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A COMPARISON OF THE BIPARTISAN ENERGY INNOVATION AND CARBON DIVIDEND ACT WITH OTHER CARBON TAX PROPOSALS

Working Paper

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Executive Summary

In November 2018, three Republicans and three Democrats in the House of Representatives led by Congressman Deutch (D-FL) proposed the Energy Innovation and Carbon Dividend Act ("Deutch proposal"), the first bipartisan carbon pricing proposal in Congress in nearly a decade. The proposed legislation would establish a national carbon tax, which would achieve reductions in greenhouse gas emissions at a lower cost than approaches that focus on specific sectors, regions, or technologies. Proceeds from the carbon tax would be returned to Americans in the form of monthly rebate checks.

Three other prominent federal carbon tax proposals have been released or modified in 2018: (1) by Congressional Democrats led by Senator Whitehouse ("Whitehouse proposal"); (2) by Congressional Republicans led by Congressman Curbelo ("Curbelo proposal"); and (3) by the Climate Leadership Council, authored by James Baker and George Shultz ("Baker proposal").

The purpose of the Carbon Tax Research Initiative of the Center on Global Energy Policy at Columbia University is to enable the thoughtful design and consideration of federal carbon tax policies in the United States. To that end, this paper describes how the Deutch proposal resembles and differs from the other prominent carbon tax proposals of 2018.

The Deutch proposal is similar to the other plans in several ways. For example, the carbon tax is imposed primarily on producers of fossil fuels near where the fuels enter the economy, which keeps the number of regulated entities at manageable levels. It covers nearly all carbon dioxide (CO_2) emissions from the US energy system. Importantly, the proposal includes a border carbon adjustment to avoid harming the competitiveness of US industries in international markets.

Like the Curbelo proposal, the Deutch proposal would suspend certain EPA regulations that are redundant with a carbon tax—regulations of stationary sources of emissions covered by the tax—and it would leave in place EPA regulations of CO_2 emissions from motor vehicles and greenhouse gases (GHGs) not covered by the tax. The Deutch proposal would not eliminate fuel excise taxes (as in the Curbelo proposal) or tort liability for emitters (as in the Baker proposal).

The carbon tax rates in the Deutch proposal start relatively low ($15/ton) but increase rapidly to levels that far exceed the rates in other carbon tax proposals. Carbon tax rates rise to nearly $100/ton (in inflation-adjusted terms) by 2030 and potentially higher if the emissions targets stipulated in the bill are not met.

While a more detailed review of the Deutch proposal is needed to understand its likely impacts on emissions, energy markets and the economy, analyses of other federal carbon taxes enable the following general and preliminary conclusions:

- **The higher carbon tax rates of Deutch proposal would lead to larger emissions reductions, carbon tax revenues and impacts on energy markets by the late 2020s compared to the other carbon tax proposals.** By 2030, carbon tax rates under the Deutch proposal would be at least 60 percent higher than under the Whitehouse and Baker proposals and at least two times higher than under the Curbelo proposal.
- **The Deutch proposal would likely cause emissions to fall below the targets the plan lays out through at least 2030.** The legislation targets emissions reductions of 45% below 2015 levels by 2030 (52% below 2005 levels). Analysis of the Whitehouse proposal shows emissions falling 65 to 90 percent of the way to that 2030 target with significantly lower carbon tax rates than the Deutch proposal's (Larsen et al 2018).
- **The Deutch proposal would rapidly decarbonize the US power sector.** The carbon tax rates in the Deutch proposal would provide a substantial boost to low carbon generation sources including solar, wind and nuclear energy, and virtually eliminate the use of coal in the US electricity system by 2030 (Larsen et al. 2018).
- **Under the Deutch proposal, low- and middle-income households would receive more in rebates than they pay in taxes, while high-income households would pay more in taxes than they receive in rebates.** A relatively small share of carbon tax payments would come from low- and middle-income households. If these households are given an equal share of the carbon tax revenues, as they would be under the Deutch proposal, the rebates received by the average low- and middle-income households would exceed the additional expenditures of these households due to the higher prices caused by the carbon tax (Rosenberg et al. 2018).
- **Using revenues for rebates under the Deutch plan would sacrifice opportunities for better macroeconomic outcomes or government services.** The Whitehouse proposal returns revenues to Americans primarily by cutting the payroll taxes paid by workers, which would boost the economy by encouraging work. The Curbelo proposal allocates the revenue to government programs to support transportation infrastructure, energy innovation, climate change adaptation, and assistance for displaced workers (Diamond and Zodrow 2018, Kaufman and Gordon 2018).

Introduction

In November 2018, Representatives Deutch (D-FL), Fitzpatrick (R-PA), Delaney (D-MD), Rooney (R-FL), Crist (D-FL) and Trott (R-MI) proposed the Energy Innovation and Carbon Dividend Act, which would put a price on carbon dioxide emissions in the form of a carbon

tax ("Deutch Proposal"). It is the first bipartisan proposal for a federal carbon pricing policy since a proposal from Senators Collins (R-ME) and Cantwell (D-WA) in 2010.

