The Current State of Global Carbon Tax Implementation and Implications for the United States

Business of Energy Transition Initiative

Carbon taxes are a type of tax where businesses/individuals are required to pay for carbon emissions, typically structured in a way such that policymakers establish a standardized tax rate for each metric tonne or imperial ton of GHG emissions. The levy can cover all greenhouse gases or be tailored to a specific greenhouse gas such as carbon dioxide or methane. Governments can also exercise significant discretion in determining the points of taxation in the supply chain to minimize administrative burden.

When paired with complementary fiscal measures such as reductions in corporate/payroll tax, rebates, permanent 100% bonus depreciation, R&D expensing, carbon taxes can be an efficient tool for policymakers to guide economies towards deep decarbonization while enabling equitable economic growth through reducing unemployment, encouraging innovation, and increasing pre-tax wage rates. Given the significant merits, carbon taxes have been utilized globally to reduce greenhouse gas emissions, with over 20 countries implementing some form of a carbon tax, including the European Union (EU), which in itself consists of 27 countries, Japan, Kazakhstan, South Korea, Mexico, New Zealand, Canada, South Africa, United Kingdom, Ukraine and Singapore.

European countries were the first to implement a carbon tax. Sweden, which ranks amongst the wealthiest and least carbon intensive amongst developed countries (in terms of GDP and 
emissions per capital), adopted a carbon tax policy in 1991. Before the carbon tax, most Swedish climate policies were environmental measures in the form of regulations/prohibitions. In the 1980s, sentiment for more economic instruments began to build. Starting with economics professor Erik Dahmén’s 1987 article “The environment and the market” which suggested that market mechanisms were undervalued by policymakers when compared to regulations. This was followed by Bert Bohlin’s (Swedish meteorologist / first chairman of IPCC) article proposing a carbon tax in Sweden’s major daily newspaper Dagens Nyheter. Finally, a few years later in 1991, a carbon tax was finally implemented.

Sweden’s carbon tax was not adopted on a stand-alone basis, possibly one of the reasons for its success. From 1990 to 1991, Sweden had a major tax reform which sought to increase environmental taxes while cutting other taxes, such as marginal income tax, corporate income tax, capital income/gains tax. By effectively “swapping” other taxes with its carbon tax, Sweden was able to maintain economic output growth while penalizing negative environmental externalities. Since 1991, emissions in Sweden have decreased by close to 50% while GDP per capita has roughly doubled.

Within North American, a federal carbon tax was also implemented in Canada in 2019. Certain Canadian provinces such as British Columbia, Northwest Territories and Quebec already had carbon taxes in place and the federal tax would only apply to provinces that did not meet existing standards. Similar to Sweden, Canada’s carbon tax was revenue neutral. Tax revenues were distributed back to source provinces, which were then mostly rebated back to individual taxpayers.

While Canada’s carbon tax is relatively recent, since its implementation, Canada has displayed healthy GDP growth, increasing from $1.74 trillion in 2019 to $2.14 trillion in 2022, representing a 7% compound annual growth rate, while emissions have decreased from 724 to 670 million metric tonnes. Both metrics appear to be moving in the right direction, but one could argue that its implementation is too recent. British Columbia, one of Canada’s exempt provinces, implemented its carbon tax in 1990. An
empirical 2019 study by economist Gilbert Metcalf found no adverse impact of British Columbia’s carbon tax on GDP. Metcalf also studied countries in the EU and found a slightly positive impact, suggesting that the positive effect is caused by carbon tax revenue being used to lower other types of taxes, which has been the case in Sweden.

Since European countries began pricing carbon in 1990, we have seen many countries across the globe follow their footsteps. In Asia, Singapore became the first country to implement a significant carbon tax, introducing its carbon pricing scheme on 1 January 2019. The tax is revenue neutral, with all tax revenues earmarked to cushion the impact on businesses/households and support decarbonization efforts. Japan had also implemented a revenue neutral carbon taxes in 2012 as part of a broader tax reform but with a significantly lower tax rate while Indonesia is planning to implement a carbon tax in the years ahead.

