



**Congressional  
Research Service**

Informing the legislative debate since 1914

---

# Border Carbon Adjustments: Background and Developments in the European Union

Updated February 21, 2023

**Congressional Research Service**

<https://crsreports.congress.gov>

R47167



## Border Carbon Adjustments: Background and Developments in the European Union

A key concern among policymakers is that differing climate change mitigation policies could create a competitive disadvantage for some domestic businesses—for example, by raising production costs compared to another country. In addition, differences among countries’ climate policies could create incentives to shift economic activities to countries with less stringent or less comprehensive climate policies, ultimately leading to “emissions leakage.” In general, greenhouse gas (GHG) emissions leakage can occur if a domestic policy to reduce domestic emissions leads to an increase in emissions in another location, thus undermining emission reductions resulting from the domestic climate policy. Policymakers might consider several approaches to address these potential concerns. One approach that has received interest in recent years is a border carbon adjustment (BCA).

A BCA is a potential trade-related option, such as an import fee or tariff, intended to mitigate adverse competitiveness effects and other concerns when one or more countries establish more ambitious policies to reduce GHG emissions than others. Although no countries have yet implemented a BCA as part of their climate change policies, the European Commission—which functions as the executive of the European Union (EU)—released a legislative proposal in July 2021 for a BCA to complement its mandatory emissions reduction program. In December 2022, the European Parliament and the Council of the EU reached a provisional agreement on a proposed BCA framework, as part of a larger legislative and policy package that includes changes to the EU Emissions Trading System. The European Parliament and the Council of the EU share legislative power and both would need to approve a European Commission proposal for it to become EU law. The provisional agreement on the EU BCA (known in the EU as a Carbon Border Adjustment Mechanism, or CBAM) would need formal approval by the Parliament and the Council before it can take effect.

When establishing a BCA, several key questions would need to be addressed: (1) which materials or products would likely be subject? (2) how would the BCA fee be determined? and (3) which countries’ materials or products would be subject?

Establishing a BCA would likely present substantial implementation challenges. Depending on design specifics, a BCA would require calculating the economic impact of a domestic climate policy on a wide range of domestically produced goods as well as the analogous costs in other countries. To alleviate some of these challenges, policymakers could limit the program to a select number of industries and apply a simplified set of default values and assumptions for categories of goods.

The potential imposition of BCAs raises a range of trade issues and other related concerns. Some analysts have expressed concern that BCAs could be (or be interpreted as) disguised protections for domestic industry. Some experts have suggested that BCAs could negatively affect developing countries in the short run. Further, some researchers have highlighted the potential for unintended consequences from a BCA, including impacts to U.S. currency.

The World Trade Organization (WTO) oversees and administers multilateral trade rules, and serves as a forum for trade negotiations and trade disputes. It is uncertain whether a BCA would comply with WTO rules because a WTO dispute settlement panel has never considered the issue. In particular, it is uncertain whether a BCA would be consistent with General Agreement on Tariffs and Trade (GATT) principles. It is also uncertain whether specific GATT exceptions might allow a BCA that is otherwise deemed inconsistent with key GATT principles.

Some studies have questioned whether BCAs would be effective, considering the balance between expected benefits and implementation challenges, and potential consequences that may result from them. Policymakers have alternatives to BCAs that could be used to address leakage or competitiveness concerns. For example, within the framework of a cap-and-trade system, covered entities could receive emission allowances at no cost. This has occurred in the EU’s cap-and-trade system, California’s cap-and-trade program, and in the Regional Greenhouse Gas Initiative to a lesser extent. In addition, policymakers could support carbon-intensive, trade-exposed industries by funding research, development, and deployment efforts in particular sectors or for specific technologies. Climate policies could include funding to support transition assistance for specific industries or communities with large concentrations of impacted industries.

R47167

February 21, 2023

**Jonathan L. Ramseur**  
Specialist in Environmental Policy

**Brandon J. Murrill**  
Legislative Attorney

**Christopher A. Casey**  
Analyst in International Trade and Finance

## **Contents**

Introduction .....	1
Background and Context .....	1
What Are Border Carbon Adjustments?.....	3
Which Materials or Products Would Likely Be Subject to a BCA?.....	4
How Would the BCA Fee on Imports Be Determined? .....	4
Which Countries’ Materials or Products Would Be Subject to a BCA?.....	5
BCA Implementation Challenges and Options .....	5
European Union CBAM.....	6
Background .....	6
Products Covered .....	7
CBAM Carbon Price .....	8
Direct or Indirect Emissions.....	9
World Trade Organization Issues .....	9
GATT Obligations Related to Border Adjustments.....	10
GATT Exceptions.....	11
Other Trade-Related Issues.....	12
Alternatives to BCAs.....	12

## **Figures**

Figure 1. European Union Emissions Trading System Emission Allowance Prices .....	9
---	---

## **Contacts**

Author Information.....	13
-------------------------	----

## Introduction

A border carbon adjustment (BCA) is a potential trade-related option intended to mitigate adverse competitiveness effects and other concerns when one or more countries establish more ambitious policies to reduce greenhouse gas (GHG)<sup>1</sup> emissions than others. Other countries may also have an incentive to adopt more stringent climate policies to avoid the BCAs.

BCAs have been a subject of high-level bilateral and multilateral discussions among countries in recent months. The 27-member European Union (EU) is finalizing legislation on a proposed BCA framework.<sup>2</sup> In December 2022, the European Parliament and the Council of the EU reached a provisional agreement on a BCA framework, as part of a larger agreement that included changes to the EU Emissions Trading System.<sup>3</sup> The European Parliament and the Council of the EU share legislative power and must both approve the provisional agreement for it to become EU law.

The EU provisional agreement, which (as of the date of this report) would still need to be formally approved and could take several years to fully implement, has raised concerns from policymakers in a number of countries, including the United States. In addition, in 2021, Canadian government officials conducted a consultation process among stakeholders seeking input on BCA issues in the context of Canada’s national carbon tax framework.<sup>4</sup>

This report explains what BCAs are and examines some of the international challenges they might present if pursued in government policies. In addition, the report discusses alternatives to BCAs and includes selected viewpoints from a range of stakeholders.