The Deutch proposal follows other carbon tax proposals in 2018 by Senator Whitehouse (D-RI) and congressional Democrats in February and by Representative Curbelo (R-FL) and congressional Republicans in July.[1] While not yet proposed as formal legislation, the carbon tax proposal of the Climate Leadership Council, authored by James Baker and George Shultz ("Baker proposal"), also garnered considerable attention in 2018.[2]

The next two sections describe the major design elements of the Deutch proposal and compare them to the other prominent federal carbon tax proposals. No detailed and comprehensive analysis of the Deutch proposal has been completed to date, but the third section draws various preliminary conclusions about the policy's likely impacts on emissions, energy markets, and the economy using analyses of other federal carbon tax scenarios.

Ways the Federal Carbon Tax Proposals Are Similar

Which Emissions Are Taxed

A carbon tax with a broader scope will achieve more emissions reductions because the financial incentive to reduce emissions covers additional mitigation opportunities. However, covering certain emissions sources—like those from crops or methane leaks from fossil fuel systems—is difficult for administrative (and perhaps also political) reasons.

The Deutch proposal covers virtually all of the US energy system's CO_2 emissions,[3] which account for about 90 percent of the country's net greenhouse gas emissions (GHG) and 80 percent of gross GHGs.[4] Proposals with this degree of coverage are colloquially referred to as "economywide" carbon taxes. The Whitehouse, Curbelo, and Baker proposals are economywide carbon taxes as well.

Carbon tax proposals often add a few additional percentage points of coverage by applying the policy to some non-CO_2 GHGs and CO_2 emissions from industrial processes. The Deutch proposal puts a separate fee on hydrofluorocarbons (HFCs) emissions but does not cover industrial processes or methane emissions.[5]

Where Emissions Are Taxed

Similar to other prominent federal carbon tax proposals, the Deutch proposal is structured to minimize the number of taxed entities: coal is taxed at the mine, natural gas at the processing plant, and petroleum at the refinery. The tax is imposed on imported fuels when they enter the country.

Regardless of where the tax is imposed, firms will attempt to pass these costs on to consumers in the form of higher prices. Therefore, while the point of taxation matters to individual businesses and sectors, it is not a major determining factor of the overall energy market, emissions, or economic outcomes of a carbon tax.

Border Carbon Adjustment

Unilaterally implementing a carbon tax raises various concerns for producers of products that are heavily carbon intensive and traded in international markets. First, companies may be put at a disadvantage compared to foreign competitors whose products are not taxed at comparable rates. Second, if US producers relocate their operations to places without similar or equivalent regulations, the carbon tax would not reduce their greenhouse gas emissions, it would just move their place of origin.

To lessen these concerns, the Deutch proposal and the three other prominent carbon tax proposals have all proposed a border carbon adjustment (BCA), requiring importers of carbon-intensive goods to pay a fee and providing a rebate to exporters of the same products.

While simple in theory, designing a BCA is complex in practice. It is difficult to track the carbon intensity of some products, particularly when they are produced abroad. Imports from countries that have comparable regulations should arguably be treated differently than imports from countries without such regulations. Finally, scholars have long debated the compatibility of a BCA with international trade law. Countries in the World Trade Organization (WTO) in general are not allowed to selectively tax products from other WTO countries, although there are exceptions (e.g., for environmental protection) for which a well-designed BCA would arguably qualify.[6]

The Deutch proposal makes a set of choices to overcome these challenges associated with its BCA: the mechanism will apply only to products that exceed a certain level of carbon intensity, and the fee differs across trading partners based on a "foreign cost of carbon" that will be defined for each major trading partner. The other prominent proposals make somewhat different choices. These details are likely to be subject to refinement and negotiation in any carbon tax legislation that receives serious attention in Congress.

