



Our Alarming Climate Crisis Demands Border Adjustments Now

John S. Odell



International Centre for Trade
and Sustainable Development

Think Piece

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ICTSD welcomes feedback on this publication. This can be sent to Ingrid Jegou (ijegou@ictsd.ch) or Fabrice Lehmann, ICTSD Executive Editor ([flehmman@ictsd.ch](mailto:flehmann@ictsd.ch)).

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LIST OF ABBREVIATIONS

BCA	border carbon adjustment
BTA	border tax adjustment
CO ₂	carbon dioxide
EU	European Union
GATT	General Agreement on Tariffs and Trade
GHG	greenhouse gas
OECD	Organisation for Economic Co-operation and Development
UNCTAD	United Nations Conference on Trade and Development
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization
WTO	World Trade Organization

FOREWORD

The decision of President Trump to withdraw the United States from the Paris Agreement of the United Nations Framework Convention on Climate Change coincided with numerous extreme, intense weather events and atmospheric carbon dioxide concentrations growing at record-breaking speed, hitting the highest level seen in 800,000 years.

Going forward, the U.S. Director of National Intelligence Dan Coates warned Congress in February 2018 about the threat of “abrupt” climate change noting that, “the past 115 years were the warmest in modern civilization and that the past few years were the warmest on record. And there’s a possibility of a sudden shift in the global climate once it reaches a tipping point.”*

The universally endorsed and ratified Paris Agreement, concluded in December 2015, is set to limit temperature increases to well below 2°C above preindustrial levels. Recent estimates by UN Environment however indicate that current pledges made in the nationally determined contributions only cover a third of the emissions reductions needed. The author of the present paper therefore argues that we are now in a state of emergency.

Over the years, scholars have argued that it should be possible to erect tariffs at the border against products that have not been taxed domestically for the relevant carbon emissions. This would allow countries imposing the tariffs to adopt ambitious climate policies at home without risking carbon leakage. While many policymakers have considered such border carbon adjustment measures as one possible device in the toolbox, they have so far not put them to practice, but have rather sought to find ambitious, multilateral solutions. The current climate urgency combined with the fact that the world’s largest economy and second largest emitter is now choosing to step aside has however relaunched the debate.

It is in this vein that John Odell, Professor Emeritus of International Relations with the University of Southern California, revisits the border carbon adjustment topic. In this paper, he puts forward a model for how a border carbon adjustment could look like that is effective, World Trade Organization compatible, and sensitive to development considerations. While he makes a strong case for his proposition, he also attempts to answer some of the questions that will inevitably arise around this most contentious topic.

The intention of this paper is to spur debate and to stimulate innovative thinking that can foster effective climate policies in a globalised economy. We welcome any thoughts and comments that will take us towards that direction.



Ricardo Meléndez-Ortiz
Chief Executive, ICTSD

* <https://www.dni.gov/files/documents/Newsroom/Testimonies/2018-ATA---Unclassified-SSCI.pdf>

EXECUTIVE SUMMARY

The global climate crisis is now an emergency. Concentrations of atmospheric greenhouse gases have continued rising at record rates, and climate damage is intensifying across the planet. The 2015 pledges governments made as part of the historic Paris agreement, even if all were implemented, fell far short of what is needed to stabilise the climate. Then last year the Trump Administration even threw US national policy into reverse gear. The need for a much more effective policy response is extremely urgent. While efforts at multilateral cooperation should continue, it is now too late to delay plurilateral and unilateral trade measures any longer.

It is time for each country that imposes positive net taxes on fossil fuel use at home to extend the same treatment to all goods the country imports, unilaterally if necessary. It should set a default carbon surcharge on an imported product equal to net fossil energy taxes (taxes minus subsidies) applied on a competing home good throughout its supply chain. The government should deduct from this surcharge for a given shipment to the extent that costs due to carbon energy taxes—or other measures that are comparable in effectiveness in reducing greenhouse gas emissions—have already been paid on the imported good in any jurisdiction throughout its own supply chain. All exports from countries where CO₂ emissions per capita are low should be exempt from these trade measures. The goal is to help people in high-polluting countries make their national mitigation policies more effective.

This paper sketches a preliminary illustration of such a policy. An eventual complete plan should satisfy three principles. First, border carbon adjustments should aim for consistency with World Trade Organization rules. Second, the measures should impose the smallest possible additional transaction costs on domestic and international trade. Third, these border adjustments should exempt all exports from the dozens of poor and middle-income countries, whose per capita CO₂ emissions are low. The paper concludes by addressing several possible objections. Responding to an obvious one: paradoxically, trade itself in the long term needs carefully limited trade restrictions like these in the short term.

1. INTRODUCTION

The global climate crisis is an extraordinary challenge to all peoples. It worsens many other problems, including illness, economic development, government deficits, refugee pressures, and international conflict. And the climate crisis has now reached alarming proportions. Scientists report that Greenland and Antarctica are melting faster than anticipated. Sea levels are rising and waters are warming. Between 1980 and 2014 the world had already experienced a quadrupling of destructive extreme climate events (World Energy Council 2015). Just last year, extreme flooding in South Asia killed more than 1,000 people and affected more than 40 million (Crunken 2017). Biodiversity is declining rapidly. The Great Barrier Reef is dying. World populations of vertebrate species collapsed by 58 percent between 1970 and 2012 because of human pressures, including climate change (Ripple et al. 2013, supplemental file 1). Climate vicious cycles are intensifying, possibly moving closer to sudden changes that would permanently overwhelm societies' capacity to adapt. All this has been due to global warming of 1° Celsius.