## Background and Context

Under the 2015 Paris Agreement, all Parties agreed to submit “Nationally Determined Contributions” (NDCs) containing nonbinding pledges to mitigate GHG emissions, among other

---

<sup>1</sup> The primary greenhouse gases (GHGs) emitted by human activities—and estimated by the U.S. Environmental Protection Agency (EPA) in its annual inventories—include carbon dioxide (CO<sub>2</sub>), methane, nitrous oxide, sulfur hexafluoride, chlorofluorocarbons, hydrofluorocarbons, and perfluorocarbons. Other GHGs include carbonaceous and sulfuric aerosols, hydrochlorofluorocarbons, and elevated tropospheric ozone pollution generated by emissions of nitrogen oxides and volatile organic compounds, such as solvents.

<sup>2</sup> For more details, see CRS In Focus IF11211, *The European Parliament and U.S. Interests*, by Kristin Archick; see also European Parliamentary Research Service, *EU Carbon Border Adjustment Mechanism Implications for Climate and Competitiveness*, June 2022, [https://www.europarl.europa.eu/thinktank/en/document/EPRS\\_ATA\(2022\)729462](https://www.europarl.europa.eu/thinktank/en/document/EPRS_ATA(2022)729462).

<sup>3</sup> European Parliament, “Climate change: Deal on a more ambitious Emissions Trading System (ETS),” press release, December 18, 2022, <https://www.europarl.europa.eu/news/en/press-room/20221212IPR64527/climate-change-deal-on-a-more-ambitious-emissions-trading-system-ets>; and Council of the European Union, “Fit for 55’: Council and Parliament reach provisional deal on EU emissions trading system and the Social Climate Fund,” press release, December 18, 2022, <https://www.consilium.europa.eu/en/press/press-releases/2022/12/18/fit-for-55-council-and-parliament-reach-provisional-deal-on-eu-emissions-trading-system-and-the-social-climate-fund/>.

<sup>4</sup> Government of Canada, Department of Finance, *Exploring Border Carbon Adjustments for Canada*, 2021, <https://www.canada.ca/en/department-finance/programs/consultations/2021/border-carbon-adjustments/exploring-border-carbon-adjustments-canada.html>.

actions.<sup>5</sup> Parties agreed to update or submit new NDCs by 2020 and every five years thereafter.<sup>6</sup> GHG emission reduction goals in the NDCs vary across countries, according to their “common but differentiated responsibilities,” under the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement.<sup>7</sup> The national climate change policies required to achieve these commitments would likely differ in terms of scope, stringency, and timing. Assuming these policies are implemented and the goals achieved,<sup>8</sup> they would likely result in a range of economic impacts across countries.

For example, a 2017 study estimated the cost of emission reduction in selected countries to meet their individual NDCs.<sup>9</sup> The study’s cost estimates are comparable to an estimate of the carbon price (e.g., tax or fee) that would be needed in particular countries to achieve their NDCs. Although the study’s estimated results are outdated for several reasons (e.g., many countries have updated their NDCs since the study’s publication), the relative cost estimates may be instructive. The cost estimates ranged from zero (e.g., China and India)<sup>10</sup> to hundreds of dollars per metric ton of carbon dioxide (e.g., the European Union, Japan). The estimate for the United States was roughly \$100 per metric ton.

One concern among policymakers is that differing climate policies could cause the domestic price of goods to increase more than the prices of similar goods manufactured abroad, potentially creating a competitive disadvantage for some domestic businesses.<sup>11</sup> This is a particular concern for “emissions-intensive, trade-exposed” (EITE) industries, such as steel manufacture, as discussed below. A second key concern is that differences among countries’ climate policies could create incentives to shift economic activities to countries with less stringent or less comprehensive climate policies, ultimately leading to “emissions leakage.” In general, GHG emissions leakage can occur if a domestic policy to reduce domestic emissions leads to an increase in emissions in another location, thus undermining emission reductions resulting from the domestic climate policy.<sup>12</sup>

---

<sup>5</sup> The Paris Agreement is an international treaty under the United Nations Framework Convention on Climate Change (UNFCCC), which since 1992 has been the primary international forum among national governments to address GHG-induced climate change. Two principles agreed to in the UNFCCC are that (1) Parties should act “on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities” and (2) developed country Parties should take the lead in combating climate change. For more information about the treaties, see CRS Report R46204, *The United Nations Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement: A Summary*, by Jane A. Leggett.

<sup>6</sup> Each successive NDC of a Party “will represent a progression” and “reflect its highest possible ambition, reflecting its common but differentiated responsibilities and respective capabilities, in light of different national circumstances.”

<sup>7</sup> The UNFCCC Article 2 includes the principle of “common but differentiated responsibilities and respective capabilities,” sometimes with the acronym CBD-RC, which carries over in its subsidiary Paris Agreement.

<sup>8</sup> Based on past experience with international commitments to reduce GHG emissions (including prior U.S. targets), the degree to which these emission targets will be met is uncertain. This issue is beyond the scope of this report.

<sup>9</sup> See Keigo Akimoto et al., “The Analyses on the Economic Costs for Achieving the Nationally Determined Contributions and the Expected Global Emission Pathways,” *Evolutionary and Institutional Economics Review*, vol. 14 (2017).

<sup>10</sup> The study authors stated that some countries’ estimated abatement costs were zero, because these countries could meet their NDCs using “business-as-usual” climate policies.

<sup>11</sup> Although some industries may become less profitable, lose market share, and reduce jobs, not all businesses within a sector may be affected similarly. For example, under an emission cap or carbon price framework, a company using electricity produced with hydropower would experience less cost increase than a company using electricity produced with coal. In addition, some businesses may be more energy efficient than others or use less emitting processes. Some may be able to reduce their emissions in response to the new policies at lower cost than others.