Ways the Federal Carbon Tax Proposals Differ

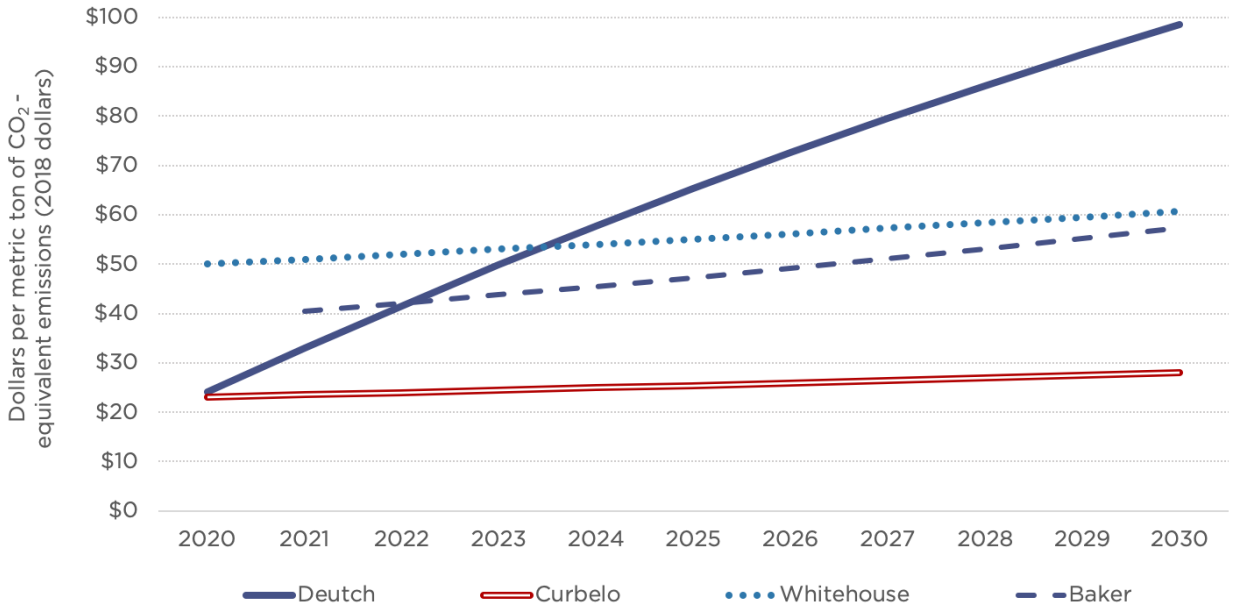
Carbon Tax Rates

A carbon tax requires policymakers to define the schedule of prices for carbon dioxide emissions, typically on an annual basis. Tax rates that are too low risk failing to accomplish the goals of the policy, which may be a combination of emissions reductions, revenue, and a price signal for investors. Tax rates that rise too high too quickly risk disrupting the energy system and economy. One recent study identified carbon tax rates of $40–$80 per metric ton by 2020 and $50–$100 per metric ton by 2030 as consistent with the Paris goals of limiting warming to well below 2 degrees Celsius (High-Level Commission on Carbon Prices 2017).

Under the Deutch Proposal, the tax starts at $15/ton of CO_2 emissions in 2019 and increases by $10/ton per year, which means the tax rate rises to $125/ton by 2030. This figure includes the effects of inflation, so the inflation-adjusted carbon tax levels are lower—perhaps a bit less than $100/ton in 2030. The Deutch Proposal also makes the tax rate increases dependent on emissions outcomes: the tax rate increases by $15/ton per year if the emissions targets stipulated in the proposal are not met.

Figure 1 shows that the Deutch proposal's carbon tax rates are far higher than the other federal carbon tax proposals by 2030. The Whitehouse proposal starts at a higher level but increases at a much slower rate. The Curbelo proposal's carbon tax rates are about half as large as those in the Whitehouse proposal, although they could rise by an additional $2/ton annually if emissions targets are not achieved. Under the Deutch proposal, the carbon tax rates continue to increase rapidly after 2030.

Figure 1: Carbon Tax Rates in Prominent Federal Proposals



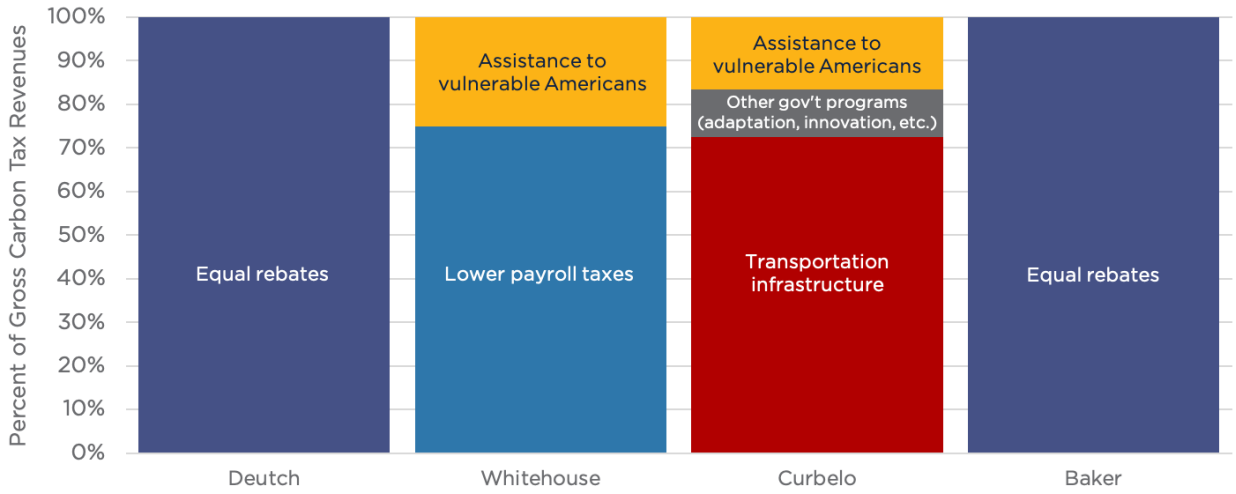
Notes: Assumes an annual inflation rate of 2 percent per year.
The Baker Proposal has not been formally proposed. A 2018 Climate Leadership Council report designated the carbon tax rates displayed above as its "mid-point" pathway (Climate Leadership Council 2018).

What is Done with the Revenue?

Carbon tax payments become additional government revenue. Like other government resources, no consensus exists on how carbon tax revenue should be spent.

The Deutch proposal's plan for revenue use is simple: divide the revenue into equal portions and send monthly payments to all Americans. The Baker proposal is similar. The other two proposals use the revenue for multiple purposes. The Whitehouse proposal allocates most of the revenue to cut the employee portion of the payroll tax, whereas the Curbelo Proposal allocates most carbon tax revenue to government spending (primarily on transportation infrastructure). Both proposals also allocate funds to protect low-income Americans from energy price increases.