Most recently, the EU adopted the Carbon Border Adjustment Mechanism, an environmental policy designed to addressing the risk of carbon leakage by requiring importers to report (and eventually pay for) carbon emissions embedded in the goods imported into the EU. Essentially, if importers are paying a carbon price less than the carbon price within the EU, they will have to pay the difference.

On some level, the EU has established its position as a trailblazer of global climate policy. With the union’s recent adoption of the Carbon Border Adjustment Mechanism, a globally coordinated carbon pricing mechanism could be an eventual possibility. If this becomes a reality, countries will want to ensure that they have in place an optimal carbon policy that does not deter free trade and capital flows. This includes America—if the United States wishes to maintain or improve its trade position, a carbon tax could prove useful, if not essential.

**Determining the Price of Carbon in the United States**

America currently does not have a federal carbon tax. Several regions/states have carbon pricing initiatives in place such as the Greenhouse Gas Cap-and-Trade program in California and the Regional Greenhouse Gas Initiative program in the Northeastern states. The state of Washington also has its own carbon pricing system. A number of proposals for a federal carbon tax have been submitted to Congress but none have been successful due to the gridlock in congress. If the gridlock is not broken, we may very well reach a scenario where each state adopts their own carbon tax and a legislation similar to the EU’s Carbon Border Adjustment Mechanism is applied to enable coordination amongst states. A federal carbon tax would significantly reduce the administrative burden associated with such level of coordination.

In terms of how a federal carbon tax can be implemented, it appears that most successful democratic countries have done so with complementary measures that share several key characteristics:

- **Encourages Economic Growth – Revenue Neutrality Offsets Market Distortions:** While carbon taxes discourage carbon emissions which reduce societal negative externalities, taxes by nature are market distortions that lead to economic inefficiencies and deadweight losses through its interference with the free market mechanism. If America were to introduce a carbon tax, it should not be an added impediment to economic efficiency. Thus, the associated market distortion must be addressed. This can be done through a tax swap, reduction in other taxes such as corporate income tax and payroll tax.

- **Strive for Equitable Outcomes – Compensating Impacted Stakeholders and Limiting Regressivity:** Individuals with a lower disposable income spend a larger fraction of their earnings on carbon intensive goods such as electricity, heating, and gasoline. A broad-based carbon tax applied at consumption would effectively reduce the disposal income of the working class. A partial solution would be a payroll tax reduction which directly increases spending power. An
alternative approach would be shifting the point of taxation upstream and reducing corporate tax rates to ensure that the incremental tax burden does not result in blue-collar job loss. Tax rate reductions could be more industry selective if fiscal balance and national interests are important considerations.

- **Preserve National Interests and Strengthen Domestic Supply Chains for Critical Industries:**
  Certain sectors are carbon intensive but essential to national interest, such as defense, power, energy, manufacturing, steel, and natural resources. Some also play a key role in enabling the energy transition. For example, the necessary infrastructure needed for electrification cannot be built without a reliable supply of low-cost steel and copper. Recent geopolitical tensions (Russia-Ukraine, Trade wars with China) have further highlighted the importance of a resilient domestic supply chain. Free trade should be encouraged but not at the expense of sacrificing domestic supply chains. For businesses in these critical industries, a carbon tax should not only be met with an offsetting corporate tax reduction, but additional incentives should also be in place to incentivize the development of sector-specific deep carbonization solutions. A simple starting point could be expanding the scope of 100% bonus depreciation to include decarbonization-related assets and permitting the classification of decarbonization-related R&D and CAPEX spending as expenses.

Through implementing a carbon tax that encourages economic growth, compensates vulnerable stakeholders, and protects national interests, the possibility of getting buy-in from both sides of the political spectrum is made possible.

