

# Implications for Customs of climate change mitigation and adaptation policy options: a preliminary examination

*Robert Ireland<sup>1</sup>*

## Abstract

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This paper offers a preliminary examination of the theoretical and practical implications of climate change mitigation and adaptation policy options on the role of Customs. The policy options covered are carbon import tariffs (especially border tax adjustments [BTAs]), trade facilitation of low-carbon energy technology (including the salience of the Harmonized Commodity Description and Coding System), enforcement against emission permit trading irregularities, customs clearance of humanitarian relief consignments, trade recovery, and Customs' responses to the potential of climate change driven international trade contraction. The paper contends that further research on such topics using positive and normative criteria will promote rational consideration, formulation and implementation of Customs-relevant climate policies. An interdisciplinary approach is used for the paper's sourcing and analysis, and expanded use of this methodology is encouraged to further enrich research on Customs matters.

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## 1. Introduction

Climate change (or global warming) is widely recognised by most scientists as a potentially severe environmental threat to the planet Earth. In public policy circles, climate change policy options are generally divided into two types, *mitigation* (targeting the causes) and *adaptation* (targeting the impacts). Intriguingly, both mitigation and adaptation climate change policies have implications for Customs administrations. This paper provides an identification and introductory analysis of the essential customs subjects under a framework of climate change mitigation and adaptation policy options. Academic literature and other research that directly or indirectly relate to this multifaceted topic are surveyed.

Customs administrations may be called upon by their political masters to implement climate change mitigation policies in the form of border procedures or customs enforcement, such as carbon import tariffs (especially border tax adjustments [BTAs]), trade facilitation of low-carbon energy technology (especially the use of commodity classification), and enforcement against emission permit trading irregularities.

In addition, Customs administrations may be directed to deal with climate change impacts by developing adaptation policies, such as customs clearance of humanitarian relief consignments, trade recovery, and customs best practices to deal with the potential of international trade contraction caused by climate change welfare losses.

The paper begins by discussing the science of climate change, as the overarching inquiry (the implications for Customs) cannot be seen in isolation. The scientific consensus that human activities are contributing

to climate change and that there is a likelihood of mid- to long-term adverse consequences suggest the need for productive negotiations leading to implementation of robust action. National and international politics have, however, thus far deferred adequate policy responses to this global crisis. Moreover, the entanglement of climate change policy and pure free trade principles have surprisingly produced quarrels about which takes precedence.

## 2. Climate change science

While the details of climate change science are outside the scope of this paper, examining whether there is a need for national and global climate policies, and whether Customs has a participative role, require reflection on four key scientific inquiries. First, whether carbon dioxide (CO<sub>2</sub>) concentrations are increasing in the atmosphere. Second, if yes, whether this trend is anthropogenic (attributable to human activities). Third, how sensitive the Earth's climate is to increased CO<sub>2</sub> atmospheric concentrations. And fourth, whether climate change poses serious implications for the Earth.

Most of what is known about climate change is summarised in scientific assessments, which synthesise the leading scientific knowledge to make it accessible to non-experts, especially policymakers (Dessler & Parson 2006, pp. 43-45).<sup>2</sup> As presented in scientific assessments based on empirical evidence and peer-reviewed literature, it is well established that climate change is occurring and is predominantly anthropogenic. Fossil fuel (especially coal and oil) burning and deforestation augment the concentration of CO<sub>2</sub> and other greenhouse gases (GHGs)<sup>3</sup> in the atmosphere. The CO<sub>2</sub> in the atmosphere absorbs energy from the sun and emits less radiation back into space, thus warming the planet. In other words, atmospheric CO<sub>2</sub> functions as a heat-trapping blanket for the surface below. Indeed, without any atmospheric CO<sub>2</sub> the Earth would be so cold it would be uninhabitable for humans. Too much CO<sub>2</sub> would turn the Earth into a blazing inferno.

The story of anthropogenic climate change began with the emergence of the industrial revolution in the eighteenth century. Industrial processes brought forth fossil fuel combustion and deforestation; these activities cause CO<sub>2</sub> emissions which settle in the oceans, land sinks, and the atmosphere, and led some scientists to worry that it would upset the fragility of the Earth's climate balance. In 1957, oceanographer Roger Revelle and chemist Hans Suess published a paper where they famously wrote that 'within a few centuries we are returning to the atmosphere and oceans the concentrated organic carbon stored in sedimentary rocks over hundreds of millions of years' (Revelle & Suess 1957).

Revelle advocated for a data collection initiative to measure CO<sub>2</sub> concentration in the atmosphere and his employer, the Scripps Institution of Oceanography in California, hired chemist Charles Keeling for this project. Beginning in 1958 and over the coming decades, Keeling and his colleagues collected data on CO<sub>2</sub> concentration in the atmosphere from the Mauna Loa Observatory in Hawaii and other sites (Weart 2008, pp. 34-37).

