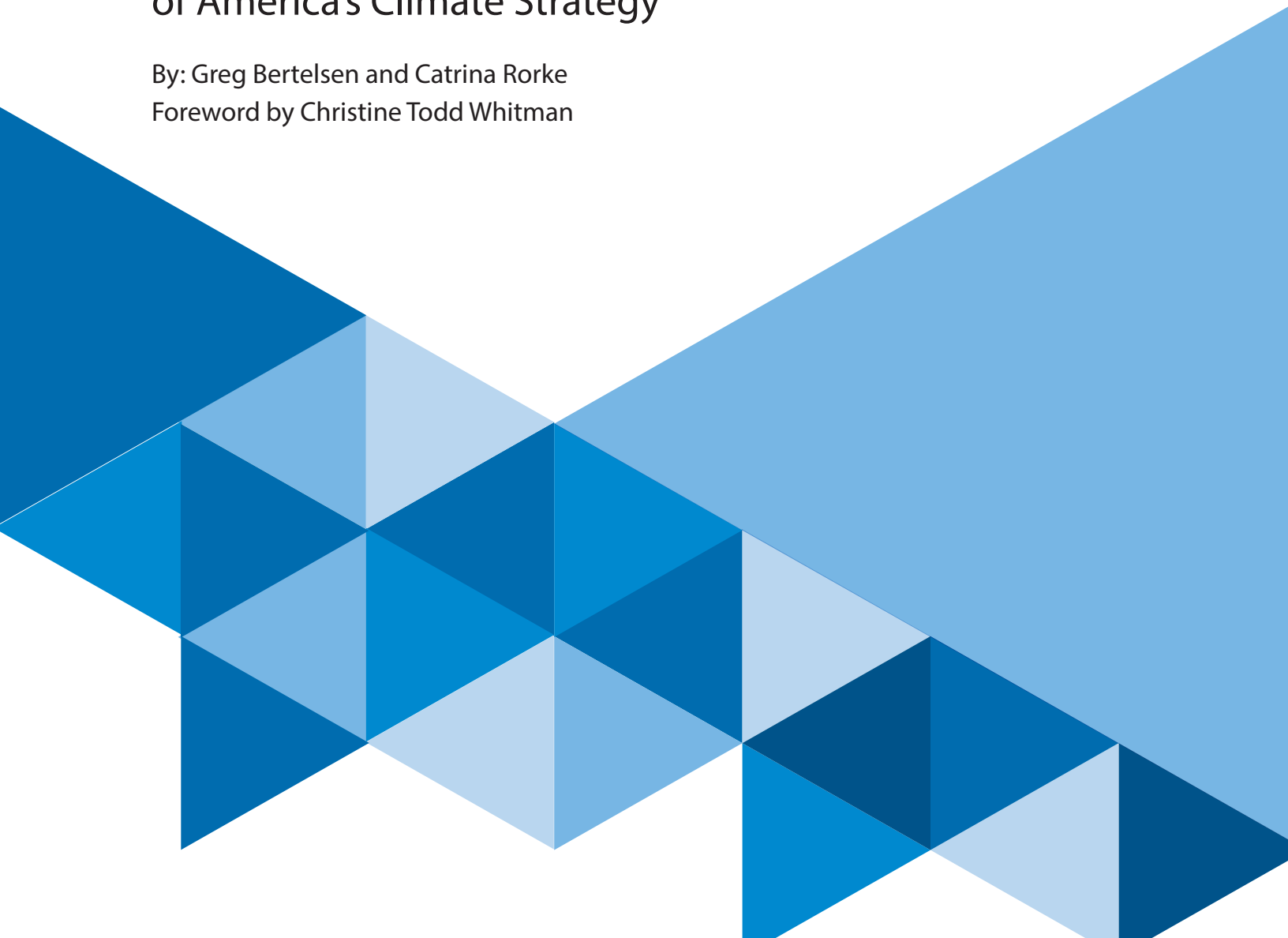


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# Meeting the Climate Challenge

A Carbon Fee Should Be the Centerpiece  
of America's Climate Strategy

By: Greg Bertelsen and Catrina Rorke  
Foreword by Christine Todd Whitman





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## Foreword

by Christine Todd Whitman

The United States has a window of opportunity to act decisively on climate and ensure a livable planet for future generations. The international community has set a goal of achieving net-zero emissions by midcentury. For the U.S. to meet this enormously challenging target, we must embrace a strategy that can achieve fast and measurable progress.

*A carbon fee at the heart of a U.S. climate strategy will go further, faster than any other single policy intervention.*

There is no better tool available for rapidly decarbonizing than an economy-wide fee on carbon. A carbon fee at the heart of a U.S. climate strategy will go further, faster than any other single policy intervention. It can be designed to guarantee emissions reductions. It clears the path for innovators. It can reach beyond American shores to encourage greater climate ambition globally. And it acts as a multiplier for climate progress when paired with everything else we're doing to lower emissions.