<sup>12</sup> Some studies have raised questions regarding the degree to which emissions leakage would be a concern under a

Policymakers might consider several approaches to address these potential concerns. One approach that has received interest in recent years is a BCA.<sup>13</sup> The sections below discuss the concept, scope, and logistics of a BCA approach.

## What Are Border Carbon Adjustments?

To address the potential impacts associated with different climate policies across countries, a BCA would impose a trade measure, such as a fee or tariff,<sup>14</sup> on certain imported materials or products. BCA frameworks could also provide a rebate to exporters of certain materials or products based on increased costs from a domestic climate policy. Generally, a BCA would seek to promote “equal conditions of competition” for foreign and domestic companies supplying products or services within a taxing jurisdiction.<sup>15</sup> Some observers have noted that BCAs could encourage other countries to adopt comparable climate policies.<sup>16</sup>

Although no countries have yet implemented a BCA as part of their climate change policies,<sup>17</sup> the EU (as discussed below) is developing a legislative framework for a BCA that would complement its mandatory emissions reduction program. In Congress, most of the recent carbon tax or emission fee legislative proposals include a BCA.<sup>18</sup>

When establishing a BCA, policymakers could face consideration of several key questions, which are discussed below.<sup>19</sup>

---

unilateral approach. This issue is beyond the scope of this report. See, for example, Warwick McKibbin et al., “The Role of Border Carbon Adjustments in a U.S. Carbon Tax,” *Climate Change Economics*, vol. 9, no. 1 (2018); Adele Morris, *Making Border Carbon Adjustments Work in Law and Practice*, Tax Policy Center, July 26, 2018; and Joseph Aldy, “Frameworks for Evaluating Policy Approaches to Address the Competitiveness Concerns of Mitigating Greenhouse Gas Emissions,” *National Tax Journal*, vol. 70, no. 2 (2017).

<sup>13</sup> Policymakers, stakeholders, and researchers refer to these mechanisms by a variety of names, including *border adjustments*, *border tax adjustments*, *border carbon adjustment mechanism*, or *carbon border adjustment mechanism* (the term used in the EU), among others. This report uses the term *border carbon adjustments* (BCAs).

<sup>14</sup> A *tariff* is a customs duty levied on imported and exported goods and services. For more background, see CRS In Focus IF11030, *U.S. Tariff Policy: Overview*, by Christopher A. Casey.

<sup>15</sup> Organisation for Economic Co-Operation and Development (OECD), *OECD International VAT/GST Guidelines on Neutrality*, 2011, <https://www.oecd.org/tax/consumption/guidelinesneutrality2011.pdf>.

<sup>16</sup> See for example, Adele Morris, *Making Border Carbon Adjustments Work in Law and Practice*, Tax Policy Center, July 26, 2018.

<sup>17</sup> As a component of its climate policy, California has a mechanism to address imported electricity from surrounding states (California Air Resources Board cap-and-trade program, <https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program>). Some argue this is a form of a BCA. See, for example, Aaron Cosbey et al., “Developing Guidance for Implementing Border Carbon Adjustments: Lessons, Cautions, and Research Needs from the Literature,” *Review of Environmental Economics and Policy*, vol. 13, no. 1 (2019).

<sup>18</sup> See CRS Report R45472, *Market-Based Greenhouse Gas Emission Reduction Legislation: 108th Through 117th Congresses*, by Jonathan L. Ramseur.

<sup>19</sup> A number of researchers have examined these questions and other design issues associated with BCAs. See, for example, Brian Flannery et al., *Framework Proposal for a US Upstream GHG Tax with WTO-Compliant Border Adjustments: 2020 Update*, Resources for the Future, 2020; Aaron Cosbey et al., “Developing Guidance for Implementing Border Carbon Adjustments: Lessons, Cautions, and Research Needs from the Literature,” *Review of Environmental Economics and Policy*, vol. 13, no. 1 (2019); Samuel Kortum and David Weisbach, “The Design of Border Adjustments for Carbon Prices,” *National Tax Journal*, vol. 70, no. 2 (June 2017).

## **Which Materials or Products Would Likely Be Subject to a BCA?**

Many BCA approaches would apply a fee to imported goods from industrial sectors that are expected to experience the greatest impacts from unilateral climate policies. These industries are often described as “emission-intensive, trade-exposed.”

An industry’s GHG emission intensity is a function of the following:

1. direct emissions from its manufacturing process, such as carbon dioxide (CO<sub>2</sub>) from cement or steel production; and
2. indirect emissions from the inputs (e.g., electricity, natural gas) to the manufacturing processes (e.g., steel, cement, and chemical production).

“Emissions-intensive” industries would be impacted by climate policies affecting direct emissions during manufacture and climate policies affecting “upstream” emissions by suppliers, such as electricity generators, that may pass higher costs through to electricity consumers. Emission-intensive industries are likely to experience greater cost increases than less emission intensive industries, all else being equal.<sup>20</sup>

Trade-exposed industries are those that face greater international competition, compared to other domestic industries. One potential measure of a sector’s trade exposure would compare the combined value of a sector’s exports and imports with the value of its domestic production and imports.

A 2009 interagency report prepared during the consideration of federal GHG reduction legislation identified industrial sectors that would meet specific emission-intensive, trade-exposed criteria.<sup>21</sup> For the most part, these sectors included industries in chemical, paper, nonmetallic minerals (e.g., cement and glass), and primary metals (e.g., aluminum and steel) sectors.