Figure 2: Carbon Tax Revenue Uses in Prominent Federal Proposals



Notes: The Deutch proposal allocates an equal share of rebates to all American adults with a social security number or a tax identification number, with minors receiving a half-share each. A small percentage is also be allocated to administration expenses required to run the program.
The Whitehouse proposal provides American workers with an offset to their payroll taxes equal to the lesser of a $800 refundable tax credit or 6.2 percent of earned income to offset payroll taxes paid, with comparable payments for Social Security and veterans beneficiaries, and at least $10 billion annually in grants to states for a range of purposes, including helping low-income and rural households, workers transitioning to new industries, and communities battling the effects of climate change. Figure 2 assumes that 75% of the revenue is allocated to payroll tax cuts, but the actual amounts could differ significantly.
Under the Curbelo Proposal, 72.6% of revenue is allocated to infrastructure, primarily to the Federal Highway Trust Fund, 16.5% is allocated to vulnerable Americans, including for low-income households and displaced workers, 8.1% is allocated for programs related to climate change adaptation, and 2.3% for programs related to energy research and development (Majkut and Bookbinder 2018).
The Baker Proposal allocation is based on preliminary statements from the Climate Leadership Council that all the proceeds will be returned to the American people on an equal and quarterly basis via dividend checks, direct deposits or contributions to their individual retirement accounts (Baker et al. 2017).

Regulatory Changes

A carbon tax is not a panacea: it will not cover all sources of greenhouse gas emissions, and it does not address non-price-related barriers to reducing emissions, such as underinvestment in R&D and behavioral barriers to energy efficiency. Additional climate policies are warranted. Yet policymakers are also justified in reconsidering the need for and stringency of existing policies with similar or overlapping objectives with a carbon tax.

Therefore, carbon tax proposals commonly include additions, subtractions, or changes to other policies. The Deutch proposal amends the Clean Air Act so that the same sources of greenhouse gas emissions covered by the carbon tax are not subject to separate regulations by the Environmental Protection Agency (EPA). For example, it would suspend regulations of CO_2 emissions from power plans, such as the Trump administration's proposed Affordable Clean Energy Plan that would replace the Obama administration's Clean Power Plan. (The

carbon tax would reduce power plant CO_2 emissions by far more than either of these regulations.) It would also suspend regulations of CO_2 from energy use by industrial sources—EPA has had the authority to regulate these emissions since 2009, but it has not done so. Under the Deutch proposal, if actual emission exceed the emissions targets by 2030, EPA is instructed to impose regulations to fill this emissions gap.

The Deutch proposal carves out an exception for regulations of GHG emissions from vehicles under the Clean Air Act, which could continue. The Clean Air Act would also continue to cover GHG sources not covered by the tax (e.g., methane leaks) and all other non-GHG regulations, and the EPA would retain authorities related to monitoring and reporting of GHGs covered by the tax.

Table 1 shows how these changes compare to the significant additions, subtractions, and changes contemplated in the other carbon tax proposals. The Whitehouse plan is unique among the four proposals in not modifying or eliminating any existing policies. While the Baker proposal has not been finalized, the reports released by the Climate Leadership Council have made various assumptions about regulatory changes that are reflected in the table.

Table 1: Regulatory Changes in the Prominent Federal Carbon Tax Proposals

	Deutch	**Whitehouse**	**Curbelo**	**Baker** *(indications)*
Modifications to existing policies:				
EPA regulations of GHGs from stationary sources covered by the carbon tax	Moratorium[1]	Retained	Moratorium[1]	Eliminated
EPA regulation of motor vehicle GHGs	Retained	Retained	Retained	Retained
EPA regulations of emissions not covered by the tax	Retained	Retained	Retained	Retained
Fuel excise taxes	Retained	Retained	Eliminated	Retained
Payment of state-level carbon prices	Retained	Retained	Temp. credit[2]	Retained
Tort liability for emitters	Retained	Retained	Retained	Eliminated
Policies in addition to the carbon tax:				
HFCs/other flourinated gases	Fee on HFCs	Separate Fee	Contingent[3]	May be added[4]
Methane and other GHGs from fossil fuel production	No	Separate Fee	No	May be added[4]

Notes: The Baker proposal has not released formal legislation; the information above is based on preliminary indications and assumptions made in the reports released by the Climate Leadership Council (Baker et al. 2017, Climate Leadership Council 2018).

[1] Regulations are eliminated as long as emissions targets stipulated in the proposed legislation are achieved.
[2] A temporary and declining credit against any carbon price paid at the state level, as in California or the RGGI states, that phases out after five years.
[3] The carbon tax covers HFC emissions if the United States has not ratified the Kigali Amendment to the Montreal Protocol.
[4] The Climate Leadership Council has indicated that it intends to propose measures that cover non-CO_2 greenhouse gas emissions (Climate Leadership Council 2018).

Impacts on Emissions, Energy Market, and Economic Outcomes

The impacts of a carbon tax on emissions, energy market, and economic outcomes are inherently uncertain: they depend on assumptions about technologies, the evolution of the US energy system and economy, and the response of producers and consumers to the tax. These impacts can be estimated using detailed models of the US energy system and economy that translate CO_2 prices into effects on market prices across the economy and then forecast the extent to which producers and consumers will shift to less carbon-intensive actions due to the price changes.