If you want to stimulate clean-tech innovation, a carbon price provides a powerful incentive

coupled with market certainty to entrepreneurs. If you want to promote electric vehicles, a carbon price stokes consumer demand. If you want to expand direct air capture, you can entice market entrants with a carbon price. And if you want to accelerate a fast transition to clean power, put a price on carbon. No matter what the specific policy goal, a carbon price amplifies its impact.

A carbon fee harnesses market forces and the full innovative power of the private sector toward a clean energy future. It touches virtually every decision in the economy, steering all businesses and consumers toward low-carbon solutions. Where no solutions exist, it offers the market certainty and economic incentives for innovators to develop and deploy them. As this study describes, a carbon fee of \$40 per ton (2017\$), if implemented in 2023, can cut U.S. emissions in half by 2035. Paired with other commonly discussed policies and investments, this carbon price would be consistent with an emissions reduction target of 50% or more below 2005 levels by the year 2030.

A carbon fee also works remarkably fast. Even before it is implemented, consumers and businesses will anticipate energy price changes and begin shifting their behavior. Once the fee goes into effect, low-carbon solutions will quickly

find their place in the market in every corner of the economy.

Speed is of the essence for climate policy: the faster we cut emissions, the more we slow climate change and prevent damage to natural ecosystems and human health. At the same time, a policy that works quickly will strengthen America's hand in global negotiations: soon after announcing climate commitments, the U.S. will have the emissions reductions to back them up.

As good as it is at cutting domestic emissions, a carbon fee doesn't just work at home. Coupled with a system of border carbon adjustments, it is the only climate tool that increases U.S. ambition while reaching beyond our borders to price the emissions of imported goods. Overseas manufacturers will face a choice: lower their emissions or lose a piece of the world's largest market. By leveraging the power of the U.S. consumer, America can give a much-needed jolt to global climate efforts, encouraging other countries to switch to clean energy.

While its primary purpose is to combat climate change, a carbon fee can also speed progress

on other major environmental problems, like improving the air quality in our communities. As carbon emissions plummet, so will air pollutants that are associated with burning fossil fuels. A carbon fee can cut other pollutants by as much as half across the economy, cleaning up communities as we protect the climate. In this way, a carbon fee can act as a complement to other necessary policies and regulations to ensure the health and safety of all communities.

*By leveraging the power of the U.S. consumer, America can give a much-needed jolt to global climate efforts, encouraging other countries to switch to clean energy.*

For all these reasons, a carbon fee should serve as the centerpiece of a U.S. strategy to achieve net zero emissions. While it won't get us all the way there, it will go further than any other single policy toward that goal.

*Christine Todd Whitman served as Administrator of the Environmental Protection Agency from 2001 to 2003 under President George W. Bush. From 1994 to 2001, she was the 50th governor of New Jersey.*

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**About the Authors**



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**About the Climate Leadership Council**

The Climate Leadership Council is an international research and advocacy organization founded in collaboration with a who's who of business, opinion and environmental leaders to promote a carbon dividends framework as the most cost-effective, equitable and politically-viable climate solution. Find out more at [www.clcouncil.org](http://www.clcouncil.org).

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## Executive Summary

The risks to human and economic health continue to mount as we further delay taking comprehensive actions to address climate change. The U.S. must reassert its role as a climate leader with an ambitious domestic policy to support rapid, economy-wide decarbonization. This is essential for jumpstarting international cooperation toward meaningful global emissions reductions. A rising carbon fee and border carbon adjustment as a central piece of U.S. climate policy will:

- cut carbon emissions reductions further and faster than other measures;
- reduce emissions of other air pollutants that are impacting local communities;
- introduce powerful global incentives for other countries to rapidly reduce their emissions;
- and create a force multiplier that makes every policy intervention and private investment toward decarbonization more effective and easier to implement.

The Climate Leadership Council has worked with four dozen Founding Member companies, environmental nonprofits and individuals to develop the carbon dividends solution. This plan proposes a carbon fee starting at \$40 per

ton (2017\$) and increasing annually at 5 percent above inflation. The fee will be paid by large companies and emitters and paired with border carbon adjustments to ensure that international partners pay their fair share.

This report explores the environmental, health and diplomatic benefits of implementing a federal carbon fee and border adjustments as the core of an ambitious U.S. climate strategy. It complements the deep body of research, studies and recommendations on the significant economic benefits of pursuing a properly structured carbon fee.<sup>1</sup> Emissions reductions benefits arising from the Council's proposed carbon fee were analyzed by teams from Resources for the Future (RFF) and Yale University. The domestic carbon price would:

- cut domestic CO<sub>2</sub> emissions in half by 2035 on its own;
- measured with other commonly discussed instruments like efficiency standards and nature-based investments, cut CO<sub>2</sub> emissions 50% or more by 2030, and;
- reduce criteria pollutant emissions from covered sources by 20% or more by 2035.