## **How Would the BCA Fee on Imports Be Determined?**

In general, a BCA would likely levy a fee on the estimated tons of GHG emissions associated with imported goods (often described as its carbon or emissions content). The rate of the fee would likely be based on a domestic carbon price in the country of import, such as a carbon tax or emissions fee, or a calculated implicit carbon price from a regulatory program or other related policies.<sup>22</sup> To achieve this objective, one government may levy a fee on an imported product from another country, based on estimates of the GHG emissions generated during the manufacturing process of the imported product. Estimated emissions generally would include direct emissions

---

<sup>20</sup> A 2015 study estimated that the “energy-intensive industries of iron and steel, aluminum, pulp and paper, cement, glass, and industrial chemicals would bear total percentage declines in domestic production, on the order of 3 to 5 percent, in excess of the manufacturing sector average of 1.5 percent.” See Joseph Aldy and William Pizer, “The Competitiveness Impacts of Climate Change Mitigation Policies,” The Harvard Project on Climate Agreements, 2015.

<sup>21</sup> Interagency Report, *The Effects of H.R. 2454 on International Competitiveness and Emission Leakage in Energy-Intensive Trade-Exposed Industries*, 2009, [https://www.epa.gov/sites/default/files/2016-07/documents/interagencyreport\\_competitiveness-emissionleakage.pdf](https://www.epa.gov/sites/default/files/2016-07/documents/interagencyreport_competitiveness-emissionleakage.pdf). Federal agencies in the Obama Administration prepared this report in response to a request from several Senators considering H.R. 2454 (111<sup>th</sup> Congress) and related legislation. H.R. 2454 (“Waxman-Markey”) passed the House in 2009 and would have established a GHG emission cap-and-trade program, among other provisions. The legislation included emission allowance rebates and other assistance for industries based on their energy intensity and trade intensity.

<sup>22</sup> Calculating a BCA fee for imports from regulatory programs or policies may present greater challenges than a calculation based on explicit carbon prices, such as taxes or fees.



from onsite processes and may also include indirect emissions associated with the product's manufacture, such as emissions from electricity generation at offsite locations.

In addition, some proposed BCA frameworks further adjust the import fee to account for the climate policies (and costs) in place in the exporting country.<sup>23</sup> The EU BCA includes this type of adjustment.

## **Which Countries' Materials or Products Would Be Subject to a BCA?**

Policymakers may consider including or excluding materials from some countries from a BCA for a range of reasons. For example, a BCA may exclude imports from countries that have climate policies (e.g., carbon prices) that are comparable to domestic policies. In recent U.S. federal legislative proposals, BCAs would apply fees to imported goods from countries that do not have climate policies comparable with those of the United States. Under these approaches, the federal agency in charge of implementing the BCA program, such as the Department of the Treasury, would generally be required to make this determination. How such determinations of climate policy parity are made, and by whom, can raise challenging technical and policy issues.

Policymakers may consider excluding goods from less developed countries or materials from countries whose trade of covered materials is below certain volume thresholds.<sup>24</sup> The former might encourage economic development in the exporting country. The latter might reduce the administrative burden on the country with the BCA. However, such exclusions might raise concerns in the World Trade Organization (discussed below).

## **BCA Implementation Challenges and Options**

Establishing and operating a BCA would likely present implementation challenges.<sup>25</sup> Depending on design specifics, a BCA would require calculating the economic impact resulting from a domestic climate policy on domestically produced goods and materials as well as the analogous costs in other countries. A calculation involving a carbon price and its impact on materials directly subject to the price—often coal, natural gas, and oil—could be relatively straightforward. A calculation involving a carbon price and its impact on materials indirectly affected by a carbon price—such as steel or fertilizer—would be more complicated. Analogous calculations might be needed for imported goods produced in many countries—goods that might cross national borders multiple times before being shipped to the importing country—further increasing the complexity of the program.

To alleviate some of the measurement complexity, policymakers could limit the program to a select number of industries and apply default values and assumptions to particular manufacturing

---

<sup>23</sup> See CRS Report R45472, *Market-Based Greenhouse Gas Emission Reduction Legislation: 108th Through 117th Congresses*, by Jonathan L. Ramseur.

<sup>24</sup> See, for example, Aaron Cosbey et al., "Developing Guidance for Implementing Border Carbon Adjustments: Lessons, Cautions, and Research Needs from the Literature," *Review of Environmental Economics and Policy*, vol. 13, no. 1 (2019).

<sup>25</sup> See, for example, Marco Sakai and John Barrett, "Border Carbon Adjustments: Addressing Emissions Embodied in Trade," *Energy Policy*, vol. 92 (2016); Sam Kortum and David Weisbach, "Border Adjustment for Carbon Emissions," Resources for the Future, 2016; Carolyn Fischer et al., "Carbon Taxes and Energy-Intensive Trade-Exposed Industries," in *Implementing a U.S. Carbon Tax: Challenges and Debates*, ed. Ian Parry et al. (Washington, DC: International Monetary Fund, 2015).



processes. For example, some have proposed using average emission values for particular sectors (e.g., steel) and for different countries.<sup>26</sup> However, this simplified approach could result in less accurate import price adjustments, which could potentially affect the accuracy of GHG emission reductions achieved by the program.<sup>27</sup>

Another option would be to allow companies to provide measured, independently verified emissions data as an alternative to default values. Emerging technologies, such as improved sensors and digital ledgers, may allow for increasing reliability of tracking products through supply chains.

## European Union CBAM

### Background

As of the date of this report, the 27-member EU's governing institutions are trying to finalize legislation on a proposed BCA framework.<sup>28</sup> The EU's proposed framework is called the carbon border adjustment mechanism (CBAM).

The CBAM would complement the EU's principal GHG mitigation policy mechanism: the Emissions Trading System (ETS). The ETS is a GHG emissions cap-and-trade program that started in 2005 and covers emissions from the electricity sector, selected energy-intensive industries, and aviation.<sup>29</sup> In a cap-and-trade system, the emissions cap is partitioned into emission allowances. One emission allowance represents the authority to emit one metric ton of carbon dioxide-equivalent (mtCO<sub>2</sub>e).<sup>30</sup> The emissions cap creates a new commodity—the emission allowance. Policymakers may decide to distribute the emission allowances to covered entities at no cost (based on, for example, previous years' emissions), sell the allowances (e.g., through an auction), or use some combination of these strategies. The distribution of emission allowances is typically a source of significant debate during a cap-and-trade program's development, because the allowances have monetary value.