To break the gridlock in congress, determining an appropriate carbon tax rate is also important. There are ongoing discussions revolving around determining the “true” carbon tax rate. Countries across the world have implemented a wide ranges of rates, ranging from $1/t in Poland and Ukraine to more than $120/t equivalent in Sweden, Liechtenstein, and Switzerland. A rate too low would not effectively motivate industries to curb emissions, while a rate too aggressive could significantly reduce economic activity—for example if a revenue neutral carbon tax was greater than a corporation’s corporate and payroll tax, business margins would decrease, and production decisions would be impacted.

Some suggest using the Social Cost of Carbon (SCC) to determine an appropriate tax rate. SCC essentially represents societal net benefit of reducing carbon dioxide by one ton. It is calculated by deriving the monetary value of the future stream of net damages associated with adding one ton of carbon dioxide to the atmosphere in a given year and discounting these values back to the present. These calculations are conceptually interesting but highly assumption driven. Further, model outputs are highly sensitive to specific inputs—for example, the federal government currently estimates a social cost of carbon at $51/t using a 3% constant discount rate, but if the discount rate assumption is decreased by 0.5% to 2.5%, SCC increases by ~50% to $76/t.

The determination of inputs for calculating SCC then becomes a contentious issue as it involves significant subjectivity. Perhaps the best course of action is to avoid overly complicated calculations altogether and shift focus on setting a specific target on tax revenues, emissions reduction, or some combination of two.

**A Revenue Neutral Carbon Tax**

In the United States, a potential starting point for establishing an appropriate carbon tax could be using federal corporate tax revenues as a benchmark. Based on “through-the-cycle” average corporate tax revenues, which range from $243 billion to $312 billion (depending on the exact definition of economic...
cycles) and 4.8 billion imperial tons of carbon emission (in-line with current emissions), we can calculate a revenue neutral carbon tax ranging between $50-64/t. In other words, if only federal corporate taxes are used to maintain revenue neutrality, $50-64/t would be the upper limit of the carbon tax rate.

One could argue that a carbon tax would reduce the need to subsidize clean energy development as the tax itself adequately incentivizes market participants to push development into lower carbon energy supplies. Current federal clean energy subsidies mainly includes programs from the Inflation Reduction Act (IRA) and the Bipartisan Infrastructure Act, such as investment tax credits/production tax credits for renewable development as well as the build out of EV-infrastructure. Modelling from the Tax Foundation forecasts ~$32 billion of green energy-related IRA tax credit spending from 2024 to 2028. Average spending increases to ~$36 billion (or ~$7.4/t), if we include ~$18 billion of electrification-related spending from the Bipartisan Infrastructure Act, which averages out to ~$3.6 billion over 5 years. Including these offsets, the revenue neutral carbon tax range would decrease to roughly ~$42-56/t.

One common characteristic shared by many countries in their carbon tax implementation is a (1) phased, (2) publicly announced and (3) increasing carbon tax schedule. Singapore, for example, initially set the carbon tax rate at S$5/t for the first five years from 2019 to 2023 to provide a transitional period for emitters to adjust, before increasing the carbon tax to S$25/t in 2024 and 2025, S$45/t in 2026 and 2027, before finally reaching S$50-80/t by 2030. A similar gradually increased schedule is in place in Canada. A transparent and gradually increasing schedule reduces uncertainty and cushions the economic impact of rate hikes. If America decides to gradually phase in increases from the $42-56/t range, reducing payroll taxes at the beginning could be one way forward.

While SCC may not be useful for policymaking, its calculations do provide an interesting takeaway—based on a constant 3% discount rate, the Social Cost of Carbon increases ~20% with the passing of each decade of inaction, essentially ascribing a tangible and material monetary cost to inaction. Therefore, rather than focusing on determining the “true” carbon tax rate, perhaps the best course of action is to quickly test the market by adopting a moderate federal carbon tax and collect feedback from the market. If emissions reductions are insufficient, the carbon tax rates can be adjusted upwards. After all, free markets always have a way finding their equilibrium.

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