



The WTO and the New Carbon Frontier: Assessing the Proliferation of Unilateral and Multilateral Carbon Trading Schemes

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Abstract

The creation of various types of carbon trading systems can be considered among the major points at the intersection of international trade and environmental regulations. This paper aims to examine the economic and legal implications of the “new carbon frontier” against the backdrop of the emergence of multiple types of carbon trading regimes and border adjustments on an international scale. The paper examines the clash between unilaterally established measures, such as the European Carbon Border Adjustment Mechanism and its American counterpart, the Border Carbon Adjustment system, and the international regulation contained in the WTO treaties. Specifically, the focus will be on their compatibility with the principles of non-discrimination under GATT treaties. Furthermore, the tension generated by the commodification of carbon as a result of markets in the context of CBDRRC will be considered. In particular, doubts are raised regarding the applicability of exceptions granted by GATT Article XX in the case of environmental protection. It has been concluded that while the existence of multiple carbon trading systems is necessary for decarbonization, there may be certain risks to international trade security. Ultimately, the aim of the paper is to develop a framework that will facilitate the harmonisation between unilateral action towards climate change and multilateral trade rules.

Keywords: Carbon Trading, GATT Article XX, WTO Compatibility, CBAM, Climate Law, Green Protectionism.

Introduction

The worsening climate crisis is changing how international trade and environmental rules interact. Scholars call this shift the “new carbon frontier”. It describes how carbon dioxide, once treated as an externality, is becoming

something that can be priced and traded across borders. ¹Moving to a low-carbon economy requires big changes to the global economic system, but countries are adopting different rules and at different speeds; that patchwork created overlapping and sometimes conflicting legal regimes.

A key development is the EU's Regulation 2023/9556,² which created a Carbon Border Adjustment Mechanism (CBAM).³ Under this law, importers of certain goods must buy CBAM certificated that reflect the carbon price those goods would have faced under the EU Emissions Trading System.⁴ Right now, CBAM covers products like cement, electricity, fertilisers, iron and steel. Aluminium and hydrogen, but it could be the first step toward more countries setting their own carbon prices.

In May 2025, Russia consultations at the WTO, brought their first formal legal challenge to CBAM.⁵ Russia argues the EU measure is discriminatory, restricts trade without justification, and breaches WTO rules on national treatment and most favoured nation obligations.⁶ This case raises bigger questions about whether unilateral climate policies can fit within the WTO's multilateral framework, which is based on principles such as non-discrimination, transparency, and market access.⁷

The Legal Tension: GATT Non-Discrimination Obligations versus Environmental Sovereignty

The “Like Product” Doctrine and Carbon Intensity

The clash between carbon trading schemes and the GATT's multilateral trade rules is a central legal issue debated over climate-related trade policies. The problem comes from a mismatch between the trade-law idea of “like product” and the real-world differences in products’ “carbon intensity.” As different places set different carbon processes, CO2 becomes increasingly commodified, which opens the door to trade disputes that resemble anti-dumping or subsidy claims. To get to the bottom of this, we need to examine closely how carbon border adjustments interact with

the non-discrimination duties that underpin the multilateral trading system.⁸

GATT Article I, the Most Favoured Nation (MFN) rule, means that any advantage given to a product from one WTO member must be given immediately and unconditionally to like products from all the members. The MFN rule helps keep markets fair by stopping members from giving special treatment to certain imports and so preserves a level playing field for “like products” from everywhere. MFN covers both obvious (de jure) discrimination and hidden (de facto) discrimination, so measures that look neutral on their face can still breach the rule if, in practice, they treat like products from other members less favourably. That matters a lot for climate measures, since policies that focus on emissions can appear neutral but may still disadvantage imports because of where they come from.⁹

Applying MFN to carbon border adjustments raises tough questions about whether goods with different carbon footprints are like under WTO law. If the WTO treats them as like, then border carbon adjustments that rely on country-specific carbon prices or membership in climate clubs could be seen as discriminating by origin rather than by product traits, and therefore infringing MFN.¹⁰