This price trajectory is consistent with several proposals from the National Academy of Science, policy institutes, academic institutions and

congressional legislation and would position the U.S. to deliver upon its deep decarbonization goals.<sup>2</sup>

Coupled with a border carbon adjustment, a carbon fee has the unique capacity to extend the reach of a domestic climate policy beyond American shores. With a single domestic policy, we can leverage the power of the U.S. economy to compel reductions abroad. Exporters to the U.S. will have to choose between reducing emissions or losing market share in the world’s largest economy.

*A carbon fee as the centerpiece of a U.S. climate strategy powerfully complements other necessary policies and regulations to ensure the health and safety of all communities.*

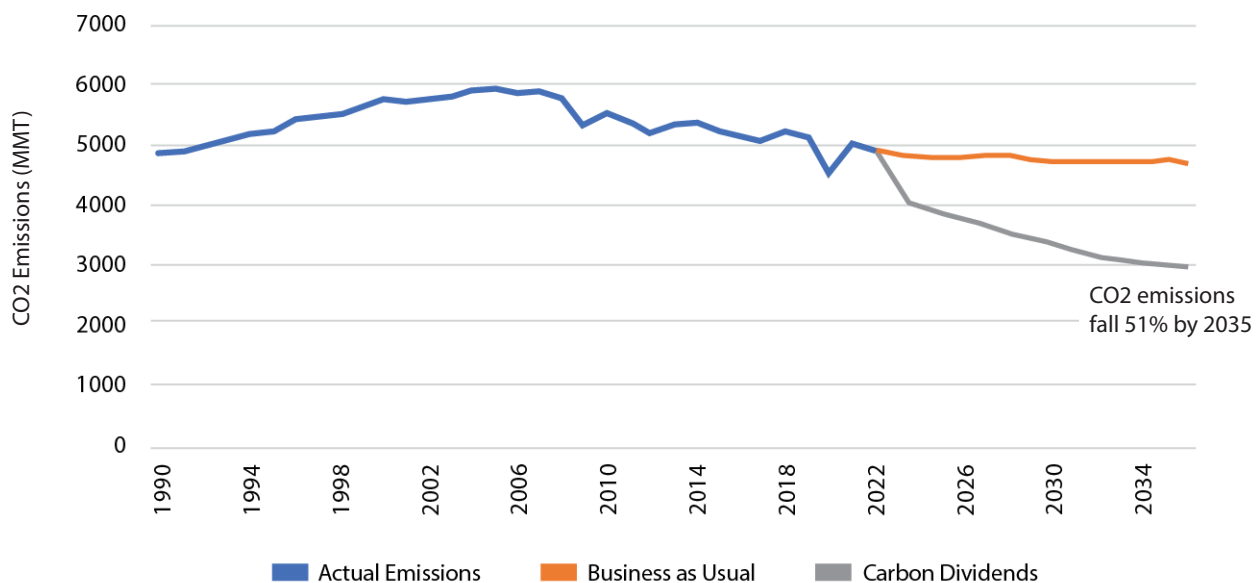
Importantly, while a carbon fee works powerfully to reduce CO2 and other emissions, it alone will not solve the global climate challenge nor correct

other important environmental challenges – globally and within our local communities. It does, however, ensure that every other climate policy, and many other policies addressing localized air pollutants, will be more effective. In this way, a carbon fee as the centerpiece of a U.S. climate strategy powerfully complements other necessary policies and regulations to ensure the health and safety of all communities.

## I. Ambitious Domestic Emissions Reductions

An economy-wide carbon fee is the most cost-effective instrument to reduce carbon emissions at the scale and speed demanded by climate change. It shifts incentives for every economic actor, from large industry to individual households. The price works in several ways simultaneously: by rewarding conservation and energy efficiency, by driving energy substitution and by spurring

**FIGURE 1: Projected CO2 Emissions Reductions from Carbon Fee**



Source: Estimates based on modeling using the Goulder-Hafstead E3 Model by Resources for the Future

investment in the deployment of available alternatives and the innovation of new fuels, technologies and methods.

Emissions reduction opportunities that are already available and affordable can be realized immediately, allowing some economic sectors, like electric power, to move faster than others. Sectors in which emissions reductions are more difficult, and available alternatives are scarcer, will have the long-term policy certainty and economic incentives to drive investment towards innovative new solutions. All sectors will work in tandem to decarbonize.