Initial pledges to the historic 2015 Paris Agreement, even if all were fully implemented, will fall far short of achieving the parties' own declared goal to stop global warming well below 2°C—and even farther short of their more ambitious 1.5°C goal (Climate Interactive 2017a). In 2015 and 2016, greenhouse gas (GHG) concentrations in the atmosphere increased still further, and at record speeds, and last year they rose again (US, NOAA 2017; Gillis 2017). Last year, new global carbon dioxide emissions from fossil fuel combustion and industrial activity began to rise again for the first time in four years

(Peters et al. 2017). Between 470 million and 760 million people live on coastal territory that is highly likely to be inundated by 2100 if our present emissions trajectory continues (Climate Central 2015). One in six species could go extinct (Urban 2015). Yet even the European Union (EU), a world leader, is on pace to miss its Paris emission targets (Plumer 2017). A much more effective policy response is not only needed—it is extremely urgent. While efforts at multilateral cooperation should continue, it is now too late to delay unilateral and plurilateral trade measures any longer.

A major obstacle to bending that trajectory is domestic political resistance in high-polluting countries. Most notably, the United States is responsible for a greater share of historical GHG accumulations than any other country, and we Americans are still emitting the second largest quantity of new CO₂ pollution each year. Per capita CO₂ emissions in the US are double those in China and almost ten times those in India (see Table 1). A number of other countries also emit high carbon pollution per person.¹

On top of all this, in 2017 US President Donald Trump even began attempting to reverse mitigation steps already taken, and to cut funding for clean energy innovation and international climate cooperation. In June, Trump announced his intention to withdraw the US from the Paris Agreement (Trump 2017). While some American states and cities are making welcome efforts, these contributions, if all implemented, can fulfil only about 20 to 36 percent of the US Paris pledge (Climate Interactive 2017b), which President Barack Obama conceded was insufficient to solve the problem.

1 These standard data refer to emissions arising from each country's territory. If instead we ask what measurement of emissions should be attributed to a population as consumers, including emissions embodied in their imports and excluding those embodied in their exports, we find, for 2011, that emissions attributable to the EU, Japan, and the US were higher, and those due to Russian and especially Chinese consumption were lower, than their territorial emissions (Fernández-Amador et al. 2016, Table 2).

Table 1. Country CO₂ emissions and energy tax rates

Country	CO ₂ per capita 2014	Total CO ₂ 2015	Energy tax rate
	Metric tonnes per capita	Territorial emissions in million tonnes CO ₂	Euros per tonne of CO ₂ emissions
Qatar	45.4	91.0	
Trinidad and Tobago	34.2	45.0	
Kuwait	25.2	102.0	
Bahrain	23.4	33.0	
United Arab Emirates	23.3	177.0	
Brunei Darussalam	22.1	9.1	
Saudi Arabia	19.5	600.5	
Luxembourg (EU28)	17.4	10.0	93.64
United States	16.5	5 413.6	4.83
Oman	15.4	63.0	
Australia	15.4	399.7	19.55
Canada	15.1	557.0	7.72
Estonia (EU28)	14.8	20.0	25.70
Kazakhstan	14.4	235.0	
Turkmenistan	12.5	91.0	
Palau	12.3	0.2	
Russian Federation	11.9	1 617.3	0.01
Korea, Rep.	11.6	592.2	26.47
Singapore	10.3	55.0	
Netherlands (EU28)	9.9	162.0	87.98
Japan	9.5	1 237.3	37.41
Ref: OECD mean	9.5		
Norway	9.3	44.0	93.25
Czech Republic (EU28)	9.2	96.0	31.55
Libya	9.2	54.0	
South Africa	9.0	462.2	13.86
Germany (EU28)	8.9	798.3	58.26
Finland (EU28)	8.7	44.0	60.18
Belgium (EU28)	8.3	100.0	45.63
Iran, Islamic Rep.	8.3	647.5	
Malaysia	8.0	249.0	
Israel	7.9	72.0	73.33
New Zealand	7.7	36.0	31.33
Poland (EU28)	7.5	315.8	25.50
China	7.5	10 357.1	3.40
Ireland (EU28)	7.4	37.0	77.13
Ref: OECD MEDIAN	7.15		
Mongolia	7.1	45.0	
Austria (EU28)	6.9	67.0	57.86
Belarus	6.7	61.0	
United Kingdom (EU28)	6.5	416.8	73.23