National Treatment Obligations and Carbon Pricing

The National Treatment rule in GATT Article III adds another layer of difficulty because it requires imported goods to be treated no less favourably than domestic like goods regarding internal taxes, charges, and regulations.¹¹ Carbon border adjustments try to create parity by making imports bear the same carbon costs domestic producers face, effectively imposing the equivalent of a

domestic carbon border tax adjustment, critics argue that CBAMs often function more like tariffs than bona fide border tax measures.¹²

These issues become especially tricky when importers must buy emission allowances to cover the carbon in their goods. If BCA forces importers to acquire allowances from the importing country's emissions trading system, that requirement looks like a charge related to importation under GATT Articles I AND III. The assessment is even harder when exporting states tackle emissions through non-market measures rules or standards that reduce emissions but do not put a price on carbon because those efforts may not be recognised as equivalent to a formal carbon cost.¹³

Climate Clubs and Preferential Trading Arrangements

The rise of climate clubs and preferential arrangements complicates the balance between environmental policy autonomy and trade rules. Climate clubs try to gather enough members to make cooperation effective, using incentives for members and penalties for outsiders to push wider participation.¹⁴ While preferential treatment within a club might fall under WTO exceptions for regional or special arrangements (for example, GATT Article XXIV or the Enabling Clause), giving special trading advantages to club linkages operate in practice if they produce real-world effects that disadvantage non-members, that can amount to prohibited discrimination even when measures appear neutral.¹⁵

The Russian Challenge to the EU CBAM

Russia's request for WTO consultations in May 2025 was the first formal dispute over CBAM and brought these theoretical tensions into a real-world legal fight. Russia has claimed the EU's CBAM violates several WTO obligations, is discriminatory, illegal trade restriction, and

breaches both National Treatment and MFN principles.¹⁶ The Russian complaint describes the CBAM and the EU ETS as discriminatory and contends they operate as tariff-like barriers justified as climate protection. The consultation request points to alleged conflicts with GATT, the Subsidies and Countervailing Measures Agreements on Import Licensing Procedures, indicating the wide range of legal arguments available against unilateral carbon pricing.¹⁷

The EU responds that CBAM was designed to match the carbon costs faced by domestic producers under the ETS, which, the EU says, preserves parity and the level playing field. Still, CBAM'S unilateral design such as EU-set carbon benchmarks and limited acceptance of non- EU carbon pricing raises questions about whether it respects the climate principle of "common but differentiated responsibilities" and whether it can be justified under GATT Article XX.¹⁸

Navigating GATT Article XX: The General Exceptions Defence

The Two-Tiered Structure of Article XX

When carbon trading measures might conflict with GATT'S non- discrimination rules, Article XX's environmental exceptions offer the main legal route for justification.¹⁹ Article XX works in two tiers: the measure must fall under one of the specific exceptions listed in the Article, and it must also pass the chapeau, which bars arbitrary or unjustifiable discrimination between countries in similar situations and prevents measures that disguise trade restrictions.²⁰ Applying this two-part test to carbon border adjustments raises hard questions about how far environmental goals can justify departures from core trade obligations.

The exceptions most relevant to carbon schemes are Article XX(b) measures "necessary

to protect human, animal or plant life or health” and Article XX(g) measures” relating to the conservation of exhaustible natural resources” when applied together with domestic restrictions. Using these exceptions for CBAMs requires showing that the measure genuinely aims to prevent carbon leakage and that it is tailored to that goal without creating unnecessary barriers to trade. The necessity test under Article XX(b) is strict: the measure must be essential to the environmental objective, and there must be no reasonably available, less trade-restrictive alternative.

The Exhaustible Natural Resources Requirement

Article XX(g) raises its own issues for BCAs because it depends on whether the atmosphere can be treated as an “exhaustible natural resource”. WTO case law has accepted that clean air and the global atmosphere can count as exhaustible natural resources, but applying XX(g) to greenhouse gas measures is not fully settled. The measure must have a real link between means and conservation ends showing that carbon border adjustments encourage emissions reductions at home and abroad can help make that link. This exception can allow for measures that discriminate between countries based on their environmental policies, provided that the discrimination is not arbitrary or unjustifiable.²¹