The Columbia University Center on Global Energy Policy (CGEP) and its partners—Rhodium Group, Rice University, and Urban-Brookings Tax Policy Center—have performed detailed analyses of federal carbon tax scenarios that resemble the Whitehouse and Curbelo proposals, as well as a scenario that assumes all carbon tax revenues are used for equal rebates.[7]

An analysis of the Deutch proposal's impacts on emissions, energy markets, and the economy has not been completed to date. Nevertheless, preliminary and general conclusions can be drawn using the studies released by CGEP and its partners in 2018 and the broader recent literature on federal carbon taxes.[8]

Emissions Impacts

A carbon tax reduces emissions by providing financial incentives to switch to lower-carbon alternatives if doing so costs less than paying the tax. The analyses in Larsen et al. (2018) and Kaufman et al. (2018) projects a range of potential emissions impacts of federal carbon tax proposals that resemble the Whitehouse and Curbelo proposals. Figure 3 displays CO_2 emissions from fossil fuel combustion, a proxy for the emissions covered by the Deutch proposal.

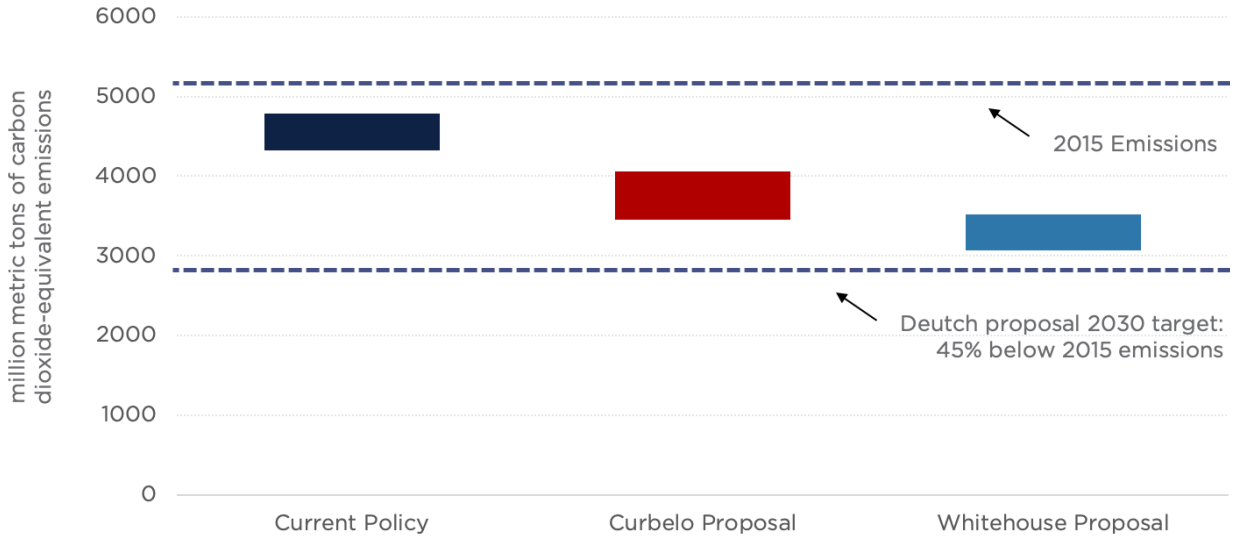
Also displayed in figure 3 is the 2030 emissions target in the Deutch proposal, a 45 percent reduction compared to 2015 emissions levels (equivalent to a 52 percent reduction from 2005 levels). If the Deutch proposal is implemented, this target is likely to be achieved. After all, projected emissions under the Whitehouse proposal bring emissions levels 65 to 90 percent of the way to this 2030 target, and the Deutch Proposal's carbon tax rates are over 60 percent higher (in inflation-adjusted terms) by 2030. In addition, if emissions are not on pace to achieve the target, the Deutch proposal's carbon tax rates increase at $15/ton per year instead of $10/ton, which means the tax rates could be over two times larger than the Whitehouse proposal's tax rates by 2030. Finally, complementary polices could be added that enable further emissions reductions, particularly outside the power sector where the carbon tax achieves relatively few emissions reductions in the 2020s.

Actual emissions could be higher or lower than the projections shown above, and these results should be interpreted with the following considerations in mind:

- Models capture only a subset of technologies and strategies consumers and producers will use to avoid the tax payments;
- Models do not capture the accelerated innovation in low carbon technologies caused by the carbon tax;

- Models assume that consumers and producers respond to the price changes caused by a carbon tax in the same way that they respond to other comparable price changes, but a policy change may be viewed as more visible and permanent than day-to-day price fluctuations;
- Models assume consumers are rational and responsive to price signals, but some consumers will not observe or respond to the price changes caused by the carbon tax;
- The carbon tax scenarios displayed above assume that a carbon tax is the only policy layered on top of a current policy scenario.

Figure 3: Carbon dioxide Emissions from Fossil Fuel Combustion in 2030



Notes: For each scenario, the higher ends of the emissions ranges reflect assumptions of relatively rapid progress in clean energy technologies, while the lower ends of the ranges reflect slower progress. The Current policy and Whitehouse proposal scenarios are from modeling undertaken in Larsen et al. (2018). The Curbelo proposal scenario is from modeling undertaken in Kaufman et al. (2018).