In the EU ETS, electricity generators generally purchase emission allowances through government auctions, but covered industrial facilities have received a portion of their allowances

---

<sup>26</sup> See, for example, Michael A. Mehling et al., “Designing Border Carbon Adjustments for Enhanced Climate Action,” *The American Society of International Law*, vol. 113, no. 3 (2019); Aaron Cosbey et al., “Developing Guidance for Implementing Border Carbon Adjustments: Lessons, Cautions, and Research Needs from the Literature,” *Review of Environmental Economics and Policy*, vol. 13, no. 1 (2019).

<sup>27</sup> Congressional Budget Office, *Border Adjustments for Economywide Policies That Impose a Price on Greenhouse Gas Emissions*, 2013.

<sup>28</sup> For more details, see CRS Report RS21372, *The European Union: Questions and Answers*, by Kristin Archick; see also European Parliamentary Research Service, *EU Carbon Border Adjustment Mechanism Implications for Climate and Competitiveness*, June 2022, [https://www.europarl.europa.eu/thinktank/en/document/EPRS\\_ATA\(2022\)729462](https://www.europarl.europa.eu/thinktank/en/document/EPRS_ATA(2022)729462).

<sup>29</sup> For more information, see the European Commission EU ETS website, [https://ec.europa.eu/clima/policies/ets\\_en](https://ec.europa.eu/clima/policies/ets_en).

<sup>30</sup> This term of measure (CO<sub>2</sub>e) is used because GHGs vary by global warming potential (GWP). GWP is an index developed by the Intergovernmental Panel on Climate Change (IPCC) that allows comparisons of the heat-trapping ability of different gases over a period of time, typically 100 years. Consistent with international GHG reporting requirements, EPA's most recent GHG inventory (2018) uses the GWP values presented in the IPCC's 2007 Fourth Assessment Report. For example, based on these GWP values, a ton of methane is 25 times more potent than a ton of CO<sub>2</sub> when averaged over a 100-year time frame. The IPCC has since updated the 100-year GWP estimates, with some increasing and some decreasing. For example, the IPCC 2013 Fifth Assessment Report reported the 100-year GWP for methane as ranging from 28 to 36. EPA compares the 100-year GWP values in Table 1-3 of its 2018 GHG Inventory.

for free since 2005.<sup>31</sup> The rationale for this approach is generally the same as the rationale for a BCA: to address concerns of competitiveness with international firms that do not face comparable GHG mitigation and avoid emissions leakage.

The European Commission, which represents the interests of the EU as a whole and functions as the EU's executive, introduced a CBAM proposal in July 2021.<sup>32</sup> The Council of the EU (which represents the interests of the national governments of the member states) reached agreement on its approach for the proposed BCA framework in March 2022.<sup>33</sup> The European Parliament adopted its own position on the BCA framework in June 2022.<sup>34</sup> In December 2022, the European Parliament and the Council of the EU reached a provisional agreement on a BCA framework, as part of a larger legislative and policy package (known as "Fit for 55") that includes changes to the EU Emissions Trading System.<sup>35</sup> The European Parliament and the Council of the EU share legislative power and must both formally approve the provisional agreement for it to become EU law.<sup>36</sup> The EU provisional agreement has raised concerns from policymakers and stakeholders in a number of countries, including the United States.

The CBAM proposal is part of a larger reform package that would amend other components of the EU ETS. In particular, the reforms would reduce the ETS emissions cap and gradually eliminate the allocation of free allowances. The CBAM would be phased in as free emission allocation is phased out. Following a reporting period that would start in October 2023, the CBAM would start in 2026 in a limited form and reach full implementation in 2034, as free allowances are reduced to zero. During the phase-in period, the CBAM would apply only to the percentage of emissions that does not benefit from free allowances, thus reducing the CBAM price on covered imported products.

## Products Covered

The precise list of imported products subject to the provisional CBAM is uncertain. EU policymakers have debated which products to include in the CBAM. The European Commission's July 2021 proposed CBAM applied to a selected number of goods: iron and steel, cement, fertilizer, aluminum, and imported electricity. In June 2022, the European Parliament proposed to add organic chemicals, plastics, hydrogen, and ammonia to the scope of coverage.

---

<sup>31</sup> For more background the free allocation, see the European Commission, "Allocation to Industrial Installations," [https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/free-allocation/allocation-industrial-installations\\_en#allocation-based-on-benchmarks](https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/free-allocation/allocation-industrial-installations_en#allocation-based-on-benchmarks).

<sup>32</sup> For more information, see European Commission, "Carbon Border Adjustment Mechanism," [https://ec.europa.eu/taxation\\_customs/green-taxation-0/carbon-border-adjustment-mechanism\\_en](https://ec.europa.eu/taxation_customs/green-taxation-0/carbon-border-adjustment-mechanism_en).

<sup>33</sup> Council of the European Union, "Council Agrees on the Carbon Border Adjustment Mechanism (CBAM)," press release, March 15, 2022, <https://www.consilium.europa.eu/en/press/press-releases/2022/03/15/carbon-border-adjustment-mechanism-cbam-council-agrees-its-negotiating-mandate/>.

<sup>34</sup> European Parliament, "CBAM: Parliament Pushes for Higher Ambition in New Carbon Leakage Instrument," press release, June 22, 2022, <https://www.europarl.europa.eu/news/en/press-room/20220516IPR29636/climate-change-meps-push-for-accelerated-eu-action-and-energy-independence>.

<sup>35</sup> European Parliament, "Climate change: Deal on a more ambitious Emissions Trading System (ETS)," press release, December 18, 2022, <https://www.europarl.europa.eu/news/en/press-room/20221212IPR64527/climate-change-deal-on-a-more-ambitious-emissions-trading-system-ets>; and Council of the European Union, "Fit for 55': Council and Parliament reach provisional deal on EU emissions trading system and the Social Climate Fund," press release, December 18, 2022, <https://www.consilium.europa.eu/en/press/press-releases/2022/12/18/fit-for-55-council-and-parliament-reach-provisional-deal-on-eu-emissions-trading-system-and-the-social-climate-fund/>.