The US- Shrimp Case gives important guidance on how Article XX(g) and the chapeau are interpreted. The US banned shrimp imports caught without Turtle Excluder Devices to protect endangered sea turtles, a ban challenged by India, Malaysia, Pakistan, and Thailand.²² The Appellate Body recognised sea turtles as “exhaustible natural resources” and looked to modern international agreements in its interpretation.²³ But it found the US measure failed the chapeau because

it effectively demanded that other members adopt regulatory programs essentially identical to the US regime without properly considering differing national conditions. The US also failed to properly negotiate cooperative arrangements before imposing its ban.²⁴

The Chapeau’s Constraints

The chapeau limits the scope of Article XX by forbidding arbitrary or unjustifiable discrimination between countries in comparable situations. It aims to prevent environmental measures from being used as disguised protectionism and to ensure that measures genuinely pursue environmental aims rather than trade restrictions.²⁵ In the context of the CBAM, the chapeau inquiry focuses on whether treating exporters differently because of their climate policies is arbitrary or based on objective environmental criteria.²⁶

The US-gasoline case further illustrates the chapeau analysis. The US applied stricter baseline rules to foreign refiners under the Clean Air Act. Although the measure might have fit within Article XX (g) on its face, the Appellate Body found it failed the chapeau because the US did not adequately pursue cooperative solutions with foreign governments nor consider the costs imposed on foreign refiners.²⁷

The CBDR-RC principle (common but differentiated responsibilities and respective capabilities) is central to interpreting the chapeau in climate contexts. It requires differentiating obligations between developed and developing countries, reflecting capabilities and historical emissions, and may mean BCAs must account for developing countries’ limited capacity to adopt comparable carbon pricing.²⁸ In practice, CBDR-RC could require BCAs to be calibrated so they do not impose disproportionate burdens on developing-

country exporters.²⁹

Implementation Challenges and the Chapeau

Deciding whether a BCA meets the chapeau involves looking at the measure as a whole: product coverage, country exemptions, how embedded emissions are calculated, and whether equivalence credits are recognised.³⁰ The main implementation risks are calculated, and whether equivalence credits are recognised. The main implementation risks are measures that, by ignoring the realities of developing and least-developed countries, create excessive administrative burdens and costs for those exporters.³¹

Embedded-emissions calculation methods are a particular sticking point, especially where default values substitute for actual emissions data. Defaults can overstate emissions from countries lacking monitoring systems, imposing unfair costs on developing-country exporters.³² Requiring verification and certificate surrender also raises transaction costs and complexity that may act as a informal trade barriers, risking a chapeau violation. Recognition (or non-recognition) of equivalence whether foreign climate actions, including non-market regulations, count can amount to arbitrary discrimination.³³

The National Security Alternative

Some scholars have suggested an alternative route: justifying BCAs under the national security exception in GATT Article XXI, given the climate-security nexus. States might argue that climate change creates national-security threats that justify trade measures under Article XXI.³⁴ Although Article XXI has not been used for BCAs, an expanded understanding of national security could encourage members to negotiate a broader agreement on carbon abatement, reducing

disputes and singing trade with climate policy. Invoking of article XXI risks abuse and could weaken the multilateral trading system if used as a broad escape clause.³⁵

In the end, whether a border carbon adjustment (BCA) can stand up to WTO scrutiny really depends on how it's actually designed and put into practise.³⁶ Even differences in how it's structured can make or break its compatibility with WTO rules. The reason behind the BCA matters too. If a BCA is mostly about boosting competitiveness or gaining political leverage, it's going to be much harder to defend than one that's genuinely trying to protect the environment.³⁷

Climate Justice and Legal Equity

The Disproportionate Burden on Developing Countries

The spread of carbon trading schemes raises serious issues for climate justice and legal equity, especially for developing countries and the Global South. While border carbon adjustments can help cut emissions and encourage global decarbonization, if they are not designs with sensitivity to global inequalities, they risk placing disproportionate burdens on developing and least developed countries and may clash with GATT's non-discrimination rules and the Article XX chapeau.³⁸ To judge whether current trade rules fairly balance sustainability and equity, we need to look closely at the financial pressures these schemes place on exporters from poorer regions and at structural inequities in existing carbon-trading systems.³⁹

