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What Fixing the Ozone Layer Can Teach Us About Carbon Import Fees

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ABOUT THE AUTHOR

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INTRODUCTION

The Montreal Protocol is often cited as the most influential international environmental treaty to date. This agreement protects the stratospheric ozone layer by regulating the production and consumption of certain ozone-depleting chemicals (OCDs).[i] Initially signed by forty-six countries, universal participation was eventually achieved, with all 197 countries joining the Protocol.

The treaty produced a framework that lowered global emissions of ozone-depleting substances, leading to a gradual recovery of the ozone layer,[ii] which projections indicate will return to 1980 levels by 2040.[iii] U.S. policymakers can gain valuable insights from the trade mechanisms utilized in implementing the Montreal Protocol and the U.S.'s accompanying excise tax on designated chemicals. By applying lessons learned from this successful regime to emerging climate and trade policy sets, such as a carbon import fee, policymakers can uphold environmental effectiveness while minimizing compliance and administrative burdens.

Carbon import fees—border charges based on the carbon intensity of imports—are gaining momentum internationally. The fees target carbon emissions associated with traded goods,[iv] which contribute to nearly 25% of global emissions[v]. Carbon import fees aim to level the playing field for firms demonstrating superior environmental performance through increased carbon efficiency. This approach also helps mitigate carbon leakage by rewarding clean operators, further incentivizing decarbonization. The European Union has already implemented its Carbon Border Adjustment Mechanism (CBAM), with import fees starting in 2026 on targeted energy-intensive sectors. Canada, Australia, Taiwan, India, South Korea, Japan, and the U.K. are all considering deploying similar policy measures. Several pieces of legislation have also been introduced in the Senate to adopt a carbon import fee in the U.S.

As governments consider the design of their own carbon import fees, they will tend to draw on existing policy templates. The EU CBAM, the only operational carbon import fee, offers a rigid, administratively complex, and unilateral approach (see *Table 1*). Policymakers may instead want to consider the model of ODC policies,[vi] which collectively are simpler, more streamlined, and showcase the effectiveness of a straightforward administrative structure supported by international cooperation between key trading partners. Through the ODC policies, the U.S. has been successfully pricing regulated chemicals, including inputs, at the border for several decades and working cooperatively with international partners to ensure global emissions reductions. The success of these policies can help build an intriguing foundation for the design of a carbon import fee.

This analysis identifies the key lessons learned from the U.S. experience targeting ODCs and applies them to a carbon import fee. The trade mechanisms of ODC policies present policymakers with valuable information on how to effectively design a similar fee for imports and enlist international cooperation.

Background

ODC policies effectively reduced the consumption and production of emissions targeted by the Montreal Protocol Treaty. These manufactured chemicals were frequently used in refrigeration, aerosols, and electrical cleaning products from the 1950s until the treaty was implemented in 1987. Scientists gradually raised environmental concerns about ODCs due to their damage to the ozone layer, leading to substantial thinning over the southern hemisphere. This thinning heightened exposure to ultraviolet radiation, resulting in concerning impacts on public health, like increased skin cancer risk.

Notably, parallels exist between ODCs and GHGs, as both persist in the atmosphere for long periods, are released from diverse sources, and exert a global impact, making it a prime example of a global commons issue. Further, ODCs, like GHGs, are used as products themselves and as chemical inputs to new products. As the international community grapples with effectively addressing global GHG emissions, understanding the historical context of the Montreal Protocol and ODC excise taxes can inform policymakers in crafting effective global climate policies.

The effort to reduce and eliminate ODC emissions gained momentum in the 1970s, driven by mounting scientific evidence, public health concerns, and the heightened interest of forward-thinking domestic chemical manufacturers. These manufacturers were at the forefront of developing and marketing alternatives to ODCs. Their positioning propelled the U.S. into a leadership role, galvanizing global talks that led to the adoption of the Montreal Protocol Treaty.

The treaty created a binding international structure that established a club-like framework with exclusive compliance measures, aid benefits, frictionless trade for members, and increased trade barriers for non-members. The use of trade barriers gave the treaty teeth by eliminating the competitive advantage of those outside the club. The Montreal Protocol Treaty exemplifies successful international cooperation in achieving environmental objectives through a club-like structure, a feature that could be incorporated into the design of a carbon import fee to achieve a modern and nimble club framework with key trading partners.

The U.S. expedited its efforts to reduce the production of Montreal Protocol-covered chemicals by implementing three types of ODC excise taxes on domestic production and imports: the tax on ODCs,[vii] the tax on imported taxable products,[viii] and the floor stock tax.[ix] These taxes served two primary purposes: (1) to accelerate the depletion of legal stockpiles and recycled ODCs on the market and (2) to promote the use of alternative chemicals. The straightforward design of the ODC taxes, discussed below, contrasts with early efforts by international partners to address the carbon intensity of imported products, like the EU CBAM. This analysis specifically focuses on the design and implementation of fees imposed on imports, which are most relevant to a carbon import fee.