In fact, the carbon fee will spur investment in technology development and business practices that cut emissions--then ensure the rapid uptake of those solutions as they emerge. Economic analysis suggests that the Council's carbon dividends plan can unlock \$1.4 trillion in capital investment for innovation and create 1.6 million jobs by 2035.<sup>3</sup>

Using the Hafstead-Goulder E3 model, RFF modeled the CO2 emissions reductions anticipated from the carbon dividends plan through 2035. Those results are captured in Figure 1; carbon dividends will cut covered emissions 46 percent by 2030 and 51 percent by 2035, relative to 2005 levels.<sup>4</sup>

Several other climate policies are commonly included in discussions about a comprehensive U.S. climate strategy. These often include efficiency standards, investments in infrastructure, and support for forestry and land use changes. While these policies are beyond the scope of the Council's carbon dividends plan, if taken together with a carbon fee, the expected emissions cuts would be 50% or more by 2030.<sup>5</sup>

## II. Emissions Drop Quickly

Not only does an economy-wide carbon fee cut CO2 emissions dramatically, it cuts them quickly. As soon as a carbon fee is implemented, virtually

every business and consumer across the economy will begin to activate available low-carbon alternatives all at once. The steep drop in emissions in the first year of the model results reflects the abundance of cost-effective ways to lower emissions that are available today.

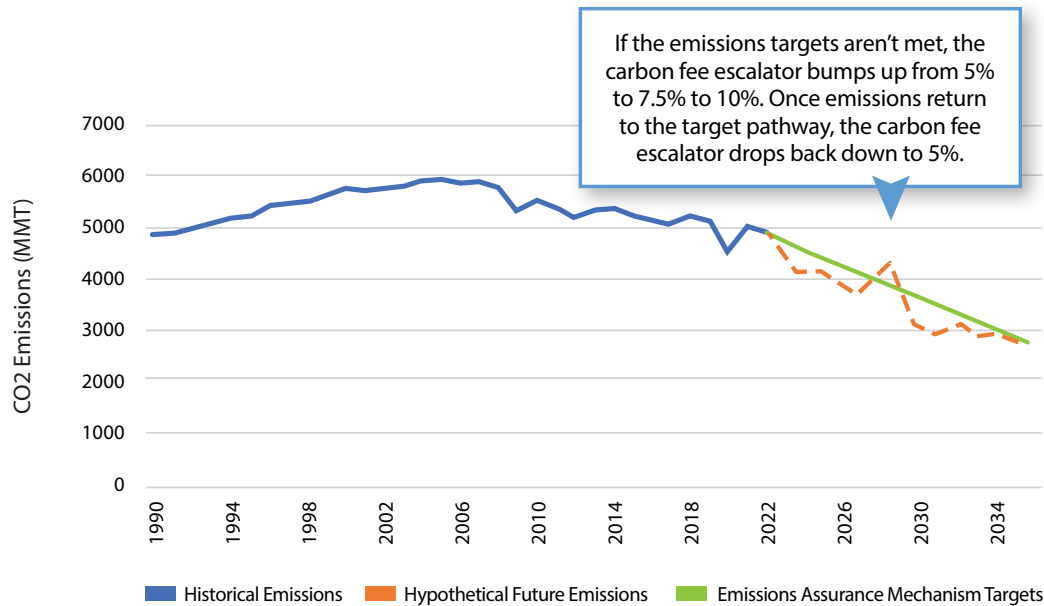
This fast response is largely a result of a rapid shift away from the most carbon-intensive forms of electric power. Lower-carbon alternatives in the form of natural gas, nuclear and renewables are already available and can be dispatched quickly in the presence of a carbon fee. Other emissions reductions will follow as investment dollars gravitate toward decarbonization.

*Big reductions in early years buy the U.S. and our global partners more time and flexibility to hit that target.*

The carbon fee also starts driving emissions reductions even before it goes into effect.<sup>6</sup> Since there is perfect certainty as to the level of the carbon fee and how it will grow over time, households, businesses and investors can easily anticipate how the carbon fee will change their bottom lines. Even before implementation, they will start making decisions to lower their fee burdens.

A large drop in emissions early in the program has an outsized benefit for climate action. Given that the international community is laser focused on keeping warming "well below" 2°C and pursuing efforts to limit the temperature increase to 1.5°C, big reductions in early years buy the U.S. and our global partners more time and flexibility to hit that target. Moreover, large early emissions reductions will reinforce any pledge that the U.S. makes under the Paris climate agreement and future climate negotiations. These fast and measurable reductions will offer real-time proof of the U.S.

**FIGURE 2: Emissions Assurance Mechanism**



commitment to decarbonization, quickly boosting U.S. leverage in the international climate discussion.

also ensuring that emissions fall at the desired pace.