The financial impact of CBAM-style measures on developing-country exporters can be large and varied.⁴⁰ Requiring importers to buy CBAM certificates that match the carbon price in the importing country can raise export costs considerably, harming the competitiveness

of industries in countries that lack their own carbon pricing tools or institutional capacity.⁴¹ For India where a sizeable share of iron and steel goes to the EU - CBAM could become a significant tax on those exports once the mechanism moves into its compliance phase. The burden is worsened by limited access to emissions-reduction technologies and weak monitoring systems in many developing countries, which makes meeting CBAM rules especially costly.⁴²

Administrative Burdens and Regulatory Uncertainty

CBAMs also create heavy administrative work that becomes an extra hurdle for exporters from developing countries. Exporters have to verify the emissions embedded in their products using methods set by the importers, keep detailed records of how their products were made, and surrender CBAM certificated.⁴³ All of this creates high costs and makes the rules feel uncertain. These demands hit exporters from emerging economies harder because they often lack robust emissions monitoring infrastructure and the institutions needed for complex regulation. Where actual emissions data are missing and default values are used, emissions may be overestimated for some developing countries, pushing their effective carbon costs even higher.⁴⁴ This creates a structural disadvantage for countries without advanced monitoring systems compared with developed countries that can more easily meet verification requirements.⁴⁵

CBDR-RC and the Operationalisation of Equity

The clash between CBAMs and the CBDR-RC principle is central to debates on climate justice. CBDR-RC requires differentiating responsibilities and commitments according to countries' capabilities and circumstances,

and international climate law reflects this by imposing heavier mitigation obligations on developed states than on developing ones.⁴⁶ But CBAMs tend to apply a uniform carbon cost to all exporters irrespective of development status, which undermines the differentiation core to climate justice. Although the WTO's preamble acknowledges differing responsibilities toward the environment, the organisation does not operationalise CBDR in environmental terms; special and differential treatment in WTO law mainly addresses trade liberalisation, not differentiated environmental obligations.⁴⁷

Equity in climate law also requires that climate measures to be arbitrary or disguised trade restrictions⁴⁸. Article 3.5 of the UNFCCC demands cooperation to keep the international economic system open and says measures to tackle climate change should not be arbitrary discrimination or disguised trade barriers.⁴⁹ The Paris Agreement didn't provide clear guidance on unilateral trade measures, so it's still unclear how to balance trade and climate goals. This gap has been partly filled by unilateral measures like CBAMs, which raises questions about whether these policies respect the fairness principles that are central to international climate law.⁵⁰

Risks of Retaliation and Trade Tensions

CBAMs also risk triggering retaliation and wider trade tensions, which is a major concern for developing countries. If countries affected by CBAMs see them as protectionism rather than legitimate environmental regulation, they might retaliate, leading to disputes that could destabilise the global trading system.⁵¹ Developing countries argue that the EU's default settings and heavy administrative rules create significant costs and uncertainty that hurt exporters disproportionately especially those who don't have the infrastructure to monitor their emissions.⁵² When rich countries impose

carbon costs on their own without agreement, it can feel like they're shifting the economic burden of climate mitigation onto poorer countries, which undermines international cooperation on climate change.⁵³

The emergence of a BCA coalition among like-minded developed states risks amplifying these harms. If several developed jurisdictions adopt similar BCAs, developing exporters could face cumulative-costs that seriously damage their competitiveness.⁵⁴ With countries such as the US and UK following the EU's lead, developing countries may find themselves forced either to set up carbon pricing systems they cannot afford or to face rising trade barriers. Concentrating carbon-pricing demands among developed countries may find themselves forced either to set up carbon-pricing demands among developed countries would deepen existing inequalities in the global trading system and penalize those least responsible for historical emissions but most vulnerable to climate change.⁵⁵