<sup>36</sup> For more information on the legislative process in the EU, see European Parliament, "Ordinary Legislative Procedure," <https://www.europarl.europa.eu/olp/en/interinstitutional-negotiations>.

According to documentation explaining the European Commission’s initial 2021 CBAM proposal, the CBAM would cover imports of goods from all non-EU countries. Countries that participate with the EU ETS or have their own emissions trading systems linked with the ETS (e.g., Switzerland) would be excluded from the CBAM.<sup>37</sup> In addition, the Commission’s CBAM proposal included an adjustment mechanism to account for the climate policies (and costs) in place in the exporting country.<sup>38</sup>

Based on the available information from the December 2022 provisional agreement, the CBAM would initially apply to imports of cement, aluminum, fertilizers, electricity, hydrogen, iron and steel, as well as some precursors and a limited number of downstream products (e.g., screws and bolts).<sup>39</sup> The European Commission is to consider whether to include organic chemicals and polymers in the future.<sup>40</sup>

## CBAM Carbon Price

Starting in 2026, the EU CBAM would indirectly attach a carbon price to the GHG emissions associated (“embedded”) with the initial list of imported products identified in the December 2022 provisional agreement (described above). The carbon price would be linked to the weekly average auction price for the EU ETS emission allowance. The CBAM would attach the price to imported goods through a certificate process. One certificate would equate with one metric ton of CO<sub>2</sub> emissions. Companies importing covered products into the EU would need to purchase certificates through national authorities. Once a year, importers would need to surrender an amount of certificates that matches the emissions associated with their imported covered products. CBAM certificates are not tradeable or bankable, but companies may sell a limited quantity of unused certificates back to a national authority.

**Figure 1** illustrates the EU ETS allowance prices over time. As the figure indicates, allowance prices have increased in recent years. The average price in 2002 was \$85 per metric ton of CO<sub>2</sub>e emissions. This value is considerably higher than 2022 emission allowance prices in U.S. state and regional GHG emissions reduction programs. As a point of comparison, the average emission allowance price in 2022 from the Regional Greenhouse Gas Initiative (RGGI), a cap-and-trade program in 11 U.S. states, was \$13.5 per metric ton.<sup>41</sup> The 2022 average allowance price in California’s cap-and-trade program was \$28.5 per metric ton.<sup>42</sup>

---

<sup>37</sup> European Commission, “Carbon Border Adjustment Mechanism: Questions and Answers,” July 2021, [https://ec.europa.eu/commission/presscorner/detail/en/qanda\\_21\\_3661](https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3661).

<sup>38</sup> See CRS Report R45472, *Market-Based Greenhouse Gas Emission Reduction Legislation: 108th Through 117th Congresses*, by Jonathan L. Ramseur.

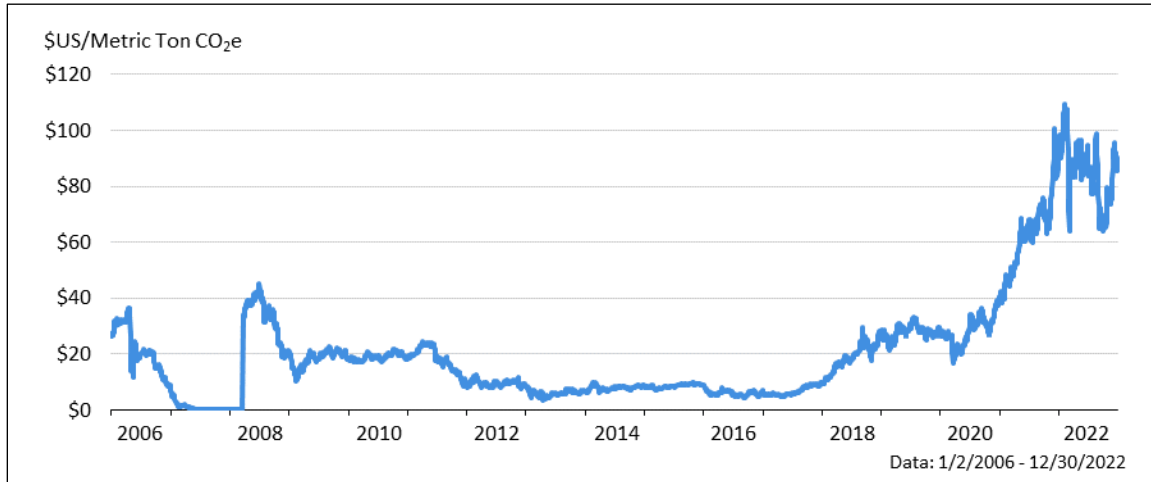
<sup>39</sup> European Parliament, “Deal reached on new carbon leakage instrument to raise global climate ambition,” press release, December 13, 2022, <https://www.europarl.europa.eu/news/en/press-room/20221212IPR64509/deal-reached-on-new-carbon-leakage-instrument-to-raise-global-climate-ambition>.

<sup>40</sup> Ibid.

<sup>41</sup> This is the average settlement price from the past four RGGI allowance auctions. Eleven U.S. states participate in the Regional Greenhouse Gas Initiative (RGGI), a cap-and-trade program that covers CO<sub>2</sub> emissions from electric power. The RGGI states are Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Virginia, and Vermont. Through executive branch action, Pennsylvania is seeking to join RGGI. Some policymakers in Pennsylvania’s legislative bodies have voiced strong opposition to joining RGGI and the governor’s actions to join the program without enacting new legislation. In addition, the governor of Virginia has proposed removing his state from RGGI. For more information, including emission allowance price data, see <https://www.rggi.org>; see also, CRS Report R41836, *The Regional Greenhouse Gas Initiative: Background, Impacts, and Selected Issues*, by Jonathan L. Ramseur.