The Scripps data, known as the *Keeling curve*, has become an icon of climate change, and shows conclusively an inexorable increase in atmospheric CO<sub>2</sub> concentration. Carbon parts per million (ppm) in the atmosphere have grown from **280** ppm in the pre-industrial era, to **315** ppm in 1958, and reached **392** ppm in April 2010 (IPCC 2007b; Scripps 2009; NOAA 2010). The current CO<sub>2</sub> ppm concentration is the highest in at least 650,000 years and possibly 20 million years; moreover, the average annual growth rate of global atmospheric CO<sub>2</sub> for 2000 to 2006 was 1.93 ppm, which is the highest growth rate since the Keeling curve measurements began (Canadell et al. 2007).

Concomitant to CO<sub>2</sub> atmospheric accumulation, the IPCC has concluded that 'warming of the climate system is unequivocal' (IPCC 2007a). Scientific analysis of the surface thermometer history, glacier retreat, rising sea levels, decline in sea ice, rise in sub-surface ocean temperatures, and climate proxies (analysis of climate variation on such physical items as tree rings, ice cores, corals, and ocean sediments) conclusively proves that the planet is warming, including a 0.4 °C to 0.8 °C average increase during

the twentieth century (Dessler & Parson 2006, pp. 48-59). Current estimates are that a doubling of CO<sub>2</sub> atmospheric concentration leads to an average warming of 2 °C to 4.5 °C which, depending on emissions trends and other factors, means the planet will be on average 2 °C to 7 °C warmer in 2095 than it was in the pre-industrial era (Archer & Rahmstorf 2010, pp. 8, 129-32). Climate scientists from the US National Aeronautics and Space Administration (NASA) recently reported their conclusion 'that global temperature continued to rise rapidly in the past decade' and projected that 2010 will likely become the hottest or second hottest year at least since temperature record keeping began in the 1880s (Hansen et al. 2010).

Because the Earth's climate system is sensitive to even modest temperature changes, these projections are foreboding for the impacts on nature and human civilization. The 2007 IPCC report suggests that climate change will likely cause harmful effects for planetary life, including but not limited to, increases in heavy precipitation events, rises in sea level which will cause massive flooding (including densely populated areas and seaports), drought-affected areas, coastal erosion, intensity and duration of heatwaves, risks of flora and fauna extinction, acidification of oceans that damages marine life, non-productivity of crops, and melting glaciers leading to reductions in water availability for human consumption (IPCC 2007a). Widespread starvation and forced migration, especially in developing countries, are a likely initial devastation that climate change will cause for humans. While there are uncertainties over climate change impacts, location, and timing, if CO<sub>2</sub> emissions continue at their current or an accelerated pace, it will likely cause acute planetary damage. More ominously, a threshold of irreversible climate change due to CO<sub>2</sub> emissions and amplifying feedback, such as the release of methane due to melting permafrost, has been reached (Solomon et al. 2009).

### **3. Customs and climate change**

The Customs-climate change linkage is not intuitive. Customs regulates cross-border movements of goods and is traditionally associated with responsibilities such as revenue collection, anti-smuggling, supply chain security, trade facilitation, and gathering trade statistics. Customs administrations and the World Customs Organization (WCO), however, have forayed into environmental protection, especially the enforcement provisions of several international conventions.<sup>4</sup> The WCO Secretary General, Kunio Mikuriya, chose environmental protection in 2009 as the theme of International Customs Day, and has stated that 'protection of the environment is often regarded as a policy matter of other ministries, but the customs community has the effective means to contribute to this increasingly important policy objective' (Mikuriya 2009).

Under the Montreal Protocol ozone depleting substances (ODS) requirements, Customs has gathered trade statistics, collected duties, and investigated smuggling (Benedick 1998, pp. 269-86; Andersen & Sarma 2002). To aid the collection and use of ODS import and export data, the WCO has several times adjusted its Harmonized Commodity Description and Coding System (Harmonized System or HS) by establishing specific commodity subheadings to give separate status to ODS covered by the Montreal Protocol.

The United States (US) Government, as part of its ODS policies, applied BTAs (a tariff on ODS imports) to complement ODS excise taxes (Hoerner 1998, pp. 11-12). The amount of the tax (on each pound of 'any ozone-depleting chemical sold or used by the manufacturer, producer, or importer' and 'any imported taxable product sold or used by the importer') is 'the base tax amount, multiplied by the ozone-depletion factor for such chemical' with 'the base tax amount with respect to any sale or use during any calendar year after 1995 shall be \$5.35 increased by 45 cents for each year after 1995' (26 U.S.C. § 4681). The BTA language from the law is the following: '[T]he amount of the tax imposed on any imported taxable product shall be the amount of tax which would have been imposed on the ozone-depleting chemicals used as materials in the manufacture or production of such product if such ozone-depleting chemicals had been sold in the United States on the date of the sale of such imported taxable product' (26 U.S.C. § 4681).

ODS, in addition to being detrimental to the ozone layer, are also powerful GHGs and contribute to climate change. Thus, while the principal reason for the US ODS tariff was protection of the ozone layer, in practice it was also an import tariff on carbon equivalent GHGs.

The Montreal Protocol's Article 4 obligated parties to impose import and export bans on controlled substances against non-parties, although this became moot because ratification was soon nearly universal (Brack 1996, pp. 44-48; World Bank 2008, p. 16). The chief US negotiator for the Montreal Protocol, Richard Benedick, has contended that the objective of these trade measures 'was to stimulate as many nations as possible to participate in the protocol, by preventing nonparticipating countries from enjoying competitive advantages and by discouraging the movement of CFC [chlorofluorocarbons] production facilities to such countries' (Benedick 1998, p. 91).