Comparative Approached to Carbon Border Measures

EU CBAM

The EU CBAM is currently the most developed and clearly defined model. It works alongside the EU emissions Trading System and is intended to make imported goods face carbon costs similar to those paid by producers inside the EU. That gives the EU a strong argument that the measure is meant to ensure regulatory balance rather than simply protect domestic industry.⁵⁶ At the same time, the CBAM is highly centralised, since the EU itself decides the emissions methodology, benchmark values, and the extent to which foreign carbon pricing will be recognised. This gives the system certainty, but it also makes it look more unilateral, especially when

foreign climate policies are only partly taken into account.⁵⁷

US and UK possibilities

A carbon border measure in the United States would probably look different because the American system is more fragmented and politically contested. Instead of one economy-wide mechanism, the US may rely on sector-specific measures or connect border charges to domestic subsidy or industrial policy tools.⁵⁸ That could make the system more flexible, but it may also create uncertainty because exporters would face different rules depending on the sector and the legal basis of the measure. The UK is likely to fall somewhere between the EU and the US. Because of its close regulatory relationship with the EU, it may adopt a CBAM-style model, but it may also try to make the system more flexible for developing countries and for foreign carbon policies.⁵⁹

WTO compatibility concerns

From the WTO point of view, the main issue is whether the measure treats like products equally and avoids hidden discrimination. If a border measure recognises only the domestic carbon price of the importing country but gives little or no credit to foreign climate regulation, it becomes much harder to defend under MFN and national treatment rules⁶⁰. A measure that is transparent, proportionate and to open claims of equivalence is easier to justify than one that is rigid and one-sided. That is why comparison matters so much: different legal designs create different levels of WTO risk.⁶¹

Development and Equity

Looking across jurisdictions also shows that carbon border measures raise serious questions of fairness. Developed countries

are far more likely to have the administrative systems, technical infrastructure, and financial resources needed to comply with detailed emissions reporting and verification rules.⁶² Developing countries, especially in the Global South, may struggle to meet those standards even when they are genuinely trying to cut emissions through other regulatory methods. This means the design of a carbon border measure is not just a trade issue but also an equity issue. A measure that ignores these differences can easily become a form of climate pressure rather than a neutral regulatory tool.⁶³

Carbon Measurement and Verification Challenges

Data gaps and default values

The first major problem is the lack of reliable data. Many developing countries lack sophisticated emissions monitoring systems or detailed carbon accounting infrastructure. As a result, importing authorities often use default values when actual emissions data are not available.⁶⁴ While this makes administration easier, it also creates the risk of overestimation. If default values are set too high, exporters from countries with weaker reporting systems may end up paying more than their carbon cost. That makes the measure look neutral on paper while producing unequal effects in practice.⁶⁵

Verification Burdens

The second issue is verification. Border carbon systems usually require importers or exporters to submit documents, emissions reports, and third-party verification. For large firms in developed economies, this may be manageable. For smaller producers in developing countries, however, it can be expensive and time consuming.⁶⁶ These compliance demands can therefore become a hidden barrier to trade, especially where firms do not have the

technical expertise or administrative capacity to meet them. The danger is that a system meant to support climate fairness ends up favouring countries with stronger institutions rather than those with lower emissions.⁶⁷

Recognition of equivalence

Verification is also closely connected to the question of equivalence. If an exporting country already has a domestic carbon price, the importing state should ideally recognise that and avoid double charging. But the issue becomes more complicated when the exporting country relies on non-market measures such as efficiency standards, regulatory limits, or command and control rules instead of a formal carbon price. If those measures are not recognised, then real climate action may be ignored simply because it is not expressed in market terms. That creates a serious fairness problem, especially for developing countries that may rely on different policy tools because of limited capacity.⁶⁸

These measurement and verification problems are not only technical. They go to the heart of WTO compatibility and climate justice. A system that relies too heavily on default values, excessive paperwork, or narrow forms of recognition may end up discriminating against countries with fewer resources. On the other hand, a system that is too loose may be easy to manipulate and may fail to stop carbon leakage effectively. The real challenge is to design a framework that is accurate enough to support environmental goals, but flexible enough to avoid unjustified discrimination. That balance is essential if carbon border measures are to avoid unjustified discrimination. That balance is essential if carbon measures are to remain credible within the multilateral trading system.⁶⁹

Policy Recommendations

Multilateralization of Carbon Pricing Standards.