How the ODC Regime Should Inform a Carbon Import Fee

Addressing climate change meaningfully requires leveraging market forces. A carbon import fee is one vehicle to do so. By using the guiding principles of the ODC regime's trade mechanism, policymakers can begin constructing a streamlined design that recognizes and incentivizes environmental performance, harnesses international cooperation, includes procedural best practices to support fairness and transparency, and balances coverage and administrability. The seven lessons extracted from the ODC regime most relevant to U.S. policymakers designing a carbon import fee are: [x]

- Start with a narrow scope of coverage
- Use predictable, standardized calculations
- Establish import fee standards based on U.S. industry performance
- Compel more accurate and transparent data on imports
- Use existing administrative infrastructure to ease implementation
- Lead in establishing a "club" of like-minded countries
- Use carrots and sticks to encourage more participation in the club

Each lesson is explored for its relevance to the ODC regime and its potential application to a carbon import fee. These lessons can be applied individually or in combination to enhance the effectiveness of emerging policy design.

I. START WITH A NARROW SCOPE OF COVERAGE

The ODC excise taxes started with a narrow set of chemicals, which expanded over time, as identified in the Montreal Protocol. In 1989, the taxes initially covered only eight chemicals known as "Class 1" chemicals— CFC-11, CFC-12, CFC-113, CFC-114, CFC-115, Halon-1211, Halon-1301, and Halon-2402.[xi] The narrow coverage focused on phasing out those chemicals with the highest ozone depletion rates. In 1990, Class 2 chemicals were added under the Protocol's London amendment—carbon tetrachloride, methyl chloroform, and certain additional chlorofluorocarbons. Bulk ODCs and imported products that used covered chemicals in their manufacturing were charged (matching the fees at domestic rates). These products were publicly listed on the Internal Revenue Service's (IRS) imported product table, which identifies relevant information, including—the product name, Harmonized Tariff Schedule (HTS) code, ODC, and ODC weight. The IRS can modify the covered product list at the request of importers.[xii]

Initial enforcement was poor but improved quickly; U.S. Customs and Border Protection and the IRS increased communication and capacity to enforce these novel import fees efficiently. Beginning with limited coverage and expanding over time enabled adjustments and helped alleviate administrative and enforcement burdens for agencies. The gradual expansion of the excise tax on both chemicals and products gave clear market signals to impacted industries to invest in alternative chemicals.

Translating to a carbon import fee, an initial focus on the most energy-intensive traded products could address the majority of emissions with a relatively low administrative burden. The scope can gradually expand for more comprehensive coverage, balancing coverage with administrability at the discretion of Congress or a relevant agency. This phased implementation would allow federal agencies and importers time to adjust and expand capacity sustainably, striking a practical balance in policy design. This recommendation should be considered in context with the broad uses of carbon-intensive primary materials, like steel, aluminum, and cement, relative to GHGs.

II. USE PREDICTABLE, STANDARDIZED CALCULATIONS AND MINIMIZE DATA UNCERTAINTY

To calculate the tax rate per covered product, importers use a standard calculation: Base Tax Rate x Ozone Depleting Factor x ODC Weight.[xiii]

The base rate is applicable across imports; it started at $1.37 per pound of ODC and was set to increase gradually. It was last updated in 1995 by Congress to increase by 45 cents per pound each year thereafter;[xiv] in 2023, the active rate was $17.95 per pound.[xv]

The Ozone Depleting Factor (ODF), referred to as ozone-depleting potential in the Montreal Protocol Treaty, reflects the environmental harm to the ozone, using a rating of 1-10. ODFs are chemical-specific and agreed to under the Montreal Protocol. For example, CFC-11 has an ODF of 1, while Halon 1301 has an ODF of 10.[xvi]

Lastly, the ODC weight is the amount, in pounds, of ODCs used to manufacture a unit of covered product. The ODC weight is product-specific, and importers have three options to fulfill their data requirements: the exact method, the table method, or a default if data is unavailable.

- The exact method is the most stringent, requiring importers to submit the precise ODC weight used in the manufacturing of an imported good. The IRS's "ODC Audit Technique Guide" lays out the required information importers must supply under the exact method, which includes product costs, a description of the origin country's environmental policy pertinent to the Montreal Protocol, information on alternative substances and technologies utilized, etc.[xvii]
- The table method allows the use of benchmark data for ODC weight based on U.S. industry performance. The IRS lists these benchmarks on an "Imported Product Table," made available to all importers. This method is described in greater detail in the next section.