Climate policy is linked to international trade and there is a large volume of literature on the relationship.<sup>5</sup> Moreover, two of the three broad categories of climate change policy responses widely discussed in the literature, *mitigation* and *adaptation*, have implications for Customs. Mitigation policies 'target the causes of climate change, seeking to reduce the emissions of GHGs that are causing the climate to change' while adaptation policies 'target the impacts of climate change, seeking to adjust human society to the changing climate and so reduce the resultant harms' (Dessler & Parson 2006, p. 90).<sup>6</sup>

## 4. Mitigation

A voluntary solution to CO<sub>2</sub> emissions abatement has proven to be insufficient and governmental intervention using carbon pricing mechanisms is necessary. The aim of signalling a carbon price that is real or implicit is to influence producers and consumers to emit less carbon and raise the competitiveness of low-carbon emitting industries. For political and economic reasons, policymakers appear generally to have decided that market-based regulatory instruments are preferable to command and control regulations. Market-based regulatory instruments include two broad types, *carbon taxes* and *tradable emission permit systems*.

A carbon tax draws from the work of economist Arthur Pigou who advocated taxing negative externalities by incorporating the appropriate social cost (Pigou 1920). In the climate change context this can entail taxing the CO<sub>2</sub> emissions from the burning of fossil fuels. Carbon tax design, like other taxes, derives from the chosen tax base and tax rate (Metcalf & Weisbach 2009, p. 501). A carbon tax, preferably, should be taxed upstream (on the producer or manufacturer rather than the consumer) to promote comprehensive coverage (Aldy, Ley & Parry 2008, p. 506).

Under tradable emission permit systems (generally known in the US as a cap-and-trade system), the government limits or caps the amount of allowable CO<sub>2</sub> emissions. Emitters then receive or buy allowances or credits; the total amount of credits is equivalent to the limit on emissions. Emitters who exceed their allotment must buy credits from emitters who use less than their allotment. The leading tradable emission permit system is the European Union's *Emission Trading Scheme* (EU ETS) (Dessler & Parson 2006, pp. 108-09).

### 4.1 Carbon import tariffs

Carbon imports tariffs are a climate mitigation policy where Customs is frequently the administering agency. Theoretically, there are two general types of carbon import tariffs: *product taxes* and *process taxes*. Product taxes focus on goods such as fossil fuels or GHGs with industrial uses, and this is relatively non-controversial from an international trade perspective because they appear to be in compliance with World Trade Organization (WTO) rules on national treatment and non-discrimination. In addition, they are relatively simple for Customs to administer: Customs can apply a *specific* (for instance, 100 dollars per metric tonne of carbon in the good) or an *ad valorem* (for instance, 5 per cent

of the good's value) tariff. Current examples include Denmark, which taxes imports of the industrial GHGs of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>) and is based on the Danish CO<sub>2</sub> tax correlated with the Global Warming Potential (GWP) up to a maximum of DKK 400/kg (Danish Ministry of the Environment 2005, p. 108). Norway also has an import tax on HFCs and PFCs (Norwegian Ministry of the Environment 2009, p. 10). Switzerland has a carbon tariff on some fossil fuels used for energy purposes at 36 francs per tonne of CO<sub>2</sub> (Swiss Customs 2010). More countries will likely implement product tax carbon import tariffs in the future. As Customs would generally be the responsible national agency, it is a subject ripe for focused research on the practicalities of administering these taxes.

More controversially, some policymakers are proposing process taxes, which are import tariffs on the *embodied carbon* (which is also known as *virtual carbon* or *embedded carbon*) of carbon-intensive goods. Embodied carbon, which relates to the process of producing a product rather than the product itself, has been defined as 'carbon dioxide emitted at all stages of a good's manufacturing process, from the mining of raw materials through the distribution process, to the final product provided to the consumer' (Kejun, Cosbey & Murphy 2008). Goods such as cement, paper, chemicals, glass, steel, industrial ceramics, iron, and aluminium that produce substantial carbon dioxide during their production process would be the main targets of such a tax.

This proposal is being made because implementation of a domestic carbon tax or tradable emission permit systems raises fears in some quarters of *carbon leakage to pollution havens* if emitters in other countries do not come under comparable carbon pricing regimes. The concern is that if Country A has raised its carbon prices significantly higher than Country B, there will be business and carbon migration from Country A to Country B, and aggregate global CO<sub>2</sub> emissions will not decrease. Moreover, businesses in Country A may claim they are at a competitive disadvantage to similar businesses in Country B.

To assuage concerns about carbon leakage some policymakers are thus advocating imposition of levies on the embodied carbon in the import or requiring importers to buy emission permits (Zhang 2010, p. 1) coupled possibly with rebates for exports. Because these actions could face WTO adjudication, proponents frequently cast them as BTAs, which could consist of '(i) the imposition of a tax borne by similar domestic products (that is, BTA on imports); and/or (ii) the refund of domestic taxes when the products are exported (that is, BTA on exports)' (WTO & UNEP 2009, p. 100). The literature on embodied carbon BTAs is vast and emphasises WTO law, economics, and whether they might spark a trade war. There is also research that, as a subsidiary matter, touches on design and administration.

