage a grassroots movement that will empower individuals and counter well-organized opposition forces. An organized climate reform coalition must be built,

initially by inspiring and training local activists at the grassroots level. Activists would build citizen support across partisan lines using many messages and appeals so that, ultimately, coalition leaders would be able to orchestrate citizen lobbying at critical junctures in the legislative process.

- Preparation must also include government encouragement for technological progress to reduce dependence on fossil fuels, provide healthy competition, and reduce the overall costs of adaption for all Americans. One option would be to establish an agency on Advanced Energy and Environmental Research Projects, similar to the Defense Advanced Research Projects Agency used by the Department of Defense to encourage new technologies useful to the military. Focused U.S. research and development efforts put a man on the moon and, in a similar way, could be used to create new climate friendly energy technologies.

- States and companies must develop new capacities to track, audit and monitor greenhouse gases. Such capacities will be vital for any pricing system to be successfully implemented. Capacity building will require short-term federal funding and standardized training, with the expectation that all states will be in compliance and able to fund their own further efforts within five years.

- To address the issue of international trade, efforts must be made to incorporate fair and open pricing on carbon intensive goods through the North American Free Trade Agreement and later the World Trade Organization. This would benefit all states in the Western Hemisphere and make way for fair and reasonable border adjustments. In the short term, however, some exemptions must be considered for trade-intensive industries to protect U.S. competitiveness.

- As groundwork is laid, carbon pricing policies must be carefully designed to get businesses on board by giving them ways to finance the initial costs of mitigation and build capacities. Before slated taxes go into full effect, businesses could be rewarded for establishing a voluntary nationwide emissions trading system. This will be especially helpful for small and medium sized enterprises that could be unfairly hurt by an immediate, across-the-board fossil fuel tax. Taxes and direct controls could be placed first on the coal industry – accompanied by provisions to help displaced workers and strongly impacted communities. As the taxing and direct controls for coal are put into place, other companies will get the message and become more willing to participate in emissions trading systems in anticipation that taxes or other targets are coming down the line.

Why start by regulating coal? According to the U.S. Energy Information Administration, coal produces 50 percent more carbon emissions than gasoline or diesel. Considering the importance of this single source, a market-based disincentive on coal should be reinforced with direct controls to assure change across the board. Revenue from this tax should go directly into retraining the coal related work force and supporting new enterprises in coal-producing communities. In addition, a tax on coal could serve as a pilot program or prototype for an economy-wide carbon tax system.

The second stage would involve further capacity building and policy ramp-ups. Each area of activity outlined for phase one should be expanded in this intermediate phase, prior to enacting and implementing economy-wide carbon pricing.

- As grassroots organizations educate the public about specific policy proposals, a large public relations campaign should be launched with fresh appeals to a variety of stakeholders. Patriotic messages can inform Americans that carbon pricing and a transition to a new energy economy will further national security and enhance America's economy and international status.

- Also at this stage, research and development should be refocused to spur technological advances in national transportation infrastructure. Solar electrification would help to create a transportation system not dependent on oil. This development would matter most in rural America, helping residents to avoid rising costs for energy, food and transportation. Workers displaced from carbon-intensive industries could be trained and deployed to upgrade the national transportation infrastructure with sustainability in mind – examples might include: improved mass transit, long distance bike lanes, highways that include lanes to recharge cars as they travel, and rest stops with stations for quick charging or battery exchanges.

- Clean energy and adaptive technologies can be encouraged by removing fossil fuel subsidies and simultaneously encouraging green alternatives. This is already happening in California, where all large emitters are required to produce one-half of electricity generation from renewable sources by 2030. This has sparked great interest in renewable energy, not just in California but also in surrounding states that sell electricity to the Golden State.

- On the business side, companies can be mandated in phase two to begin reporting of emissions inventories, and all states could be required to begin corporate audits of emissions inventories.

- Tax revenues from expansion of the coal tax to other dangerous emissions could be used to reduce taxes on displaced workers, fund adaptation projects, or provide insurance against climate-related damage for poor communities.

Large-scale implementation would happen in phase three, again with further steps building on each earlier-outlined area of endeavor.

- Americans must shift expectations and behaviors for the long haul, so schools should be encouraged to introduce new lessons that support changing norms about energy production and use. Educating future generations about sustainability and the environment is essential to assure the longevity of any carbon pricing system designed to promote the transition to a green economy.

- In this final stage of implementation, technological advances in research and development would expand under government leadership – to areas such as the transformation of city planning and upgrades in government office buildings, fleet vehicles, and other public works. The federal government would continue to support retraining and reassignment of displaced workers, but by this phase, the states should be able to handle emissions reporting and monitoring on their own.

- Also at this stage, incentives would begin to focus on scaling up the carbon mitigation system. For flexibility, each state would be allowed to choose a final plan – with options to include joining a regional emissions trading system or participating in the federal carbon tax.

States choosing the carbon tax would begin a phased-in federal carbon tax program. The remaining greenhouse gases would be taxed at a rate of $5-10 per ton of carbon dioxide equivalents, with the tax rates slowly and predictably increasing over a ten year period to allow for economic adjustments. Specific goals for reduced emissions would be set (such as a ten percent greenhouse gas reduction by 2020). Each year, the tax rate would increase based on the lagged trajectory of past years to avoid harsh impacts on the economy. If emissions decline rapidly, smaller tax increases would occur. If other factors impact the efforts to reduce emissions, then the policy is still flexible enough to compensate, thus ensuring the end goal is reached.

Innovations and learning may drive American leaders to prefer one or another approach to carbon pricing in the future, but as I have tried to explain in this memo, preparing for both emissions trading and tax approaches, with various uses for any revenues collected, will put us in the best position to make feasible and equitable choices and adjust as we go along. Furthermore, a phased in, multipronged approach to carbon pricing would be the most likely to prove fair and practical, yet flexible and increasingly potent.

Moving the United States toward joining and even leading the world towards a clean energy future is not impossible. Policies must be comprehensive, however, and cannot address just the supply or the demand side alone. Furthermore, ultimate success depends not only on passing bills, but on designing policies that can be effectively implemented over the long haul. A multipronged policy that incorporates long-term strategies focused on public behavior, technological advances, and business incentives has the best chance to prove successful in the years to come.