<sup>42</sup> California implements a GHG emissions cap-and-trade program that covers electric power, selected industries, and

**Figure I. European Union Emissions Trading System Emission Allowance Prices**  
2006 – 2022



**Source:** Created by the Congressional Research Service with data from International Carbon Action Partnership (ICAP), Allowance Price Explorer, <https://icapcarbonaction.com/en/documentation-allowance-price-explorer>. ICAP sourced its data from the European Energy Exchange Group, <https://www.eex.com/en/market-data/eex-group-datasource>.

## Direct or Indirect Emissions

The European Commission’s initial legislative proposal for CBAM (in July 2021) applied only to direct GHG emissions generated from the onsite production of covered materials (e.g., iron and steel). The European Commission approach included a plan to evaluate whether its BCA should include indirect emissions from these materials.<sup>43</sup> The European Parliament’s CBAM proposal (from June 2022) included indirect emissions.<sup>44</sup> According to available documentation, the December 2022 provisional CBAM agreement would cover “indirect emissions under certain conditions” and the Commission is to “assess the methodology for indirect emissions” during the transition period (i.e., 2026-2034).<sup>45</sup>

## World Trade Organization Issues

The World Trade Organization (WTO) is the 164-member international organization created to oversee and administer multilateral trade rules, serve as a forum for trade negotiations, and

---

fossil fuel distributors. For more information, see the California Air Resources Board website at <https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program>. The average allowance price is based on the auction settlement prices, available at <https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program/program-data/cap-and-trade-program-data-dashboard>.

<sup>43</sup> European Commission, “Carbon Border Adjustment Mechanism: Questions and Answers,” [https://ec.europa.eu/commission/presscorner/detail/en/qanda\\_21\\_3661](https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3661).

<sup>44</sup> EU Parliament, “CBAM: Parliament Pushes for Higher Ambition in New Carbon Leakage Instrument,” press release, June 22, 2022, <https://www.europarl.europa.eu/news/en/press-room/20220603IPR32157/cbam-parliament-pushes-for-higher-ambition-in-new-carbon-leakage-instrument>.

<sup>45</sup> European Parliament, “Deal reached on new carbon leakage instrument to raise global climate ambition,” press release, December 13, 2022, <https://www.europarl.europa.eu/news/en/press-room/20221212IPR64509/deal-reached-on-new-carbon-leakage-instrument-to-raise-global-climate-ambition>.

resolve trade disputes. The WTO encompassed and succeeded the General Agreement on Tariffs and Trade (GATT), which was established in 1947.<sup>46</sup> The GATT is one of the WTO agreements that set forth rules and disciplines for practices that affect international trade in goods and services.<sup>47</sup> These rules can be enforced by the WTO's dispute settlement mechanism, which provides a means for the resolution of trade disputes between members concerning these rules and may decide whether a member has complied with its WTO obligations.<sup>48</sup>

It is uncertain whether a BCA would comply with WTO rules because a WTO dispute settlement panel has never considered the issue. In particular, it is uncertain whether a BCA would be consistent with key GATT principles, such as nondiscrimination obligations. It is also uncertain whether specific GATT exceptions, such as those for national security<sup>49</sup> and the protection of human, animal, or plant life or health,<sup>50</sup> may allow a BCA that is otherwise deemed inconsistent with key GATT principles.

## **GATT Obligations Related to Border Adjustments**

GATT explicitly allows WTO members to impose, “on the importation of any *product* ... a charge equivalent to an internal tax ... in respect of the like domestic product or in respect of an article from which the imported product has been manufactured or produced in whole or in part.”<sup>51</sup> Some recent U.S. legislative proposals that would levy an emission fee or carbon tax apply the fee or tax not on particular products but rather on emissions or the inputs that result in emissions, namely fossil fuels.<sup>52</sup> Under these proposals, carbon-intensive materials, such as steel, cement, and certain chemicals, would not be directly subject to the proposed tax or fee. Some observers contend that a tax on products based on emissions or inputs could be used to establish a BCA, but this notion is untested.<sup>53</sup> In addition, it is unclear whether GATT contemplates the adjustment of an *implicit* tax on domestic products that would arguably result from the imposition of domestic environmental regulations.<sup>54</sup>

A key WTO issue is whether a country's BCA imposes a fee on imported products in excess of like domestic products. Under the GATT's national treatment requirement for taxation measures,<sup>55</sup> a country may not impose a BCA on imported products in excess of the internal tax

---

<sup>46</sup> For an overview of the WTO, see CRS Report R45417, *World Trade Organization: Overview and Future Direction*, coordinated by Cathleen D. Cimino-Isaacs.

<sup>47</sup> For a link to all of the WTO Agreements discussed in this report see *Legal Texts: The WTO Agreements*, WORLD TRADE ORG., [https://www.wto.org/english/docs\\_e/legal\\_e/final\\_e.htm](https://www.wto.org/english/docs_e/legal_e/final_e.htm).

<sup>48</sup> WTO, *Understanding on Rules and Procedures Governing the Settlement of Disputes (DSU)*, [https://www.wto.org/english/docs\\_e/legal\\_e/28-dsu.pdf](https://www.wto.org/english/docs_e/legal_e/28-dsu.pdf).

<sup>49</sup> GATT art. XXI.

<sup>50</sup> *Id.* art. XX(b).

<sup>51</sup> *Id.* art. II:2(a) (emphasis added).

<sup>52</sup> See CRS Report R45472, *Market-Based Greenhouse Gas Emission Reduction Legislation: 108th Through 117th Congresses*, by Jonathan L. Ramseur.

<sup>53</sup> See, for example, Jennifer Hillman, *Changing Climate for Carbon Taxes: Who's Afraid of the WTO?*, at 6, 9 (2013), <http://www.climateadvisers.com/wp-content/uploads/2014/01/2013-07-Changing-Climate-for-Carbon-Taxes.pdf>.