Conventional BTAs have a long history. Economist David Ricardo provided the intellectual origins in 1824:

In the degree then in which [domestic] taxes raise the price of corn, a duty should be imposed on its importation...and a drawback of the same amount should be allowed on the exportation of corn. By the means of this duty and this drawback, the trade would be placed on the same footing as if it had never been taxed... (Ricardo 1824, cited in Hufbauer 1996, p. 21).

Even before Ricardo's commentary, the US in the late eighteenth century used BTAs to complement its excise tax on distilled spirits (Hufbauer 1996, p. 37). EU countries have used BTAs to complement excise taxes on alcohol and tobacco (Biermann & Brohm 2005, pp. 291-92) and for value added taxes (Hufbauer 1996, p. 21). In 1970, the General Agreement on Tariffs and Trade (GATT) formally defined BTAs in paragraph 4 of the GATT Working Party on Border Tax Adjustments (GATT 1970).

The US has applied *environmental BTAs* on at least two occasions. BTAs were imposed on imports of specified chemicals and other products to balance domestic excise taxes under the US Superfund Amendments and Reauthorization Act of 1986. As mentioned earlier, BTAs were also imposed to complement a US excise tax on ozone depleting commodities that took effect in 1990. The GATT approved the use of BTAs for Superfund and was never asked to judge the use of BTAs for the ODS excise tax (Hoerner 1998, pp. 8-15).

## 4.2 The law, economics, and politics of embodied carbon BTAs

Because detailed analysis on the WTO legality of embodied carbon BTAs is beyond the scope of this paper,<sup>7</sup> only a short summary is provided here. Despite the WTO imprimatur on conventional BTAs and the history of BTAs functioning in practice, there is disagreement among legal experts on whether as embodied carbon BTAs they would be deemed legal under WTO law if litigated. The analysis is extremely complex and entails scrutiny of, among other things, whether a WTO dispute settlement body would distinguish whether the tariff is indeed targeting a *production process* (for example, the carbon emitted during the manufacturing of cement) and if so, whether this would be permissible. Moreover, there is the question of whether national and foreign cement are *like* products, if they were manufactured with different levels of environmental efficiency (Pauwelyn 2007b; WTO & UNEP 2009, pp. 106-07).

The alternative to pleading that embodied carbon BTAs are legal under GATT Articles I and III would be to claim they are allowable under one or two of the general exceptions in GATT Article XX, namely measures ‘necessary to protect human, animal or plant life or health’ and ‘relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption’. Following this, the exception must survive several tests in the GATT Article XX Chapeau, namely prohibition of measures that would constitute ‘arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade’. Litigation related to these general exceptions in the context of environmental measures has occurred in several cases (*US-Gasoline*; *Brazil-Retreaded Tyres*; and *US-Shrimp*) with uncertain implications for embodied carbon BTAs (WTO & UNEP 2009, pp. 107-10).

What may emerge, regardless of litigation over embodied carbon BTAs and decisions within the WTO arena, are expanded clashes related to climate change and trade liberalisation, and what the proper venue is for sorting out this conflict. As previously noted, under the Montreal Protocol, imports from and exports to non-parties of CFCs and other ODS were banned. Whether this would conflict with the GATT is in dispute but it was never litigated, perhaps because Montreal Protocol ratification quickly became nearly universal (Benedick 1998, p. 91; Brack 2000, p. 18).

Economists disagree on whether embodied carbon BTAs would be efficient and effective. For instance, McKibbin and Wilcoxon (2008) ‘conclude that the benefits produced by border adjustments would be too small to justify their administrative complexity or their deleterious effects on international trade’. Economist Paul Krugman, however, has written that ‘if you only impose restrictions on GHG emissions from domestic sources, you give consumers no incentive to avoid purchasing products that cause emissions in other countries; as a result, you have an inefficient outcome even from a world point of view. So border adjustments here are entirely legitimate in terms of basic economics’ (Krugman 2009).

Realpolitik could trump the legal and economic debates as policymakers may use embodied carbon BTAs as a political negotiating tactic on national and international levels. The US appears unable to garner the support for passage of climate legislation without them. Similarly, in the legislative experience targeting ODS, Hoerner (1998, p. 15) asserted that ‘the US Congress would never have enacted the ODC [ozone-depleting chemicals] tax without BTAs’. Moreover, inserting the possibility of such measures into proposed legislation, could inoculate the assertions of potential taxpayers who lobby against the installation of a carbon pricing mechanism on the basis of putative harm to competitiveness. Export-focused countries may be pressured by their exporters to implement policies that price carbon if BTAs are imposed by countries with business competitors. Finally, the identity of the potential applier and target of embodied carbon BTAs is not fixed in perpetuity as this could shift depending on who has considered or implemented such policies and who has not.