Table 1: *Continued*

Country	CO ₂ per capita 2014	Total CO ₂ 2015	Energy tax rate
	Metric tonnes per capita	Territorial emissions in million tonnes CO ₂	Euros per tonne of CO ₂ emissions
Hong Kong SAR, China	6.4	48.0	
Bahamas, The	6.3	3.3	
Bosnia and Herzegovina	6.2	22.0	
Greece (EU28)	6.2	76.0	67.99
Slovenia (EU28)	6.2	14.0	68.32
Iceland	6.1	3.4	76.00
Venezuela, RB	6.0	175.0	
Bulgaria (EU28)	5.9	48.0	
Denmark (EU28)	5.9	26.0	81.70
Andorra	5.8	0.5	
Slovak Republic (EU28)	5.7	34.0	33.58
Malta (EU28)	5.5	2.5	
Antigua and Barbuda	5.4	0.5	
Seychelles	5.4	0.7	
Cyprus (EU28)	5.3	6.9	
Italy (EU28)	5.3	361.4	75.88
Serbia (EU28)	5.3	45.0	
Ref: World mean	5.0		
Iraq	5.0	172.0	
Spain (EU28)	5.0	273.0	47.84
Ukraine	5.0	202.0	
Argentina	4.7	194.0	29.92
Chile	4.7	81.0	15.73
Equatorial Guinea	4.7	6.4	
France (EU28)	4.6	339.9	61.12
Sweden (EU28)	4.6	43.0	78.56
Thailand	4.6	312.0	
Barbados	4.5	1.5	
Turkey	4.5	386.3	38.91
Lithuania (EU28)	4.4	13.0	
Hungary (EU28)	4.3	46.0	35.39
Lebanon	4.3	23.0	
Portugal (EU28)	4.3	51.0	47.75
St. Kitts and Nevis	4.3	0.3	
Switzerland	4.3	40.0	107.28
Croatia (EU28)	4.0	18.0	
Nauru	4.0	0.1	
Azerbaijan	3.9	38.0	
Mexico	3.9	472.0	2.80
Algeria	3.7	150.0	
Macedonia, FYR	3.6	8.2	

Table 1: *Continued*

Country	CO ₂ per capita 2014	Total CO ₂ 2015	Energy tax rate
	Metric tonnes per capita	Territorial emissions in million tonnes CO ₂	Euros per tonne of CO ₂ emissions
Suriname	3.6	2.2	
Latvia (EU28)	3.5	7.3	
Montenegro	3.5	2.2	
Romania (EU28)	3.5	75.0	
Mauritius	3.4	4.3	
Uzbekistan	3.4	109.0	
Maldives	3.3	1.1	
Botswana	3.2	6.2	
Cuba	3.0	41.0	
Jordan	3.0	26.0	
Ecuador	2.8	44.0	
Gabon WORLD MEDIAN	2.8	5.0	
Brazil	2.6	514.9	0.62
Guyana	2.6	2.0	
Jamaica	2.6	8.1	
Tunisia	2.6	32.0	
Egypt, Arab Rep.	2.4	219.0	
Georgia	2.4	7.6	
Grenada	2.3	0.3	
Panama	2.3	11.0	
St. Lucia	2.3	0.4	
Dominican Republic	2.1	23.0	
Albania	2.0	4.9	
Peru	2.0	60.0	
Uruguay	2.0	7.9	
Armenia	1.9	5.6	
Bolivia	1.9	21.0	
Dominica	1.9	0.1	
Marshall Islands	1.9	0.1	
St. Vincent and the Grenadines	1.9	0.2	
Colombia	1.8	99.0	
Indonesia	1.8	537.2	0.00
Viet Nam	1.8	184.0	
India	1.7	2 274.3	3.12
Morocco	1.7	63.0	
Costa Rica	1.6	8.0	
Kyrgyz Republic	1.6	9.9	
Korea, Dem. People's Rep.	1.6		
Namibia	1.6	3.0	
Syrian Arab Republic	1.6	37.0	
Belize	1.4	0.5	

Table 1: *Continued*

Country	CO ₂ per capita 2014	Total CO ₂ 2015	Energy tax rate
	Metric tonnes per capita	Territorial emissions in million tonnes CO ₂	Euros per tonne of CO ₂ emissions
Micronesia, Fed. Sts.	1.4	0.2	
Moldova	1.4	5.0	
Angola	1.3	33.0	
Bhutan	1.3	0.9	
Fiji	1.3	1.8	
Guatemala	1.2	14.0	
Lesotho	1.2	2.8	
Liechtenstein	1.2	0.2	
Honduras	1.1	9.5	
Philippines	1.1	113.0	
Tonga	1.1	0.2	
El Salvador	1.0	6.6	
Samoa	1.0	0.3	
Tuvalu	1.0	0.0	
Cabo Verde	0.9	0.5	
Pakistan	0.9	171.0	
Paraguay	0.9	5.2	
Sri Lanka	0.9	17.0	
Swaziland	0.9	1.2	
Yemen, Rep.	0.9	26.0	
Djibouti	0.8	0.6	
Nicaragua	0.8	4.8	
Papua New Guinea	0.8	6.6	
Zimbabwe	0.8	17.0	
Mauritania	0.7	2.7	
Benin	0.6	5.9	
Congo, Rep.	0.6	2.6	
Kiribati	0.6	0.1	
Sao Tome and Principe	0.6	0.1	
Senegal	0.6	8.8	
Tajikistan	0.6	3.6	
Vanuatu	0.6	0.1	
Nigeria	0.5	104.0	
Bangladesh	0.5	77.0	
Cote d'Ivoire	0.5	10.0	
Ghana	0.5	15.0	
Timor-Leste	0.4	0.5	
Cambodia	0.4	6.0	
Myanmar	0.4	14.0	
Solomon Islands	0.4	0.2	
Togo	0.4	2.3	