Several policy steps can be drawn from the analysis above that help create a carbon trade framework that fits WTO rules while advancing equity and climate goals. First, Members should work to multilateralise carbon-pricing standards through the WTO, so rules are more predictable and less discriminatory. The WTO could host negotiations on a general agreement for carbon- agreement for carbon-abatement policies, which would lower litigation risks and help align trade and climate objectives. Clear international guidelines on border carbon adjustments would bring legal clarity while allowing for different national circumstances and capacities.⁷⁰

Respect for CBDR-RC and Differentiated Treatment

Second, BCAs must respect the CBDR-RC principle by differentiating treatment according to countries' development status and capacities. This could mean exemptions or more favourable treatment for developing countries, and targeted technical and financial support to help them build comparable carbon-pricing systems. Recognising a variety of mitigation approaches, including non-market measures, is important to meet the Article XX chapeau's requirements. The Enabling Clause offers a legal route to grant differential, more favourable treatment to developing Members without breaching MFN.⁷¹

Climate Clubs with Carrots Rather Than Sticks

Third, climate clubs can help reconcile trade and environmental goals in a WTO-consistent way. Preferential terms for club members may fit under WTO exceptions for

regional or special arrangements, such as GATT Article XXIV and the Enabling Clause. Clubs should emphasise “carrots” clearly defined benefits like finance, technology transfer, and capacity building-over punitive “sticks” like trade penalties. Revenues from import carbon pricing should be recycled into clean-technology support for exporter countries to strengthen legitimacy and operationalise differentiated responsibilities.⁷²

Reform of the WTO Dispute Settlement System

Fourth, the WTO's dispute settlement system needs reform to handle climate-related trade disputes effectively. The Appellate Body's paralysis since December 2019 has increased uncertainty about resolving CBAM disputes. The Russian challenge to the EU CBAM underlines the need for a dispute system that can deal with complex climate-trade issues. Creating a specialised climate-and-trade dispute mechanism within the WTO could offer faster, more expert resolution for cases over BCAs and related measures.⁷³

Technical Assistance and Capacity Building

Fifth, developed countries that adopt BCAs should provide technical assistance and capacity building to affected developing countries. Financial support, technology transfer, and technical help would let developing exporters meet reporting and verification requirements and, over time, develop their own carbon-pricing tools. Streamlined reporting for developing Members-such as using internationally recognised default benchmarks-can lower administrative burdens. The WTO, UNFCCC, and World Customs Organization should cooperate to produce guidance and best practices for implementing BCAs.⁷⁴

Avoiding Protectionist Design Features

Sixth, BCAs must be designed to avoid protectionist elements that could defeat their WTO legitimacy. The legal analysis will look closely at motive: measures driven mainly by competitiveness or political objectives are less defensible than those genuinely motivated by environmental protection. Design choices-product scope, embedded-emissions methodology, and rules for recognising equivalent carbon policies-should rest on objective environmental criteria, not protectionist aims. Phasing out free allowances under domestic ETSs, as the EU has linked to CBAM, shows why careful design matters to prevent undue protection for domestic industry.⁷⁵

Conclusion

The rise of carbon trading is a necessary part of tackling climate change, but also puts pressure on the multilateral trading system. This paper examined the legal and economic problems created by the “new carbon frontier” using WTO law and international climate principles, and found a clear tension between environmental goals and trade obligations. Unilateral border carbon adjustments can help reduce carbon leakage and encourage decarbonization, but they can also conflict with the trading system’s non-discrimination

rules and the equity principles central to climate law. Resolving these tensions will need a careful approach that protects the environment while keeping global trade predictable, stable, and fair.

Whether a BCA is compatible with WTO rules depends largely on how it is designed and implemented. Article XX can offer a defence for trade- restrictive environmental measures, but its chapeau imposes strict limits that are difficult to meet for unilateral carbon-pricing schemes. That makes it important to treat developing countries fairly and to recognise different, legitimate ways of cutting emissions. The CBDR-RC principle is especially relevant here, because it helps ensure BCAs respect both trade obligations and climate justice. Finally, the paper shows that fragmented regulation on carbon trading creates real risks for trade stability and international cooperation. A patchwork of unilateral measures with varying product scope, emissions calculation methods, and administrative rules creates uncertainty and can impose heavy burdens on trade. This fragmentation undermines the multilateral system’s core values of non-discrimination and predictability.

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