### 4.3 Administering embodied carbon BTAs

If some governments decide to implement these BTAs, Customs will be obligated to impose them. There is disagreement on whether it would be impossible or merely difficult for Customs to administer them. The *Economist* (2008) has opined that ‘a carbon tariff... would be hard to implement. Customs officials would either have to assess the emissions embedded in imports, an impossibly complicated task, or make arbitrary assumptions, a recipe for a trade war’. The reality is, however, that administering embodied carbon BTAs would be feasible. Several published research papers offer possible designs for calculating and administering these BTAs.<sup>8</sup>

Embodied carbon BTA procedures would be simplified if the exporter supplied the necessary information to the Customs administration of the import country. Similar to practices in assessing rules of origin, the exporter could provide a certificate of embodied carbon, although this would require some sort of verification. To influence cooperation from traders, Houser et al. (2008, p. 35) have suggested a trusted importer program where the Customs administration would evaluate importers individually for the carbon intensity of their product’s production process. It can be assumed that since the importers would not have this information because they did not participate in the production process, they would need to get it from the exporters or manufacturers. This proposal has similarities to Customs Authorised Economic Operator (AEO) programs established for supply chain security policies.

If the exporter and importer are unable or unwilling to provide the required information, then the Customs administration imposing the BTA would need to make the calculation. In targeting embodied carbon, two general approaches in the literature include ‘*top-down methods* using input-output analysis have often been applied to estimate embodied energy, CO<sub>2</sub> emissions, pollutants and land appropriation from international trade activities’ and ‘the *bottom-up approach* calculates embodied carbon by examining the production processes of specific products’ (Kejun, Cosbey & Murphy 2008). Because of its broad nature, the top-down approach (see, for example, Wyckoff & Roop 1994; Atkinson et al. 2010) does not appear at first blush to be conducive to the customs need to calculate embodied carbon of individual commodities (Kejun, Cosbey & Murphy 2008).

Measuring production processes of individual commodities is probably more realistic for customs usage. Key factors in calculating the carbon emitted during the import’s production process include process, feedstock (what raw material was used to power the manufacturing process), the energy source, and the technical efficiency of the equipment (Houser et al. 2008, pp. 33-34). The *predominant method of production* (PMP) (Zhang 1998, 2010; Biermann & Brohm 2005, pp. 298-99; Pauwelyn 2007a, p. 42) and the *best available technology* (BAT) (Ismer & Neuhoff 2004, 2007, pp. 137-64; Godard 2007, pp. 14-38) are two proposed methods.

PMP means that the country of import would apply the border adjustment by assessing the carbon embedded in an import based on their domestic production processes (Zhang 2010, p. 19). BAT means that the country of import would apply the border adjustment by assessing the carbon embedded in an import based on what the carbon emissions would be if the best available technology was used (for instance, if cement can be produced using natural gas or coal, the levy would be calculated based on the production process where natural gas was used) (Ismer & Neuhoff 2007, pp. 137-64). The efficacy of BAT is perhaps tarnished by the observation that it may introduce a disincentive by using the most efficient technology as its measurement instrument when what the policy should be targeting is what was actually used, such as the least efficient technology.

Gros and Egenhofer (2009, p. 74) have suggested using ISO 14067, which is a potential standard on quantifying the carbon footprint of goods and services. ISO 14067 is currently under development by the International Standards Organization and projected for rollout in 2012.

To simplify customs procedures, consideration could be given to the breadth of commodity coverage and which countries would be subject to the BTA. For instance, the BTA could be applied to a limited number of products that will make a difference to carbon abatement (Biermann & Brohm 2005, p. 298; Saddler, Muller & Cuevas 2006, p. 42). Related to targeting specific countries, climate change mitigation would be aided (reducing emissions by tiny economies will have no impact on CO<sub>2</sub> atmospheric concentration but lower emissions from large economies would have an impact), but this might run foul of WTO rules on non-discrimination. In addition, rules of origin add further complexity in determining whether one or more countries contributed to the production of the imports.

### 4.4 Some reflections on embodied carbon BTAs

Customs procedures related to embodied carbon BTAs would be feasible, albeit complex. This is not a new dynamic for Customs. Conventional customs procedures, while strengthened by risk analysis, automation and other modern analytical tools, must deal with the challenges of assessing commodity classification, valuation, and rules of origin, especially diverse public policy mandates, immense volumes of cargo and passengers, pressure for fast clearance of goods, deficiencies in available and accurate information, and limitations in agency capacity.

Similarly, improvements have evolved in achieving national policy objectives on anti-dumping. There is no doubt about the difficulty of calculating dumping – the home market sales price minus the export sales price (Jackson 1997, p. 251) – as it must rely on best available information and sophisticated calculations, such as home market prices, *normal value* (relates to third markets), and *constructed price* (constructed cost plus reasonable profit) (Jackson 1997, p. 251). While not easy, best efforts can be made in anti-dumping policy using expertise and rules that have improved over time, and that reduce the potential for arbitrariness.

Because WCO policy positions require Member consensus, the WCO is unlikely to take a formal position on taxing the embodied carbon of imports; some countries reject them while others have pockets of support. In addition, international negotiations on such measures will take place in other forums, especially the United Nations Framework Convention on Climate Change (UNFCCC) and the WTO. A more relevant question for Customs is whether the WCO or other customs experts should or will conduct further research on the technical methods of administering border measures targeting embodied carbon before it becomes an obligation. Some might assert that such research would be a concession that these measures are inevitable. Conversely, since such a policy would be a mandate that would not be of its choosing, advance preparation by Customs would perhaps be prudent.