### III. Safeguarding Emission Cuts

While model projections show that a carbon fee can achieve deep emissions reductions, these projections are not firm predictions. If economic conditions or fuel prices change dramatically, the carbon fee may underperform or outperform projections. To ensure that the Council’s carbon dividends policy achieves its environmental targets, the policy includes an emissions assurance mechanism (EAM), which would automatically increase the carbon fee if it underperforms projections. The EAM would be triggered if cumulative emissions exceed the target emissions reduction path.

Together, a carbon fee and EAM offer certainty for long-term low-carbon investments, while

### IV. Global Impacts: Raising the U.S. Profile

Solutions to climate change must be global in nature: any domestic strategy is incomplete unless it encourages other leading emitters to raise their climate ambition as well. The international community has repeatedly committed itself to addressing climate change through the United Nations Framework process – and individual countries have repeatedly fallen short of their targets.<sup>7</sup> As the U.S. returns to international climate negotiations, it has the opportunity to deliver a comprehensive U.S. climate policy that will underpin a bold, new U.S. commitment, ratchet up global climate efforts and confer a competitive advantage on carbon efficient U.S. firms.



The Paris Agreement is framed around individual national contributions to cut or stabilize emissions by 2030 with the goal of holding warming to well below 2°C and pursuing efforts to limit the temperature increase to 1.5°C. The United States will have the greatest influence in international negotiations if it makes an ambitious climate commitment along with a concrete plan to deliver that commitment quickly. The advantage of a legislated carbon fee is that it offers a way to realize deep and rapid domestic emissions reductions that are backed by substantial modelling. Complementary policies built around the fee will allow the U.S. to make a bold yet achievable 2030 commitment that will open the door to diplomatic cooperation toward greater international ambition.

Carbon dividends is consistent not just with the incremental targets of current international agreements, but also with the longer-term midcentury reductions around which the international climate community is coalescing. The High-Level Commission on Carbon Prices, chaired by Nobel laureate Joseph Stiglitz and Lord Nicholas Stern, was created to identify carbon prices consistent with the long-term emissions reductions goals. The commission concluded that prices must be in the range of \$40-80 per ton CO<sub>2</sub> by 2020 and \$50-\$100 per ton CO<sub>2</sub> by 2030.<sup>8</sup> The price trajectory established by the carbon dividends plan sits firmly in that range. Significantly, this price is consistent with deep midcentury emissions reductions if these prices are adopted across the economy and on a global basis. This is precisely why the international reach of the carbon dividends plan is a vital contribution to an effective global climate solution.

## V. Global Impacts: Leveraging a Clean U.S. Economy

Beyond rapid emissions reductions that can

galvanize global action, the carbon dividends plan is also specifically designed to encourage more emissions reductions in the global economy. The plan includes a border carbon adjustment (BCA), the only instrument that the U.S. can unilaterally wield to promote more comprehensive climate action in the global trading system. A BCA can harness global trade towards a low-carbon future, and at the same time provide a stronger competitive position for U.S. firms.

Roughly a quarter of global climate emissions are attributable to goods that are internationally traded.<sup>9</sup> A BCA would allow the U.S. to price those emissions beyond its borders, increasing the scope of covered emissions and ensuring that overseas manufacturers account for their carbon emissions. This is the most comprehensive approach to controlling emissions from domestic *consumption*, a figure more than 10 percent higher than domestic *production*.<sup>10</sup>

With the global trading system adjusted to favor carbon efficiency, a BCA boosts the competitive standing of efficient U.S. firms where environmental standards are higher and carbon emissions are lower. The Council’s research has found that the U.S. is 80 percent more carbon efficient than the global average and drastically more carbon efficient than major competitors like India, China, and Russia.<sup>11</sup> A BCA positions U.S. manufacturers to outcompete their overseas competitors whose dirtier production methods mean they will pay more in carbon fees.