Table 1: *Continued*

Country	CO ₂ per capita 2014	Total CO ₂ 2015	Energy tax rate
	Metric tonnes per capita	Territorial emissions in million tonnes CO ₂	Euros per tonne of CO ₂ emissions
Afghanistan	0.3	23.0	
Lao PDR	0.3	2.3	
Cameroon	0.3	7.2	
Sudan	0.3	16.0	
Kenya	0.3	14.0	
Gambia, The	0.3	0.5	
Zambia	0.3	4.1	
Mozambique	0.3	4.2	
Nepal	0.3	6.9	
Haiti	0.3	2.5	
Liberia	0.2	1.0	
Comoros	0.2	0.2	
Tanzania	0.2	12.0	
Guinea	0.2	2.3	
Burkina Faso	0.2	3.1	
Sierra Leone	0.2	1.2	
Guinea-Bissau	0.2	0.3	
Madagascar	0.1	3.4	
Uganda	0.1	5.1	
South Sudan	0.1	1.5	
Ethiopia	0.1	11.0	
Niger	0.1	2.1	
Malawi	0.1	1.3	
Rwanda	0.1	0.8	
Central African Republic	0.1	0.3	
Mali	0.1	1.0	
Somalia	0.0	0.6	
Chad	0.0	0.6	
Congo, Dem. Rep.	0.0	2.6	
Burundi	0.0	0.3	
Cook Islands		0.1	
Eritrea		0.7	
Niue		0.0	
Holy See			
Monaco			
Palestine			
San Marino			

Notes: Shading denotes exempt as de minimis. EU status ("EU28") would apply to EU member states and their overseas territories where EU customs rules apply.

Sources:

CO₂ per capita: Oak Ridge National Laboratory, USA, via data.worldbank.org/indicator/EN.ATM.CO2E.PC?page=4

CO₂ total: Boden et al. 2016; UNFCCC 2016; BP 2016; via www.globalcarbonatlas.org/en/CO2-emissions

Energy tax rate: OECD 2015b, Annex B; OECD 2013, Annex B.

On the other hand, virtually all the world's industrial countries—as well as others—impose domestic taxes on fossil energy use. These energy taxes raise the prices of fossil fuels and thus discourage their combustion, even though many taxes were applied originally for other reasons and are not optimal for climate goals. It is widely believed that taxes can be one of the most cost-effective means to reduce these fuels' harmful health and environmental side-effects.

It is time for each country that imposes positive net taxes on fossil fuel use at home (taxes minus subsidies) to extend the same treatment to all goods it imports, unilaterally if necessary. It should set a default border carbon adjustment (BCA) or surcharge on an imported product equal to net carbon energy taxes imposed on the like or competing home good in any jurisdictions along its supply chain. The government should reduce this default surcharge for a particular shipment to the extent that costs due to net carbon energy taxes, or other measures that are comparable in effectiveness in reducing GHG emissions, have already been paid on the imported good in any jurisdiction along its own supply chain. All exports from countries where CO₂ emissions per capita are low should be exempt from these border adjustments.²

The focused goal of this proposal is to help citizens in highly-polluting countries, whose mitigation effort is lagging the most, to improve their national policies. The proximate targets of these BCAs are not whole nation-states but actors inside their domestic politics. It is well known that even in democracies, policies favoured by majorities can be distorted or blocked entirely by small minorities' well-financed lobbying, especially in certain political institutions. In the US, for example, a minority has twice blocked the US Congress from enacting national carbon pricing. Majorities of the US public have favoured greater protection from global warming for some years. In 2016, 62 percent of even Donald Trump voters said they favour either taxing or regulating the pollution

that causes global warming, or both. Only 20 percent of Trump voters favours neither (Yale Program on Climate Change Communication, February 2017). Politicians, non-profits, scientists, prominent business leaders, health organisations, faith leaders, military leaders, celebrities, and media commentators have been campaigning for more serious climate action in many countries. Dozens of global businesses have called for a strong Paris agreement and pledged increased steps to reduce their carbon footprints or increase green finance.

Yet few major exporting firms in highly polluting countries are prioritising lobbying in their capitals for more effective national mitigation. New barriers in their major foreign markets that hit, or even threaten to hit, their exports will give these exporters, including farmers, a powerful incentive to join the climate campaign calling for more effective market-oriented abatement policies. Their joining would amplify the campaigns' influence enormously. While some firms will not lobby for carbon pricing, the many multinational and other firms that are already spending and planning to reduce their emissions could benefit from legislation requiring their competitors to follow them. The process would be analogous to the way negotiated trade liberalisation was accomplished in domestic politics: exporters lobbied in favour of opening the home market in general as an indirect means of opening foreign markets for themselves. Major shifts in domestic politics would correct this malfunctioning of political institutions and accelerate effective policy responses.

This paper sketches a preliminary proposal to stimulate debate and research to develop a more complete plan. The ultimate design should satisfy three principles. First, the new border adjustments should aim for consistency with WTO rules. Second, the measures should be administered so as to impose the smallest possible additional transaction costs on domestic and international trade and, when possible, administered so as to expand incentives for decarbonisation. Third, these carbon surcharges

2 Several different but related proposals have been published (McAusland and Najjar 2015; Kemp 2016; Chang 2017).

should not fall upon exports of the dozens of poor and middle-income countries whose carbon emissions per capita are low, many of whom nevertheless are already suffering the most

powerful harms from climate change—certainly not as long as more affluent peoples who emit far greater pollution per person are failing to do their part to curb the problem.