The long-term goal of the Deutch proposal is to reduce US emissions by 80 to 90 percent below 2015 levels by 2050. The carbon tax rates needed to achieve these long-term targets are unknown because they depend on highly uncertain factors such as economic growth, technological progress and policy developments.

The analysis underlying the US Mid-Century Strategy for Deep Decarbonization (White House 2016) indicates that the carbon tax rates in the Deutch proposals are likely to be sufficient to put the country on a pathway to achieve reductions of 80 percent or more by 2050 under the assumptions that progress in carbon-free technologies continues a rapid pace and effective policies are layered on top of a carbon tax, particularly in sectors in which producers and consumers are less responsive to price signals. In the event the Deutch proposal's carbon tax

rates are insufficient, the legislation instructs EPA to impose regulations that enable the long-term emissions targets to be achieved.

Additional Government Revenues

How much revenue the federal government will receive from payments of the carbon tax depends on the carbon tax rates, the activities that are taxed, and how producers and consumers respond to the tax, among other factors.

A carbon tax also affects other sources of government revenue by leaving individuals and businesses with less income to pay other taxes and causing economic activity to shift to sectors taxed at different rates. Empirical estimates suggest these additional effects are likely to reduce the net additional revenue from a carbon tax, perhaps by as much as a quarter of the carbon tax payments.[9]

With tax rates that increase at 2 percent per year, as in the Whitehouse and Curbelo proposals, additional government revenues over the first decade are roughly flat: the increasing annual carbon tax rates push revenue up over time by approximately the same amount that the decrease in annual emissions pushes revenues down. Under the Whitehouse proposal, annual federal government revenue increases by about $160 billion to $190 billion, while the revenue increase under the Curbelo proposal is much lower due to the lower tax rates and the repeal of the fuel excise taxes—perhaps $55 billion to $70 billion annually.

Under the Deutch proposal, carbon tax rates start low and increase much more rapidly than under the other plans, which would imply rapidly increasing annual carbon tax revenues in the 2020s. Eventually, as US emissions decline, annual revenues from the carbon tax will peak and then start to fall.

A detailed analysis of a carbon tax scenario with the Deutch proposal's tax rates is needed for reliable estimates of annual revenues under the policy. Analysis in Larsen et al. (2018) of scenarios with similar tax rates to the Deutch proposal suggest that carbon tax revenues (not accounting for other changes in government revenue) could be around $80 billion in the first year of implementation, $180 billion by the fourth year, and $330 billion by the ninth year. Assuming equal payments to 130 million US households, those carbon tax revenues would imply (taxable) rebates of about $600, $1,400, and $2,600 for each household in the first, fourth, and ninth years of policy implementation.

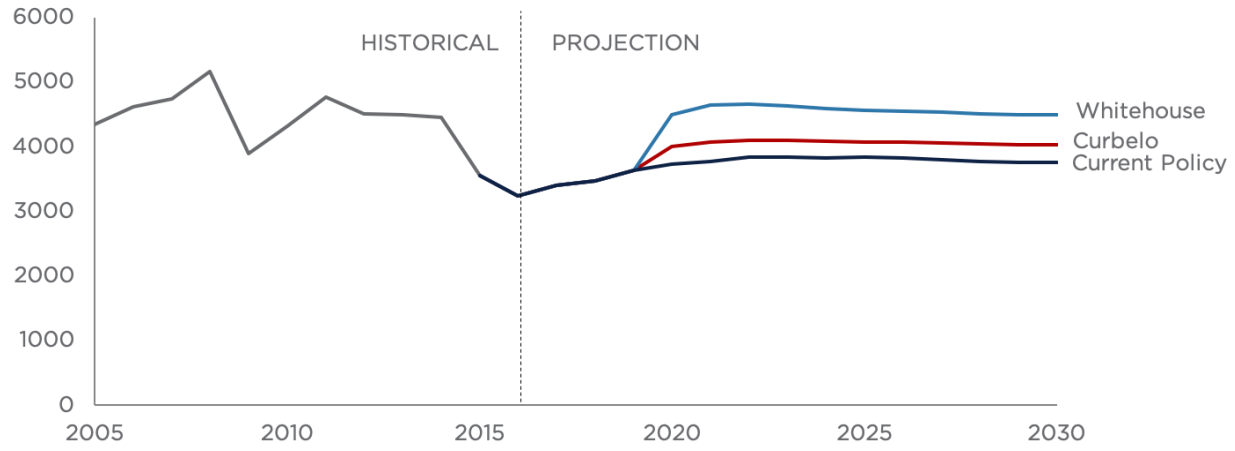
Changes in Energy Expenditures

A carbon tax increases energy costs in proportion to the carbon content of the source of energy: impacts are most significant for energy produced with coal, then petroleum, then natural gas. Higher carbon tax rates cause larger changes in energy prices.