### Relative economy-wide carbon intensities for the U.S., BRIC, EU, & USMCA Countries

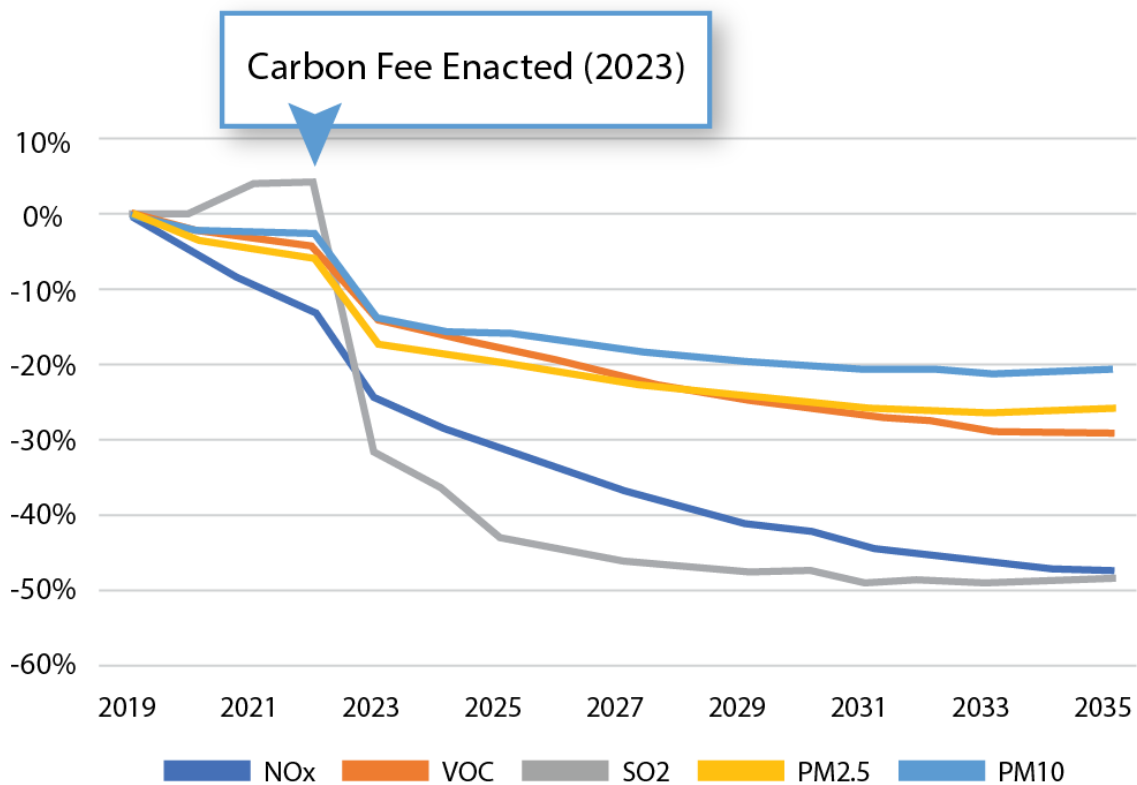
USA	Brazil	Canada	China	EU
1.0	1.1	1.3	3.2	0.9
India	Mexico	Russia	World	
3.8	1.4	4.2	1.8	

At the same time, unilateral U.S. action to adopt a carbon price with a BCA will reorient the global trading system to drive down greenhouse gas emissions. The current rules of global trade effectively subsidize carbon-intensive production overseas and prevent the U.S. from reaping the benefits of its own innovative and efficient economy. A BCA reverses this trend and ensures that the highest emitting manufacturers pay the most in carbon fees. For the first time, companies will compete for market share on the basis of carbon efficiency.

relationships like a carbon customs union that would eliminate BCAs in exchange for cooperation on equally ambitious climate action. Such a trade alliance would feature harmonized carbon pricing among its members paired with a common BCA policy applied to countries outside the alliance. A growing bloc of large economies aligning on this approach would create an ever-strengthening economic lever to pressure more reluctant countries to take climate action or risk losing market share.

The U.S. can also create a new trade benefit for international partners. The BCA presents an opportunity to create special trade

**FIGURE 3: Criteria Air Pollutant Projections from Power, Transport, & Industry (% Change from 2019)\*<sup>14</sup>**



Source: Estimates based on modeling using NEMS by Kenneth Gillingham of Yale University

## VI. Domestic Public Health Benefits

While a carbon price is specifically designed to reduce CO<sub>2</sub> from sources across the economy, it will also reduce other forms of emissions from the same sources. In particular, the carbon fee will lower emissions of criteria air pollutants, like sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), volatile organic compounds (VOCs), and inhalable particulate matter (PM), that the Environmental Protection Agency (EPA) already regulates.<sup>12</sup> As CO<sub>2</sub> emissions sources increase in efficiency or are displaced by more carbon-efficient power or industrial facilities or transportation options, emissions of these other pollutants will also fall, providing substantial and immediate health benefits at the community level.<sup>13</sup>

*A carbon fee will cause a rapid reduction in non-carbon pollutants without any additional regulation or government intervention.*

Modeling demonstrates that a carbon fee can contribute to a significant and rapid cut in local pollution emissions. By 2035, emissions of local pollutants from domestic anthropogenic sources will fall between 20% and 50%, depending on the pollutant.<sup>14</sup>

Emissions reductions will be particularly dramatic in the power sector as the carbon fee encourages a rapid shift away from emissions-intensive electricity sources. All modeled criteria pollutant emissions from the power sector will fall between 80% and 95% by 2035.

Criteria pollutant emissions decline less rapidly in the transportation and industrial sectors.