Some policymakers have advocated the imposition of embodied carbon BTAs as part of their carbon pricing policies. The leaders of France and Italy, in an April 2010 letter to the European Commission's president, wrote 'it would be unacceptable if the efforts we have made within the EU...were compromised by carbon leakage caused by the lack or inadequacy of action in certain third countries' (as quoted in *Earth Times* 2010). To counter carbon leakage, the French Government has proposed an EU *Mécanisme d'inclusion carbone* (*carbon inclusion mechanism*), which would be a requirement that importers acquire CO<sub>2</sub> allowances (EuroActiv 2010a, 2010b). In the US, although several cap-and-trade bills that included embodied carbon BTAs were introduced by legislators in the 111th US Congress, efforts were eventually abandoned to pass a comprehensive US carbon pricing law in 2010.

### 4.5 Trade facilitation and commodity classification of low-carbon energy technology

Reducing tariff and non-tariff barriers to trade (NTBs)<sup>9</sup> can foster expanded use of low-carbon energy technology (such as wind, solar, efficient lighting, and hydropower).<sup>10</sup> The seminal Stern Report states that 'the reduction of tariff and non-tariff barriers for low-carbon goods and services, including within the Doha Development Round of international trade negotiations,<sup>11</sup> could provide further opportunities



to accelerate the diffusion of key [low-carbon] technologies' (Stern 2006, p. xxv). The World Bank has estimated that the elimination of tariff and NTBs would lead to an average increase of 13.5 per cent in trade of clean coal technology, wind and solar generation, and efficient lighting technology (World Bank 2008, p. 53).

Pursuing the Stern Report and World Bank recommendations will not be easy. Import tariffs, especially in the developing world, are substantial for low-carbon energy technologies (Steenblik 2005b, p. 5; Brewer 2008, pp. 10-12). Difficulties in customs classification of environmental goods is another obstacle to overcome. In addition, border regulatory delays and corruption inhibit trade, including trade in environmental goods, and for Customs this could suggest the need for 'green' green lanes.

Efficient and precise classification of environmental goods is crucial for trade facilitation of low-carbon energy technologies. The most obvious mechanism for this is the Harmonized System, which is the international nomenclature for goods passing through Customs and is managed by the WCO. The overall objective of the HS is uniformity in the classification of goods. The HS currently consists of approximately 5,000 commodity groups organised in 96 chapters and each item is identified with a six digit code. For example, related to solar power, photovoltaic cells, modules, and panels are classified in HS subheading 8541.40; photovoltaic system controllers (to control the functioning of the photovoltaic system) come under HS subheading 8537.10; and HS subheading 8507.20 includes, among other things, certain electric accumulators used in the storage of electricity obtained via solar cells, panels, or modules. Countries that have ratified the HS Convention are required to use the six digit nomenclature but are allowed to add additional digits for added specificity (this generally means expansion to eight or ten digits). Indeed, several countries and regional groupings such as the Association of Southeast Asian Nations (ASEAN) have expanded HS nomenclature, including in some cases for renewable energies (World Bank 2008, p. 51). The HS is generally amended every four to six years to keep up with changes in commodities; the most recent amendment was in 2007 and the next one is scheduled for 2012.

The HS's six digits arguably may be insufficient to precisely describe low-carbon energy technology because they might categorise together low-carbon and non low-carbon technology goods under the same HS code (World Bank 2008, pp. 50, 101). Theoretically, if all goods under a specific HS code were granted a lower tariff rate because some were considered to be low-carbon, some goods that do not contribute to lower emissions might benefit and Customs might collect less duty (World Bank 2008, p. 52). Products that are dual-use add further complications as some are contributive, neutral, or detrimental to climate change mitigation depending on their application (Steenblik 2005a, pp. 7-10; World Bank 2008, p. 77).

Options for using the HS to help facilitate trade in low-carbon energy technologies would be difficult in practice. Creating a separate HS chapter for low-carbon energy technologies would be one possibility. As was discussed previously, more precision was brought to the classification of ozone depleting substances in order to successfully reduce their emissions. Another method would be extending the number of digits of HS Code nomenclature, but the hurdles for doing so are immense; for instance, there would have to be consensus amongst all WTO Members in support of the expansion (Steenblik 2005a, p. 16; World Bank 2008, p. 90). As well, there could be relevant lessons to be drawn from the WTO's 1996 Information Technology Agreement (ITA), which aims to increase the amount of trade in IT goods by examining HS classification divergences and eliminating tariffs (WTO 2010).

Enforcement of intellectual property rights (IPR) of low-carbon technology transfer under the WTO Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) is another climate policy matter with customs participation. IPR enforcement may impact low-carbon technology's utility as a mitigation tool. Too strong IPR enforcement cuts off transfer of these needed technologies to the developing world. Too lax IPR enforcement will stifle incentives for innovation. Thus, public policy here will need to strive for a balanced approach (World Bank 2008, p. 14; Giddens 2009, p. 139; Meyer-Ohledorf & Gerstetter 2009, pp. 23-26).