2. AN ILLUSTRATIVE POLICY SKETCH

All countries that impose positive net taxes on fossil fuel use should now extend border carbon adjustments (BCAs) to all their imports in magnitudes equal to the net taxation of carbon energy applied during the production of like or competing home goods throughout their supply chains across all jurisdictions. Net taxation means taxes collected on fossil fuel use minus subsidies provided to the same fuels through tax expenditures and budgetary transfers. Any country where producer support exceeds carbon energy taxation should not add BCAs. All import surcharges should be reduced to fully reflect costs of net carbon energy taxes already paid during the production of the imported product throughout its own supply chain. Since not all fossil energy taxes reduce GHG to the same degree, the BCA design should weight each energy tax in proportion as it reduces emissions, both when recognising the tax burden on a home good and when calculating the BCA deduction for the import. Likewise, importing countries should reduce BCAs to the extent that it can be shown that costs due to mitigation measures besides net taxation, such as regulations, have already been paid on the shipment in any jurisdiction, provided these other measures are comparable in effectiveness in reducing GHG emissions to those of the importing country.³

BCAs so designed will equal zero on all imports that reflect mitigation that is equally or more stringent than that of the importing country. But in high-polluting countries where mitigation is less stringent, these BCAs will create new incentives for raising net carbon energy taxation or other mitigation policies. As the latter governments strengthen their policies, they will reduce the BCAs facing their exports, and will discourage the fuel combustion that is the main human driver of the climate crisis and is thus harming their own people.

To illustrate this plan in part, some relevant data are already available. The Organisation for Economic Cooperation and Development (OECD) reports energy taxation in 41 countries (OECD 2015b)-the 34 OECD member states plus Argentina, Brazil, People's Republic of China, India, Indonesia, Russian Federation, and South Africa. These countries together accounted for about 84 percent of global carbon emissions from energy use in 2009. Using uniform methods, the study records the taxes each country imposes on the use for energy of coal and peat, oil and oil products, natural gas, and biofuels and waste. (The proposed BCAs should, unlike this report, take account of net taxes on fossil fuels only.) Energy use in the major categories of transport, heating and processes, and electricity generation are covered. Taxes levied on electricity consumption are shown as effective taxes on the fuels used to generate the electricity. The study incorporates tax expenditures including any offsetting tax rebates, credits and concessionary Value Added Tax (VAT) rates the country applies in favour of each fuel. Thus, it reflects net taxation, except that it omits fossil fuel subsidies in the form of budgetary transfers. It was also not able to include prices paid for emission permits in jurisdictions covered by emission trading systems, nor the implicit carbon prices added to goods by regulations such as renewable electricity standards.

For present purposes, the study shows that the overall, economy-wide level of energy taxation varies extremely across the 41 countries. Among the highest national tax rates are those of Switzerland, the Scandinavians, the UK, France, Italy, Spain, Austria, and Germany. Moderate taxers include Japan, New Zealand, Republic of Korea, Poland, Turkey, and Australia. The lowest rates are found in Canada, the USA, Mexico, China, India, Russia, Brazil, and Indonesia (see Table 1 on page 2).

³ Many previous proposals set domestic taxes and border adjustments proportional to the goods' carbon footprints rather than net energy taxes paid. The advantages of each design are discussed below under possible objections.

The OECD has also assembled an inventory of support measures provided for fossil fuels (OECD 2015a), defined as tax expenditures and budgetary transfers. This database currently covers the same countries, except not Argentina. While it is a major step forward, this database currently does not report either national total values of support or any direct comparisons of total support across countries. Additional research is needed to produce comparable data on net fossil energy taxation in all high-emitting countries.

Suppose BCAs exempted all exports from countries whose CO₂ emissions per capita, defined as a five-year moving average, are lower than those of the median OECD country in 2014, which was 7.15 metric tons per capita. Suppose the policy also exempted all states whose aggregate CO₂ emissions are *de minimis*, say less than 10 metric tons per year, on efficiency grounds. Countries whose exports are exempt should have the right to impose BCAs on their imports under the same rules, on climate and fairness grounds. However, if the exempt country has extremely low net carbon taxation (like Brazil and Indonesia, for example), these rules mean its maximum BCAs after deductions would also tend to be close to zero.

For this illustration, Table 1 shows available data on recent economy-wide levels of energy taxation (counting biofuels and waste) in Euros per ton of CO₂ emissions, for each of the 41 countries, plus levels of CO₂ emissions per capita and total CO₂ emissions for all countries. Grey shading marks those countries that would be exempt as *de minimis*.

Today, 35 countries emit more than 7.15 tons of CO₂ per capita, and two of those would be exempt as *de minimis*. Among the 33 high-emitting countries whose exports would not be exempt are found Canada, China, the Russian Federation, and the United States, which all have extremely low rates of net energy taxation and include three of the world's four

largest emitters of total new CO₂. Also covered are Persian Gulf oil producers and emitters of relatively large total amounts in Europe, Australia, South Korea, Japan, Malaysia, and South Africa. (The OECD does not yet report data on economy-wide energy taxation for 14 of these 33 countries.) 161 of 197 parties to the UNFCCC would be exempt due to either the per capita threshold, the *de minimis* rule, or both. Among the exempt low emitters per-capita, the largest total CO₂ emissions in 2015 came from (in descending order of total emissions) India, Indonesia, Brazil, Mexico, the UK, Turkey, Italy, France, and Thailand.

