



## 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 its 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 adaptation 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.