Figure 4 shows the projected changes in per capita energy expenditures under carbon tax scenarios resembling the Whitehouse and Curbelo proposals compared to historic levels and projections under current policies. The Deutch proposal's carbon tax rates are similar to those in Whitehouse proposal in 2023 and 2024, which might imply similar per capita energy expenditure increases of $750–$800 in these years (although the different tax rate trajectory

could imply significantly different impacts). Impacts will increase in later years as the carbon tax rates rise, at which point households will also receive larger rebate checks.

Figure 4: Per Capita Energy Expenditures



Notes: All scenarios use the more pessimistic of two inputs assumptions used for the progress of clean energy technologies (i.e. they correspond to the higher ends of the emissions ranges displayed in Figure 3). The Current Policy and Whitehouse proposal scenarios are from modeling undertaken in Larsen et al. (2018). The Curbelo proposal scenario is from modeling undertaken in Kaufman et al. (2018).

Such price changes would cause shifts in energy production and consumption. Coal production falls precipitously by 2030 compared to the current policy scenario, by about 45 and 80 percent in the Curbelo and Whitehouse proposals, respectively. Both proposals significantly accelerate the pace of deployment of renewable energy sources like solar and wind; nuclear energy and carbon capture and storage technologies benefit from the carbon taxes as well. Both proposals cause US natural gas production to experience small increases in 2020 but small decreases below current policy levels by 2030 (Larsen et al. 2018). Given its higher carbon tax rates, the Deutch proposal's impacts on each of these markets would be larger by 2030.

The studies of the Whitehouse and Curbelo proposals show that the changes to energy markets occur disproportionately in the power sector, which is responsible for over two-thirds of the emissions reductions in the 2020s, with only small changes to the direct use of fossil fuels in the transportation, buildings, and industrial sectors. Detailed analysis is needed to understand the extent to which the higher carbon tax rates contemplated by the Deutch proposal would change these findings, if at all.

Impacts across the Income Distribution

The Deutch proposal is a highly progressive policy. The carbon tax is paid disproportionately by high-income households that consume a disproportionate amount of the country's carbon-intensive products and own most of the carbon-intensive energy production. With the tax revenues distributed equally under the Deutch proposal, the rebates received by average low- and

middle-income households will exceed their increased expenditures caused by the carbon tax.

Recent studies of other carbon tax-and-rebate policies show that average households in the bottom six to eight deciles of the income distribution may see reduced tax burdens and/or welfare gains (Rosenburg et al. 2018, Diamond and Zodrow 2018). In contrast, the households in the highest income deciles are worse off due to the tax, although these studies do not account for the benefits of reduced emissions.

In contrast, the Whitehouse and Curbelo proposals are neither progressive nor regressive policies—compared to the Deutch proposal, they are likely to have more even impacts across the income distribution. Both proposals designate a portion of the carbon tax revenue to low-income households to offset the adverse impacts of higher energy prices. Under the Curbelo Proposal, 10 percent of the carbon tax revenue is directed to households in the bottom 20 percent of the income distribution; Kaufman et al. (2018) show that these payments are sufficient to fully offset the effects for the vast majority of these low-income households.

Macroeconomic Impacts

A carbon tax leads to better economic outcomes than policies that focus on specific sectors, regions or technologies because the carbon tax encourages low-cost emissions reductions and low-carbon innovation across the economy. Still, a carbon tax raises prices throughout the economy, which adversely affects economic growth. Expenditures of the carbon tax revenues push the economy in the opposite direction, putting more income in the pockets of Americans or providing them with additional government services. Reducing emissions will also boost the economy by avoiding adverse impacts associated with air pollution and climate change (particularly in the long run, assuming global action).

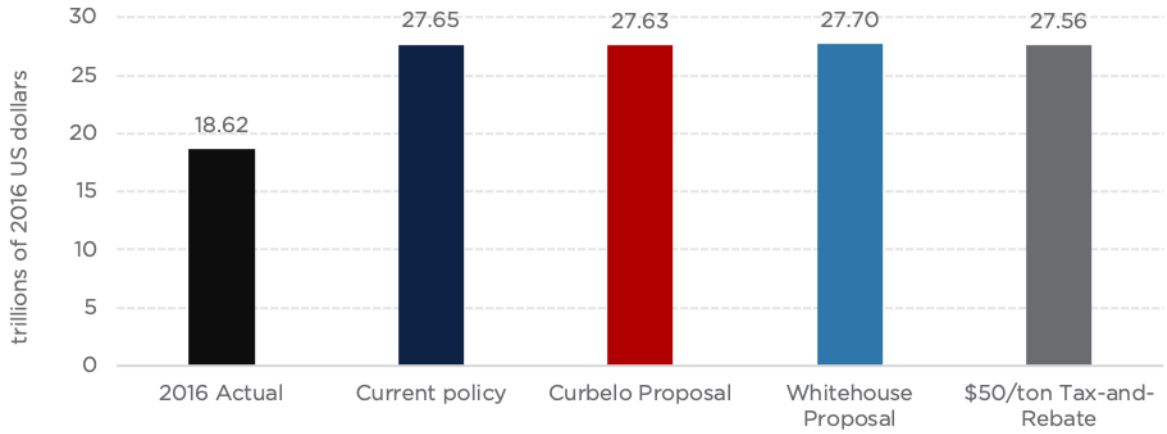
Projections of future macroeconomic economic outcomes are highly uncertain, and no study has estimated the macroeconomic impacts of the Deutch proposal. However, studies of other carbon tax proposals (Diamond and Zodrow 2018, Kaufman et al. 2018) have estimated the likely impacts on macroeconomic outcomes like gross domestic product (GDP).