- If the necessary information is not available using either of these methods, the "value method" allows importers to use a default *ad valorem* rate. This method is described in section IV.

A U.S. carbon import fee could similarly use a predictable standardized calculation to determine the fee. The calculation should prioritize environmental rigor while accommodating importers' various degrees of preparedness to report emissions information. Importers can reduce their compliance burden by relying on U.S. benchmarks, or if a product is less carbon-intensive than the benchmark and the data is verifiable, the exact method can be used, rewarding carbon-efficient products. To maintain clarity, the IRS should provide a transparent import table, similar to the imported product table, for all relevant benchmarks.

III. ESTABLISH U.S. IMPORT FEE BENCHMARKS BASED ON U.S. INDUSTRY PERFORMANCE

The table method was designed to ease compliance while maintaining environmental rigor by calculating benchmarks that reflect the performances of U.S. domestic industries.[xviii] The imported product table includes standard information based on how U.S. manufacturers produce a covered product. Importers can plug the benchmarks into the fee calculation (Base Tax Rate x Ozone Depleting Factor x ODC Weight).

For example, the imported product table displays the following information for dehumidifiers: ODC weight based on domestic manufacturing was determined as, on average, 0.344 pounds of CFC-12 per unit. The ozone-depleting factor for the relevant ODC—CFC-12 is assigned an ozone-depleting factor of 1. To determine their import fee, the importer could use this U.S. benchmark, the assigned ODF, the relevant tax rate (1990) of $1.37/lb., and the total number of imported dehumidifiers.[xix]

A U.S. carbon import fee could similarly rely on carbon intensity benchmarks based on U.S. industry performance, which would streamline administration, ease compliance burdens, and maintain environmental integrity. For additional environmental protection, the U.S. could develop metrics based on foreign production averages, making relatively unfavorable assumptions that reflect the carbon-intensive production of the origin country. Using averages for inputs strikes a balance between precision and administrability, reducing the burden on importers in data collection while ensuring the credibility of environmental metrics.

IV. COMPEL MORE ACCURATE AND TRANSPARENT DATA ON IMPORTS

When importers are unable to comply with data requirements through the table or exact method, the fee is calculated using a default backstop. ODC excise taxes used a “value method” default, which assesses a fee at a fixed percentage of a product’s import value; for ODCs, this value is 1%. This method penalizes importers who do not calculate their specific impact because the 1% default is more costly than calculating the fee according to the exact and table method. This compels importers to provide more accurate and transparent data. It is easily enforceable, requires no novel information, and is set high enough to incentivize compliance. The value method is also used in other environmental excise taxes, including the Superfund chemical tax, which uses a 10% default.[xx]

A carbon import fee could benefit from using a percentage value default across products to incentivize credible emissions intensity data reporting. The default should be set to a percentage of the product's value to “bite” and incentivize data compliance. In the carbon import fee context, a higher percentage value should be considered to incentivize compliance for lower-cost carbon-intensive imports, such as carbon-intensive primary materials like iron and steel, aluminum, and fertilizers.

V. USE EXISTING ADMINISTRATIVE INFRASTRUCTURE TO EASE IMPLEMENTATION

The ODC taxes used existing environmental excise tax infrastructure for implementation, which significantly simplified compliance. Importers of regulated ODCs and products use the existing environmental tax form, 6627,[xxi] which requires the following information from importers: ODC/product name, HTS code, the weight of ODC, entry value, and the Base Tax Rate. The internationally accepted HTS codes facilitate straightforward implementation at the border by U.S. Customs. The IRS and U.S. Customs and Border Protection have successfully implemented the ODC taxes on imports for over 30 years using these systems.[xxii]

Carbon import fee design could similarly benefit from leveraging existing environmental excise tax infrastructure on imported products. Important building blocks for policymakers to consider that can reduce administrative burdens on the government and importers include ensuring that covered products align with HTS codes, using existing environmental tax forms, and improving capacity for and communication with Customs of Border Protection to enforce fees. A carbon import fee could require product name, HTS code, carbon intensity metric, base rate, and entry value—all of which should be easily assessable with the use of standards.