A complete plan for such a major policy change will, of course, need to consider and set many additional details to make it as optimal as feasible.⁴ For example, the exemption defined over per-capita emissions might be developed into a more sensitive index combining that measure with indicators of capability such as per capita income. Second, how large a perverse incentive will this widespread exemption create for exporters in lightly-taxed countries, who now face BCAs, to move the final production stage to exempt countries, then export from there to escape the BCAs? Research should estimate the magnitudes of this perverse incentive in relation to economic and policy conditions that may offset it, and study ways to diminish it. Some economic research finds that more effective mitigation makes some industries more rather than less competitive. Also offsetting this incentive are costs of moving and the fact that all exempt countries, too, have committed to moving away from carbon, as parties to the Paris agreement. The exemption might be limited to value added in exempt countries. Trans-shipment would also need to be controlled with rules of origin, which are familiar to governments from their free trade areas.

Third, for efficiency the policy might exempt all imports that have paid less net carbon taxation than the competing home product by only a small magnitude. Fourth, member states

4 Cosbey et al. (2012) provides a comprehensive though now partially dated review of policy design options.

of customs unions will need to decide whether a common regional BCA is needed.

Fifth, to achieve faster decarbonisation, exports from the many countries whose current pollution levels are below the OECD median but above the world median, 2.8 tons per capita, might become subject to BCAs automatically at the end of each decade unless the country's CO₂ emissions per capita have fallen by, say, 20 percent during that decade. In this set are countries with relatively large total emissions such as France, Italy, Mexico, Turkey, and the UK. China's emissions today are only slightly above the OECD per capita median. Other variants of obligations graduated according to relative capabilities can easily be imagined. The policy could also provide that any exempt country whose five-year-average emissions per capita rose and remained above the threshold for three years would automatically lose its exemption.

World carbon emissions must fall to net zero and probably below net zero to keep warming from exceeding temperature limits all these states have endorsed. Thus, all parties to the

Paris agreement pledged to seek low-carbon, climate-resilient development in the future. All agreed that developing countries should receive financial and technical assistance to facilitate this development. Thus, sixth, donor countries should consider using their BCA revenue to help fund this assistance. Using revenue this way would also strengthen the case that the measures do not violate WTO law.

Finally, if a set of countries agreed to enact border adjustments using rules common to all members of the set, they would likely enhance the measures' economic efficiency and legal sustainability while avoiding possible disputes among themselves. Governments whose economies are highly dependent on the US or China also are more likely to generate the domestic political support needed to enact these BCAs if they act as members of a major global coalition including the EU. But all should prepare to immediately implement unilateral measures consistent with WTO rules, should plurilateral negotiations fail to produce agreement or delay action by more than two years.

3. WTO COMPATIBILITY

These new trade measures will achieve the most if they satisfy the rules of the World Trade Organization.⁵ While the WTO has not ruled on border carbon adjustments, a number of legal experts have identified ways BCAs could be designed to be in line with the rules of the global trade arbiter (Horn and Mavroidis 2011; Pauwelyn 2012; Hillman 2013). Designing the new surcharge as an internal measure, triggered not by the act of importation but by the entry of the imported good into the domestic economy as it leaves customs, might make it eligible under General Agreement on Tariffs and Trade (GATT) Article III (national treatment), possibly without resorting to Article XX, provided the BTA does not treat imports less favourably than domestic goods (Pauwelyn 2012; Grossman et al., 2013). But providing exemptions by national origin (the per capita threshold and the *de minimis* provision) may violate GATT Article I (non-discrimination).

Should a challenge under GATT Article I or III prevail, GATT Article XX, section g provides an exception for trade measures relating to the conservation of exhaustible natural resources. The WTO has approved measures that restrict trade citing Article XX and has ruled that clean air is an exhaustible natural resource. Respondents can add that these BCAs are intended to protect human lives and health, a value privileged in GATT Article XX section b and given great deference by WTO judges, even if respondents do not claim the XX(b) exception itself, which sets a higher bar.

To qualify under Article XX, the BCA must not have been applied in a manner that constitutes a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or be a disguised restriction on international trade. To avoid a ruling of arbitrary or unjustifiable discrimination, BCAs should recognise that

countries use regulations as well as energy taxation to promote decarbonisation. If exporting countries apply regulations that are comparable in effectiveness in reducing greenhouse gas emissions to those of the importing country, the BCA likely will need to be reduced to that extent (*US-Shrimp*, WTO Appellate Body Report AB-2001-4). Thus the importing country should notify any company and country whose exports are likely to be subject to carbon surcharges that they have the right to demonstrate that the BCA should be reduced to the extent that costs due to net carbon energy taxes, or other mitigation measures comparable in effectiveness to those of the importing country, have already been paid on the shipment in any jurisdiction. Importing countries should offer to negotiate multilaterally or bilaterally with exporting countries to reach agreement on modalities for accomplishing these demonstrations efficiently through due process.

Exempting goods from all exporting countries with low emissions, as defined by an objective standard, is neither arbitrary nor unjustifiable discrimination. This threshold is rationally and strongly related to the climate policy objective. It reasonably and properly treats countries differently where the same conditions do not prevail—countries most of whose people have far less responsibility for the climate crisis and much weaker capabilities to address it.

WTO jurisprudence to date also suggests that restrictive trade measures whose applications are balanced or proportional (i.e. they respect legitimate interests in both liberalised trade and an environment or health objective) can qualify under Article XX (Kaufmann and Weber 2011; Vranes 2016). This BCA design is balanced and not disproportionate. On the one side, these carefully tailored measures will be less restrictive than many possible trade actions.