Figure 5 shows estimates of US GDP after 10 years under scenarios resembling the Curbelo and Whitehouse proposals, a third carbon tax scenario in which all revenues are used for equal rebates (though with a tax rate trajectory that corresponds to the Whitehouse proposal as opposed to the Deutch proposal), and a current policy scenario. Under all scenarios, GDP falls within a range of about half of one percentage point after 10 years of policy implementation. These estimates do not account for any economic benefits of emissions reductions.

In figure 5, GDP is lowest after 10 years in the scenario in which revenues are used for rebates, as in the Deutch proposal. That's because sending checks to Americans sacrifices the opportunity to allocate revenues in ways designed to boost the economy, such as reducing taxes on work (as in the Whitehouse Proposal) or targeted government investments (as in the Curbelo Proposal). However, the economic model does not account for any potential benefits of reduced income inequality caused by a highly progressive policy or the larger benefits of pollution reductions due to the higher carbon tax rates of the Deutch proposal.

The near-term economic outcomes of a policy should not be confused with its net benefits. First, GDP and other economic metrics are poor indicators of social welfare, which include factors unrelated to how much money we make and spend. GDP impacts do not account for environmental degradation or natural resource depletion, for example. Second, these metrics do not capture the health or economic benefits associated with reduced air pollution and climate change.

Figure 5: US Gross Domestic Product after 10 Years of a Carbon Tax



Notes: Values exclude any impacts of emissions reductions on gross domestic product.
The Current policy, Whitehouse proposal and $50/ton tax-and-rebate scenarios are from modeling undertaken in Larsen et al. (2018).
The Whitehouse proposal scenario assumes all revenues are allocated to payroll tax reductions, whereas the actual Whitehouse proposal includes a carve-out for transfers to vulnerable Americans.
The Curbelo proposal scenario is from modeling undertaken in Kaufman et al. (2018).

Conclusion

Congress is unlikely to pass the Deutch proposal in 2019. If it did, US greenhouse gas emissions would fall dramatically in the 2020s, well beyond the pace of reductions outlined by the United States in its Nationally Determined Contribution to the 2015 Paris climate agreement. Combined with other effective policies, the Deutch proposal or a similar carbon tax would put the country on a pathway to a low carbon economy by midcentury or sooner.

The Deutch proposal would also increase the cost of energy for Americans and provide them with a rebate check each month. The carbon tax rates contemplated in the Deutch proposal are noticeably higher than under previous federal carbon tax proposals, rising near $100/ton by 2030 or beyond, depending on emissions outcomes. Detailed analysis is needed to understand the likely impacts of these carbon tax rates on energy market and economic outcomes.

Additional important factors are outside the scope of this paper. Those include the geographic distribution of impacts across the country, particularly on coal-dependent communities that

would be hardest hit. It also excludes important political considerations, including whether the structure of the Deutch proposal will enable greater or less support than other carbon tax policies.

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Notes

1. Representative Curbelo lost his seat in Congress in the November 2018 election, but cosponsors have indicated they will continue to push for the legislation in the next Congress.

2. The Climate Leadership Council added to its list of prominent supporters (https://www.clcouncil.org/founding-members/), including former Federal Reserve Chair Janet Yellen. In October, Exxon announced it was giving $1 million over two years to a group that would lobby for the Baker proposal.

3. "Virtually all" because, for example, the Deutch Proposal exempts CO_2 emissions from energy use by farm equipment and from US territories.

4. Net emissions are calculated by taking all sources of GHG emissions (gross emissions) and subtracting the carbon dioxide that is absorbed by US lands (i.e., the "land sink").

5. The three other proposals would cover CO_2 emissions from industrial processes (e.g., cement production), which account for about 2 percent of total emissions. The Whitehouse proposal includes a separate fee on HFC emissions and a supplementary fee on emitters to account for methane emissions from venting, carbon dioxide from flaring, and other greenhouse gas

emissions that escape throughout fossil fuel supply chains. The Curbelo proposal covers emissions from certain sources of biomass and covers HFC emissions only if the United States does not ratify the Kigali Amendment to the Montreal Protocol.

6. The Deutch proposal is designed to qualify under the WTO rules, going as far as to borrow language from the WTO regarding acceptable exemptions when describing the purpose of the BCA in the legislation: "To protect animal, plant, and human life and health, to conserve exhaustible natural resources by preventing carbon leakage, and to facilitate the creation of international agreements."

7. These studies are available at the website of Columbia University's Center on Global Energy Policy's Carbon Tax Research Initiative at https://energypolicy.columbia.edu/carbontax.

8. For example, Stanford Energy Modeling Forum 32 is a model inter-comparison exercise focusing on the impacts of a federal carbon tax in the United States, published in a special edition of the journal Climate Change Economics in February 2018 (https://www.worldscientific.com/toc/cce/09/01).

9. However, recent modeling by scholars at Rice University finds that this offset to government revenue may be considerably smaller than other studies have suggested, due to a shift in economic activity to higher-taxed sectors caused by the carbon tax (Kaufman et al. 2018).

About the Author

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