## 4.6 ETS enforcement

Promoting compliance (and effective enforcement when necessary) with tradable emission permit systems or carbon taxes is essential to limit carbon emissions. While relatively simple carbon pricing mechanisms are the preferred approach to reducing evasion or fraud, enforcement by the government will be required. The EU ETS has been the victim of a VAT fraud called ‘missing trader intra-community’ (MTIC) fraud (Ainsworth 2009). The scam entails criminals importing carbon credits tax free, selling them to buyers while charging a VAT, and keeping the VAT rather than giving it to the tax or customs authorities. The MTIC fraud that has received the most attention is called ‘carousel fraud’ which repeats as long as possible the import and export of the same carbon credits (Ainsworth 2009, p. 4). In 2009 the United Kingdom’s Her Majesty’s Revenue and Customs raided businesses in relation to a suspected 38 million pound carbon credit VAT fraud (*Guardian* 2009) and the Belgian government charged three Britons with failing to pay VAT worth 3 million Euros on carbon credit transactions (*Guardian* 2010). Europol estimates at least 5 billion Euros in revenue losses to government coffers (Europol 2009) as a result of MTIC fraud.

## 5. Adaptation

In formulating their adaptation policies, governments should consider the potential implications of climate change (in addition, of course, to catastrophes not caused by global warming, such as earthquakes) on their customs and border management responsibilities. This is especially true because there has been an upward growth in disasters in recent decades (UNEP/GRID-Arendal 2010), and this trend can be expected to continue because of climate change. In particular, key Customs-climate change adaptation subjects include clearance of humanitarian aid shipments, trade recovery, and advance planning for conceivable international trade contraction.

### 5.1 Clearance of humanitarian relief consignments and trade recovery

During humanitarian assistance or relief<sup>12</sup> response actions, Customs can be an obstacle or facilitator of rapid movement of relief consignments. Although data is lacking on the scale of the problem, there have been alleged incidents where Customs delayed the clearance of relief consignments by demanding payment of customs duties or for other reasons (Fisher 2007, pp. 357-58). Because of the aforementioned upward trend in disasters, Customs will more frequently deal with expediting clearance of relief consignments in the future. This will especially be true for landlocked developing countries, where customs transit is of significant importance.

Several WCO instruments provide guidance for customs controls in such situations, including the 1970 *WCO Recommendation of the Customs Co-Operation Council to expedite the forwarding of relief consignments in the event of disaster*, the *WCO revised Kyoto Convention* (Specific Annex J.5), and the *WCO Istanbul Convention on Temporary Importation* (Annex B.9). In particular, these instruments provide detailed recommendations for simplified and expedited customs procedures, and the waiver of import duties in the clearance of relief consignments. In June 2010, the WCO established an Ad Hoc Working Group for Natural Disaster Relief to study the topic further and develop recommendations.

If climate change produces cataclysmic damage, such as flooding of coastal areas and major seaports, customshouses may be temporarily non-operational or require relocation. Moreover, trade may come to a standstill at border posts. While developed in the mindset of responding to armed attacks, the *WCO Trade Recovery Guidelines* adopted in June 2009 (WCO 2009b) could be applicable to climate change adaptation. The Government of Australia and the Asia-Pacific Economic Cooperation (APEC) have also developed trade recovery strategies (Australian Customs Service 2008; APEC 2007).

## 5.2 Contraction of international trade

Climate change could lead to contraction of international trade and thus could impact Customs, including changing roles and reduced revenue collection. Although not due to anthropogenic climate change, two recent events could be a foreshadowing of the types of problems that could ensue for international trade from climate change. The eruption in 2010 of the Icelandic volcano Eyjafjallajökull briefly caused chaos for, among other things, air cargo, and this had ripple effects for overall international trade transport. More significantly, the global financial crisis of 2008 included a plunge in international trade volumes.

Related to the economic crisis, the WCO researched the implications for Customs and submitted to the G20 recommendations on how Customs could contribute to international trade stabilisation. Declining imports meant Customs administrations in developing countries suffered a reduction in the collection of the customs duties vital to fund governmental operations. Moreover, there was a deteriorating market in the commerce lubricant of trade finance. The research found that some Customs administrations took positive action in response to the crisis by putting in place deferred duty payment plans; looser repayment plans for traders who experienced temporary financial setbacks; faster customs duty drawback; and showing greater flexibility in respect of security (guarantee) requirements. On the negative side, some governments were slow to adjust revenue targets despite the falling trade, and some Customs administrations were obliged to increase physical inspection of cargo (WCO 2009a). These findings and additional research could be instructive the next time there are significant reductions in international trade volumes.

## 6. Conclusions

This paper has presented a preliminary overview of the implications for Customs of climate change mitigation and adaptation policy options. It has provided a survey of academic literature and other research linked to the Customs-climate change nexus, and has endeavoured to build a foundation for further research and analysis. Analytical frameworks and research from established disciplines and knowledge branches have fuelled this paper's development. Improved understanding of customs matters can be greatly enhanced when the principles, theories, models, and empirical evidence of other disciplines are studied and applied in parallel.