5 It has been argued that enacting a law that later must be changed because of an adverse legal ruling also can have significant effects on transnational norms and the behavior of companies, legislators, regulators, and judges (Shaffer and Bodansky 2012). ICTSD has long supported the view that WTO law should not be regarded as automatically superior to climate considerations.

On the other side, all countries agreed that effective climate action is imperative in 1992 when the United Nations Framework Convention on Climate Change was established. This convention also established the agreed principle that the parties have “common but differentiated responsibilities and respective capabilities.”⁶ In Paris on 30 November 2015, the largest number of heads of state and government ever assembled in the same place on a single day jointly urged a final end to years of delay for the sake of all their peoples. Setting the definition of low-emitter at the current OECD median emissions level also is reasonably balanced. Setting it higher would show too little respect for the urgent, globally-recognised need for faster mitigation, and setting it lower would infringe on trade and economic development to a greater degree.

To avoid a ruling of disguised protectionism, the BCAs should not function in practice to

predominantly favour home over foreign products. If internal carbon taxes fluctuate significantly, corresponding import charges should rise or fall accordingly. Leaders also should not advocate these BCAs as means of protecting national jobs or business. Instead they should promote them as steps to advance the worldwide effort to conserve human health, life, and natural resources by reducing GHG emissions.

A standing WTO body, such as its Committee on Trade and Environment, should periodically review all such approved trade measures, to increase transparency and public trust. After enough countries act unilaterally or in sets, trading and investing firms will object to yet another spaghetti bowl of diverse BCAs. They will have incentives to press capitals to negotiate multilateral rules that will reduce their compliance costs. Eventually these BCAs might be repealed.

6 While WTO judges are not allowed to enforce any treaty besides GATT and WTO agreements, they have taken into account evidence like the UNFCCC and Paris agreements in interpreting Article XX's meaning for a given case.

4. ADMINISTRATION TO MINIMISE TRANSACTION COSTS AND INCENTIVISE DECARBONISATION

If every exporting firm of the 33 countries were required to calculate the included carbon taxes of every export shipment, transaction costs would be huge and counter-productive. An alternative method entailing lower transaction costs might reasonably approximate an ideal system for the purpose of this proposal.⁷ In stage one, the importing government would set a default surcharge on a given import good, equal to the weighted average net fossil energy tax collected on the production and sale of the like domestic good. In stage two, this government would authorise its customs authorities to reduce the value of the BCA on a given shipment to the extent that the importer presents valid documentation showing that costs due to weighted carbon energy taxes, or other measures comparable in effectiveness in reducing GHG emissions, have already been paid in other jurisdictions during the goods' production and transport.

As an illustration for stage one, suppose the importing country produces and imports small electric motors. A Value Added Tax reporting system is already operating in many countries. The government could simply amend its VAT regulations, if necessary, to require the seller at each stage in the supply chain to report the carbon energy tax paid at that stage. The authorities could sum the energy tax payments reported along the chain to reach a total value for a given final shipment of motors, weighting the taxes by abatement effectiveness, and

compute the average energy tax embedded in final prices of all domestic motors shipped in the country during a base period.

For stage two, additional research should explore ways to reduce transaction costs in the processes whereby importers of goods from covered countries could document energy taxes already paid. This effort could include negotiations among all trading countries to agree on common reporting standards and mutual recognition of other states' certificates. Research by staff of multilateral organisations such as OECD, The United Nations Conference on Trade and Development, the United Nations Environment Program, and the World Bank could help streamline this process.

More difficult, perhaps, would be official agreement on ways to recognise, additionally, the carbon prices producers pay through purchases of traded emission permits in different jurisdictions, to allow deducting costs due to these spreading but diverse cap-and-trade schemes from BCAs. Perhaps more difficult still would be reaching official agreement on legally enforceable ways to establish implicit carbon prices added to goods by heterogeneous regulations like renewable electricity standards. In any case, importing governments should offer every importer a fair opportunity to make a case for deductions for the costs of any measures the importer considers comparable in GHG effectiveness.

⁷ Inspired by parts of McAusland and Najjar (2015), which proposes a destination-based carbon footprint tax on all goods sold, regardless of origin.

5. OTHER MAJOR OBJECTIONS AND QUESTIONS

Other major questions and objections can be anticipated. Would it be better to implement a uniform global carbon tax, or for governments to enact new taxes on all consumption regardless of goods' national origins in proportion to carbon footprints, or to calculate at least border adjustments in terms of imports' carbon footprints? Many of these expert ideas might, in fact, have proved more optimal than the present proposal if politicians had implemented them. But every additional year the world loses waiting for politicians to do the optimal thing, the closer the world will be to climate catastrophe—whose costs, especially for the most vulnerable, surely will exceed by many times any theoretical efficiency losses from implementing a third-best but legal, carefully-designed remedy now.

Furthermore, BCAs calculated over carbon footprints would likely be less effective in mitigating global emissions. While that method would give exporters incentives to reduce their emissions, it would not directly increase incentives for governments in high-polluting countries to improve national policies.⁸ The tax-based approach, incorporating a credit for taxes by the exporting country, does create such a government incentive. Many global emissions result from production and transport not for export but for home consumption, of non-tradables as well as tradables. These behind-the-border emissions are especially great in continental economies like the USA, China, and Russia. The proposed approach would reach behind-the-border emissions as well, and thus would likely result in larger cuts in the global total.