The carbon fee, like other policies, is anticipated to transition these sectors more slowly, as viable decarbonization alternatives are not yet widely commercially available. As investments bear fruit, the transition to low-carbon and lower-emitting alternatives will accelerate. For example, the transportation sector, the largest domestic source of CO<sub>2</sub> emissions, is expected to decarbonize relatively slowly in comparison to electric power. However, hybrid and battery electric vehicles are already reaching price parity with conventional internal combustion engine vehicles and consumer preferences are tilting in their favor.<sup>15</sup> Moreover, the carbon fee is demonstrated to have a larger impact on reducing vehicle miles traveled compared with alternative interventions.<sup>16</sup>

One particularly striking finding: a carbon fee will cause a rapid reduction in non-carbon pollutants without any additional regulation or government intervention. Regulations for non-carbon pollutants are of course needed. Yet this steep decline in criteria pollutants is a clear co-benefit to ambitious climate action. Communities will benefit from cleaner air and the EPA will be positioned to evaluate what ongoing and additional interventions are warranted to appropriately protect the public health. In this way, an economy-wide carbon fee is a complement to, and not a replacement for, policies to limit criteria and other pollutants.<sup>17,18</sup>

## VII. Conclusion: Leveraging a Force Multiplier

There is no silver bullet to address greenhouse gas emissions at the scale and speed required by the climate challenge. The U.S. climate strategy will need many policies and approaches working together to achieve deep decarbonization by

midcentury. A carbon fee as the centerpiece of this strategy not only achieves substantial CO2 emissions reductions, it also ensures that every other policy intervention is easier to implement and achieves even greater emissions reductions.

Carbon emissions, principally from the burning of fossil fuels, remain far and away the largest U.S. contribution to warming. A carbon price covers 80% of U.S. greenhouse gas emissions. These emissions are uniquely suited to direct pricing. Fuels can be priced at specific bottlenecks as they enter the economy, and industrial emissions are already measured and reported to the government. The elegance and effectiveness of carbon pricing has galvanized broad support for a carbon fee as an essential piece of U.S. climate policy. Indeed, Treasury Secretary Janet Yellen has argued that “we cannot solve the climate crisis without effective carbon pricing.”<sup>19</sup>

There’s no doubt that complementary policies are necessary to further curb emissions of CO2 and other greenhouse gases, like methane and hydrofluorocarbons. Yet today, such policies have to work against existing market incentives that treat carbon emissions as free. Once a carbon fee tilts the marketplace toward decarbonization, every other policy becomes cheaper and easier. In Congress, there is bipartisan interest in policies to encourage low-carbon investment, build out necessary infrastructure, induce innovation, improve efficiency and shift consumer behavior. A carbon fee will amplify such policies and all other domestic climate efforts.

A U.S. carbon fee and BCA can also uniquely motivate more ambitious climate action that is necessary to address the climate problem at scale. Carbon pricing will realize the deep emissions cuts necessary to reframe the international conversation around what meaningful climate policy must deliver. Adding border carbon

adjustments ensures that it’s the international marketplace – not just international diplomacy – guaranteeing a transition to a low-carbon future.

*[A Carbon fee] ensures that every other policy intervention is easier to implement and achieves even greater emissions reductions.*

Finally, an economy-wide carbon fee would drive additional environmental co-benefits, including reducing emissions of criteria pollutants like PM, SO2 and NOx. Other policies are certainly needed and should be prioritized to ensure that all communities, regardless of geographic location, demographic makeup or socioeconomic conditions are afforded a clean and safe environment.

The U.S. is poised to lead international climate diplomacy and shape agreements toward long-term deep decarbonization. A carbon fee at the heart of the domestic policy response ensures that the U.S. will also lead in setting and achieving ambitious emissions reduction goals, accelerating the domestic economy, and cleaning up the environment in every community.



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# Endnotes

1 The Council has also conducted a wide range of studies on the benefits of a carbon price for decarbonization, household income, innovation, and economic growth. See also the Economists' Statement on Carbon Dividends, endorsed by 28 Nobel Laureate economists, 4 former Chairs of the Federal Reserve, 15 former Chairs of the Council of Economic Advisers, and more than 3,500 economists: <https://clcouncil.org/economists-statement/>.

2 Most recently, a report published by the National Academy of Science proposed that a \$40 carbon price rising at 5% per year is consistent with a path to net-zero greenhouse gas emissions by midcentury. See: National Academies of Sciences, Engineering, and Medicine, *Accelerating Decarbonization of the U.S. Energy System*. The National Academies Press, February 2, 2021. <https://www.nationalacademies.org/our-work/accelerating-decarbonization-in-the-united-states-technology-policy-and-societal-dimensions>.

3 Rob West, "Analysis of Climate Leadership Council Proposal." Thunder Said Energy. Climate Leadership Council, July 2020. <https://clcouncil.org/reports/TSE-economic-analysis.pdf>.