To deal tangibly and expeditiously with the accelerating climate crisis, national and international policies must apply vigorous mitigation actions that raise the price of carbon to diminish carbon emissions and strengthen the competitiveness of low-carbon energy technology. There is an obvious role in climate mitigation policy for Customs as it can function as a lever to adjust trade dynamics that affect climate change. Finally, because some climate change consequences are inevitable, especially for most-at-risk developing countries, there is a need for anticipatory climate adaptation planning by government, including Customs.

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## Endnotes

- 1 The findings, interpretations and conclusions expressed in this paper are entirely those of the author. They do not necessarily represent the views of the WCO, WCO officials, or WCO Customs administration Members. The author would like to thank Thomas Cantens, Jae Young Choi, Ed de Jong, Mariya Polner, and Tadashi Yasui for their comments and suggestions. Any mistakes are those of the author.
- 2 The most prominent scientific assessment on this topic is an international consortium of scientists called the Intergovernmental Panel on Climate Change (IPCC), which was established by the United Nations Environmental Program (UNEP) and the World Meteorological Organization (WMO) in 1988 when climate change emerged as a public policy concern. The IPCC has thus far produced studies in 1990, 1996, 2001, and 2007.

- 3 The largest GHG by volume in the earth's atmosphere is CO<sub>2</sub>. Other GHGs include methane, black carbon, halocarbons, nitrous oxide, carbon monoxide, and volatile organic compounds. CO<sub>2</sub> is thus a synecdoche for GHG and the terms are frequently used interchangeably; more accurately, all GHGs can be measured as carbon dioxide equivalent or CO<sub>2</sub>e.
- 4 These include the Montreal Protocol on Substances that Deplete the Ozone Layer; the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal; the Stockholm Convention on Persistent Organic Pollutions (POPs); the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade; and the Cartagena Protocol on Biosafety.
- 5 See, for example, Brack 2000; World Bank 2008; Brainard & Sorkin 2009; Hufbauer, Charnovitz & Kim 2009; UNEP 2009; WTO & UNEP 2009. While there is no similar voluminous portfolio specifically focused on the Customs-climate change nexus, there is substantial existing research indirectly relevant to this connection.
- 6 The third policy response, *geoengineering*, posits theories on methods of manipulating the climate to counteract CO<sub>2</sub> accumulation, such as using technology to suck CO<sub>2</sub> out of the atmosphere or propel sulphur particles into the stratosphere to reflect solar energy back into space (Dessler & Parson 2006, p. 90), and is not particularly relevant to Customs.
- 7 For more extensive analysis, see Demaret & Stewardson 1994; Ismer & Neuhoff 2007; Pauwelyn 2007a; Hufbauer, Charnovitz & Kim 2009; WTO & UNEP 2009; Eichenberg 2010.
- 8 See, for example, Zhang 1998, 2010; Ismer & Neuhoff 2004, 2007; Biermann & Brohm 2005; Saddler, Muller & Cuevas 2006; Pauwelyn 2007a, 2007b; Godard 2007; Houser et al. 2008; Monjon & Quirion 2008; Gros & Egenhofer 2009; Metcalf & Weisbach 2009; Winchester, Paltsev & Reilly 2010.
- 9 Additional government interventions that can benefit the competitiveness of low-carbon energy technology include investment in research and development, feed-in tariffs, technology transfer to developing nations, subsidies, and reducing subsidies for fossil fuels. The Kyoto Protocol also has a policy instrument called the Clean Development Mechanism (CDM), where countries in the developed world can offset some of their emissions by installing low-carbon energy technology sources in developing countries.
- 10 Policymakers also frequently discuss nuclear power as an option as it emits less CO<sub>2</sub> than coal and petroleum (but more than renewable energies) and appears currently to be more competitive than renewable energies. Better options would need to be found for what to do with the expanded volume of nuclear waste. Moreover, in the context of international trade there are significant national security concerns related to nuclear proliferation that have led to stringent export controls in the wake of the AQ Khan smuggling network.
- 11 The ministerial declaration that launched the WTO Doha Development Round mandates in paragraph 31(iii) 'the reduction or, as appropriate, elimination of tariff and non-tariff barriers to environmental goods and services'. A final agreement, if one is ever reached, would presumably define environmental goods and services and provide a comprehensive list of such items. Such a list, however, would likely be broader than the low-carbon energy technology that would substantially assist in reducing CO<sub>2</sub> emissions (Steenblik, 2005a, pp. 4-5).
- 12 The United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA) has unofficially defined *humanitarian relief* as 'aid that seeks to save lives and alleviate suffering of a crisis-affected population' (UN OCHA 2003).

### Robert Ireland



Robert Ireland is a policy analyst in the WCO's Research and Strategies Unit within the Office of the Secretary General in Brussels, Belgium, where he conducts research on customs and international trade subjects. From 2005 to 2009 he was a development adviser in the WCO's Capacity Building Directorate. Before his WCO employment, he worked as a policy analyst at US Customs and Border Protection, Office of International Affairs, where he focused on national security policy. Prior to his US Customs employment he was an investigator with the US Federal Trade Commission. He has a BA in Political Science with an emphasis on International Relations from Drew University, Madison, NJ, and an MA in Public Administration with an emphasis on Policy Analysis from George Washington University, Washington, DC.