In a WTO tribunal, a complainant could object that imposing a larger surcharge on shipment

A than B when the two have equivalent carbon content, because of lax policies where A was made, is inconsistent with the environmental objective. Respondents could reply that on the contrary, targeting home government policies is even more effective for that objective. But should WTO judges nevertheless find the proposed BCA to be inconsistent with GATT, governments could consider falling back to carbon footprint BCAs.

Why not add equivalent rebates on goods exported to countries with low carbon taxation, to match the adjustments on imports from the same countries? Critics would argue that export rebates are designed more to promote exports than to mitigate climate change, and such export rebates may be illegal under the WTO Subsidies Agreement (Chang 2017).⁹

Why would a larger country respond to a trade restriction imposed on it by a smaller trading country? Here the first target is not the high-polluting country as a whole, but actors in its domestic politics, to induce them to increase internal pressure for policy change. But of course the larger the combined market of states that impose BCAs, the greater the likely impact.

Some worry that once legislatures start considering BCAs, actual measures will turn out to be protectionist. If so, the WTO will likely authorise retaliation. Facing retaliation, for instance by the US, such governments might well bring their measures into compliance.

Many may fear that Washington, in particular, could retaliate with new barriers on countries applying BCAs and disregard a WTO ruling that it is not entitled to retaliate.¹⁰ In the US, however, proposed illegal retaliation would generate

⁸ Sanctuary 2018 provides theoretical support for a BCA design like that proposed here.

⁹ Expert opinion on this issue is not unanimous. For instance, it has also been argued that with a destination-based VAT and flexible exchange rates, *omitting* a border tax adjustment for exports would be equivalent to a tax on imports (McAusland and Najjar 2015, 42, citing Feldstein and Krugman 1990).

¹⁰ Böhringer and Rutherford 2017 uses the possibility of US retaliation to argue against new carbon tariffs by others. But this study was not designed to address the present proposal exactly, and the paper's relevance is reduced by its simplifying assumption that the US is a unitary actor with no domestic politics that might be influenced.

significant opposition. Illegal retaliation could subject US exporters to penalties abroad. New import barriers would increase the costs of globally-integrated manufacturers like autos and electronics, as well as giant retailers like Walmart and Target, and could damage international financial investments. A retaliation proposal itself would give business leaders even stronger incentives to join the carbon-pricing movement instead.

Others will object that widespread, complex documentation requirements, even if they economise on transaction costs, will still add costs to international business compared with the status quo. These costs will be trivial compared with the added costs from unmitigated climate change that are already borne and likely to multiply dramatically. This unique climate crisis is the most serious threat of the century not only to our environment but also to our world economy, according to the International Monetary Fund (Hance 2013). Climate catastrophe will reduce productivity of workers, fields, and fisheries further; destroy more property, including seaports and airports near coastlines; and disrupt production and international transport further. Trade and business as we know them will not continue on a planet that has been roasted, toasted, fried, and grilled, as Managing Director Christine Lagarde put it (Hance 2013). Paradoxically,

trade itself in the long term needs carefully limited trade restrictions like these in the short term.

Finally, policymakers should compare the likely benefits and costs of this proposal with the risk of allowing the Paris regime to become a dead letter. If carbon-taxers defend Paris by imposing a tangible cost on free-riding, they will increase the odds that all other parties will stay the course. If a US retaliation scenario did unfold completely, it would certainly be negative for the world trade system in the medium term. Even then, though, the lasting harm to commerce might be limited if all BCAs and retaliatory measures were removed after a few years. For contrast, suppose the carbon-taxers do nothing to defend the Paris regime against aggressive defection by the leading historical polluter. Why will other parties then not also fail to implement their Paris pledges, which were collectively inadequate already, not to mention failing to improve their contributions in future decades? Those governments will face domestic demands to drag their feet. Critics will ask: why should we undertake costly mitigation if richer people in other countries are going to pollute the clean atmospheric space we save? What will be the costs for our world's population over coming decades of allowing the Paris regime to become irrelevant?

6. TOO LATE FOR FURTHER DELAY

The global climate crisis is now an emergency: it is far too alarming to continue postponing legal unilateral or plurilateral border carbon adjustments. If not this plan, what is the alternative? Multilateral agreements on climate and trade would be ideal, excellent proposals for improvement have been made, and efforts should continue. But decades of this work have failed to generate a global consensus that is sufficiently effective for climate stability. Recent UNFCCC and WTO negotiations offer no reason to expect an acceleration of their pace. In fact, we face the opposite: the U.S. has announced its withdrawal from Paris and thrown national policy into reverse gear. In addition, pressure is building in many countries for trade restrictions of some kind (Bacchus 2017, 2). Those alternatives could prove

more restrictive and harmful to international institutions than the ones proposed here. More experts should step in front of this parade and try to shape these coming trade measures while time remains. Interested research organizations should cooperate to develop this sketch into a more complete plan.

Carbon-pricing advocates in underperforming high-polluting countries need a little help from their friends. With that help, advocates for the global common interest will stand a much better chance in domestic politics. These BCAs alone will not be enough to preserve a liveable world. But major improvements in net fossil energy taxation and complementary measures in highly-polluting nations would be a historic turning point in the fight against climate change.

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