4 Note that the E3 model only addresses emissions associated with fossil fuel energy usage. The carbon fee also applies to CO2 emissions from the non-energy use of fossil fuels and industrial processes. These emissions represented a cumulative 7 percent of CO2 emissions in 2018. There is little agreement in the academic literature about how a carbon fee will drive down emission of these emissions sources.

5 The Council considered a limited set of additional and commonly discussed policies to cut emissions from existing sources (including increased investment in carbon capture and sequestration, higher efficiency requirements for light-duty vehicles, and increased investment in building efficiency) and invest in natural climate solutions (like reforestation and changes to agricultural practices). For a discussion of potential emissions reductions see, e.g. *Expanding the Reach of a Carbon Tax from Columbia's Center on Global Energy Policy and Rhodium Group and Natural Climate Solutions for the United States from Science Advances*.

6 The Council anticipates that it will take about two years to implement all provisions of the carbon dividends plan. If legislation is passed in 2021, the price will enter into effect in 2023.

7 See, for example, the data reported by the Climate Action Tracker, an independent organization that tracks commitments and emissions from 36 countries representing 80 percent of total climate emissions. Their latest country-by-country data are available online: <https://climateactiontracker.org/countries/>

8 Joseph Stiglitz et al., "Report of the High-Level Commission on Carbon Prices." Carbon Pricing Leadership Coalition. World Bank Group, May 29, 2017. [https://static1.squarespace.com/static/54ff9c5ce4b0a53deccfb4c/t/59b7f2409f8dce5316811916/1505227332748/CarbonPricing\\_FullReport.pdf](https://static1.squarespace.com/static/54ff9c5ce4b0a53deccfb4c/t/59b7f2409f8dce5316811916/1505227332748/CarbonPricing_FullReport.pdf).

9 Author's calculations based on: United States Environmental Protection Agency, "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2018." April 13, 2020. <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2018>.

10 Ibid

11 Catrina Rorke and Greg Bertelsen. "America's Carbon Advantage." The Climate Leadership Council, September 2020. <https://clcouncil.org/reports/americas-carbon-advantage.pdf>.

12 National Primary and Secondary Ambient Air Quality Standards, 40 C.F.R. 50

13 Criteria pollutant emissions reductions resulting as a co-benefit to the carbon fee are separate from any reductions required under Clean Air Act regulation issued by EPA.

14 Modeling addressed all domestic man-made sources for criteria air pollutants (power, transportation, and industrial sectors). Other sources of criteria air pollutants that would not be addressed through a carbon fee or regulatory policy for covered sectors include wildfires, forestry, agriculture, volcanos and other natural sources; international emissions and sources; and distributed small sources like woodstoves.

15 These estimates are based on NEMS from the Annual Energy Outlook (AEO) 2017 release run on a Yale server and updated to match key outputs from AEO 2020. AEO 2021 may allow for greater responsiveness to carbon pricing in transportation and industry, in which case our estimates for non-CO2 pollutants would be underestimates.

16 Thunder Said Economics identified that the carbon price would create an annual \$500-\$1,000 incentive to use electric engines rather than internal combustion engines in light duty vehicles, achieving a more rapid transition to battery electric vehicles and cutting 2.5 million barrels per day from U.S. oil consumption. See: Rob West, "Analysis of Climate Leadership Council Proposal." Thunder Said Energy. Climate Leadership Council, July 2020. <https://clcouncil.org/reports/TSE-economic-analysis.pdf>.

17 Anne E. Smith et al, "Economic Impacts of the Climate Leadership Council's Carbon Dividends Plan Compared to Regulations Achieving Equivalent Emissions Reductions Volume I: Analysis Insights for Policymakers." NERA Economic Consulting, December 2020. [https://clcouncil.org/reports/NERA\\_CLC\\_VOL1\\_Policy\\_Summary\\_121020.pdf](https://clcouncil.org/reports/NERA_CLC_VOL1_Policy_Summary_121020.pdf)

18 Jiawen Liu et al, "Environmental Justice for Criteria Air Pollutants in the United States during 1990, 2000, and 2010." In ISEE Conference Abstracts, vol. 2018, no. 1. 2018.

19 The criteria pollutants that impact vulnerable communities come from a variety of sources. On average, these communities are most afflicted by pollutants associated with high density, emissions-intensive transportation. While the decline in point sources like coal-fired electricity will benefit many communities, the longer-term reduction in transportation emissions will be most impactful.

20 Hearing on the nomination of Dr. Janet Yellen, 117th Cong. (2021) (Finance Committee Questions for the Record: Responses by Dr. Yellen). <https://www.finance.senate.gov/imo/media/doc/Dr%20Janet%20Yellen%20Senate%20Finance%20Committee%20QFRs%2001%2021%202021.pdf>



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