VI. LEAD IN THE ESTABLISHMENT OF A "CLUB" OF LIKE-MINDED COUNTRIES

The Montreal Protocol Treaty serves as a blueprint for international cooperation in reducing global emissions. The "club-like approach" was built on reducing the production of ozone-depleting chemicals, with trade being a central component. The U.S. embraced a leadership role in its development and adoption, driven by increasing public health concerns and industrial support in the late 80s. Recognizing the environmental benefits and emerging market opportunities for domestic industries, the U.S. championed the treaty and was the first to ratify it. By 2009, the parties had phased out 98% of the pollutants controlled by the treaty, a collective environmental success.[xxiii]

GHGs, akin to ODCs, are a global commons issue that will require international action to effectively address. Drawing from the precedent set by the Montreal Protocol, the U.S. can lead in coordinating climate ambitions with key partners. With its prominent role on the international stage and substantial consumer market, the U.S. is well-placed to spearhead collective action, rallying partners to adopt carbon import fees and similar policy measures to favor carbon-efficient goods. In fact, if the Group of Seven (G-7) nations aligned policies in this fashion, it would mobilize more than half of the global economy toward cleaner trade flows.[xxiv]

VII. USE CARROTS AND STICKS TO ENCOURAGE MORE PARTICIPATION IN THE CLUB

The Montreal Protocol achieved universal membership in 2019, 32 years after its introduction, with broad acceptance attributed to two key factors. Firstly, the inclusion of enforceable trade restrictions reduced the competitive advantage of not joining. Secondly, the inclusive benefits eased compliance costs for qualifying developing economies. Collectively, this incentivized ratification for both the Global North and South.

The Montreal Protocol's approach to trade is its most stringent feature. It banned the trade of chemicals between members and non-members, limiting the market access of non-members and significantly increasing the chance of countries joining. The Protocol is one of two treaties that use enforceable trade barriers, the other being the Basel Convention of the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.[xxv]

The member benefits create a self-supporting loop to ease compliance costs and incentivize innovation. There are two central benefits: the Technology and Economic Assessment Panel (TEAP) and the Multilateral Fund. TEAP provides technical and

economic support at the request of Parties. TEAP assesses and identifies alternative ODS technologies, practice changes, or innovation needs to support members in compliance. TEAP's findings help accelerate innovation and deployment. The Multilateral Fund further supports the transition by allocating funds to qualifying developing countries to support compliance measures, including the solutions identified by TEAP. This integrated approach promotes a cycle of support, ultimately contributing to the initiative's success.

Like the Montreal Protocol, a climate club could offer exclusive benefits to members, supporting a fair and transparent rules-based system. Club benefits might encompass trade-free barriers on lower-carbon goods and technology crucial for decarbonization, technical assistance, and services support, as well as prioritizing trade flows between members. While banning trade with non-members is not practical in a climate club, other tools could be utilized to compel participation, such as higher tariff rates on carbon-intensive goods for non-members or other trade barriers that reduce the competitive advantage of staying outside the club. Policymakers should give special attention to certain developing and least developed countries in carbon import fee implementation, considering various stages of economic development to ensure sincere decarbonization efforts. The innovative nature of the U.S. economy is well-suited to incubate green technologies and other goods needed for decarbonization that could be deployed in the Global South to assist in their transition.

Table 1: Attributes of a Carbon Import Fee modeled after the lessons provided by the Montreal Protocol and ODC Excise Taxes vs. the EU's CBAM

	Montreal Protocol/ODC Excise Taxes	EU CBAM
Start with a narrow scope of coverage	✓	✓
Use predictable, standardized calculations	✓	-
Establish import fee benchmarks based on industry performance	✓	-
Compel more accurate and transparent data on imports	✓	✓
Use existing administrative infrastructure to ease implementation	✓	-
Creating a "club" of like-minded countries.	✓	-
Use carrots and sticks to encourage more participation in the club	✓	-

ENDNOTES

[i] Note: ODCs are described as “ozone-depleting substances” (ODS) in the Montreal Protocol Treaty.
[ii] The Ozone is a molecule made up of three oxygen atoms, occurring naturally in the upper stratosphere 10 to 50 kilometers above the earth. It absorbs much of the sun’s ultraviolet radiation.
[iii] Danielle Underferth / Published, and 2023. 2023. “Understanding the UN Report on Ozone Layer Recovery.” The Hub. January 31, 2023. https://hub.jhu.edu/2023/01/31/un-report-ozone-layer-recovery/#:~:text=What%20is%20the%20time%20frame.
[iv] The EPA’s definition of embodied emissions is, “the **amount of greenhouse gas emissions associated with upstream stages of** a product's life.”
[v] Rorke, Catrina and Greg Bertelsen. Key Findings Embodied in Trade: Carbon Loophole. Climate Leadership Council, November 2022.
[vi] Refers to both the Montreal Protocol and ODC excise taxes. Note that “ODC” is interchangeable with “Ozone Depleting Substances.”
[vii] Under section 4681(a)(1) imposes a tax on ODCs that are sold or used by the manufacturer or importer.
[viii] Under section 4681 (a)(2) imposes a tax on imported taxable products that are sold or used the importer. The tax is computed by the weight of ODC’s used in production.
[ix] Under section 4682(h) imposes a floor stock tax on ODCs held after 1989.
[x] Excludes the ODC Floor Stock tax.
Excludes the ODC Floor Stock tax.
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