<sup>54</sup> Two proposals in the 117<sup>th</sup> Congress would arguably base a BCA on such an implicit tax. The BCA framework that would be established under S. 2378 and H.R. 4534 would not be linked to a federal carbon tax or fee but would base a BCA on “domestic environmental costs,” which would include existing Clean Air Act regulations, among other costs.

<sup>55</sup> GATT art. III:2.

imposed on like domestic products.<sup>56</sup> Depending on the design and scope of a BCA, it may be difficult to determine if a BCA were in excess of the tax or fee on domestic products.

Based on a GATT panel decision in another context, it is uncertain whether a BCA based on the amount of GHGs emitted during the manufacture or production of an imported product would conform to WTO rules, because this BCA would be based on the method of production rather than the product itself.<sup>57</sup> However, some scholars have argued that a BCA could be designed to allocate GHG emissions from the production process to particular products.<sup>58</sup>

## GATT Exceptions

If a BCA is adopted and later found to violate the GATT's requirements, a country could seek to retain the BCA under one of the GATT's general exceptions.<sup>59</sup> For example, one exception involves measures "necessary to protect human, animal or plant life or health."<sup>60</sup> Another exception provisionally allows GATT-inconsistent measures "relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption."<sup>61</sup> Certain conditions must be demonstrated to meet these exceptions. Whether a BCA would satisfy any of these exceptions and their associated conditions would likely be fact-dependent.<sup>62</sup>

In addition, another GATT provision contains an exception for national security.<sup>63</sup> A country could argue that a BCA falls within the scope of that exception because climate change is a national security emergency. It is unclear whether a WTO panel would accept this rationale. Some WTO members have expressed concern that overuse of the national security exception will undermine the world trading system, because countries might enact a multitude of protectionist measures under the guise of national security.<sup>64</sup>

---

<sup>56</sup> *Id.* In addition, Article I of the GATT sets forth the Agreement's most-favored-nation (MFN) treatment obligation, which generally prohibits a WTO member from discriminating against imported products of one WTO member country as compared to products of another WTO member, including by taxing one WTO member's products in excess of another member's like products. This provision might be relevant if a BCA imposes a higher tax on the products of one WTO member as compared to another.

<sup>57</sup> This reasoning stems from a 1991 GATT panel decision that considered whether the United States could treat imported Mexican tuna differently than United States tuna because the Mexican tuna's production method resulted in the incidental killing of dolphins. The Panel determined that the regulation was directed at the method of production of the tuna rather than the tuna itself. The Panel determined that distinguishing between tuna based on the production method was impermissible under Article III because it was not a regulation of a product. See GATT Panel Report, *United States—Restrictions on Imports of Tuna*, GATT Doc. DS21/R, GATT BISD 39S/155, para. 5.15 (September 3, 1991) (unadopted).

<sup>58</sup> See, for example, Hillman, *supra* note 31, at 6, 9.

<sup>59</sup> These are found in GATT Article XX, ¶¶ (a) through (j).

<sup>60</sup> GATT art. XX(b).

<sup>61</sup> *Id.* art. XX(g).

<sup>62</sup> See Appellate Body Report, *United States—Import Prohibition of Certain Shrimp and Shrimp Products*, WT/DS58/AB/R, paras. 158-59 (October 12, 1998).

<sup>63</sup> GATT art. XXI.

<sup>64</sup> See, for example, WTO Council for Trade in Goods, *National Security Cited in Two Trade Concerns at Goods Council Meeting*, June 30, 2017, [https://www.wto.org/english/news\\_e/news17\\_e/good\\_10jul17\\_e.htm](https://www.wto.org/english/news_e/news17_e/good_10jul17_e.htm).



## Other Trade-Related Issues

The potential imposition of BCAs raises a range of trade issues and other related concerns. For example, some analysts have expressed concern that carbon border adjustment tariffs could be (or be interpreted as) disguised protections for domestic industry.<sup>65</sup> That is, some have argued that countries could use subtle adjustments to the complex calculations often involved in the proposed BCAs to privilege domestic industries.<sup>66</sup>

Similarly, experts have suggested that BCAs could negatively affect developing countries in the short run.<sup>67</sup> A survey conducted by the United Nations Conference on Trade and Development (UNCTAD) notes that the EU's proposed carbon border adjustment mechanism, for example, "could impact the development of poorer countries and reduce their opportunities for export-led development." However, the study also noted that the impact would be highly variable, and certain developing countries could gain advantages. For example, a 2020 study argued that because the steel industries of India and Turkey are relatively carbon efficient, they would likely "take crude steel share from China, Russia, and the Ukraine" if the EU implemented a carbon border adjustment tariff.<sup>68</sup>

Further, some researchers have highlighted the potential for unintended consequences from a BCA. For example, some studies have found that a border adjustment may lead to lower net exports than the carbon price alone, due to the adjustment's terms-of-trade effect on U.S. currency.<sup>69</sup> Some of the concerns may be lessened to some degree if a larger number of nations establish comparable emission reduction policies.

## Alternatives to BCAs

Some studies have questioned whether BCAs would be justified, considering the expected benefits, implementation challenges, and potential consequences that may result. For example, a 2017 study concluded that "our review of the economics of unilateral carbon taxes, however, does not find strong justifications for [BCAs]."<sup>70</sup> A 2015 study concluded that "attempting to 'protect' energy-intensive U.S. manufacturing firms from international competitive pressures through various policies may have only a limited impact on these firms.... [G]iven the magnitude of the competitiveness impacts on climate policy in our simulation, the potential economic and diplomatic costs of such policies may outweigh the benefits and justify no action."<sup>71</sup>

---

<sup>65</sup> Peter Holmes et al., "Border Carbon Adjustments and the Potential for Protectionism," *Climate Policy*, vol. 11, no. 2 (2011); Gary Clyde Hufbauer, "Divergent Climate Change Policies Among Countries Could Spark a Trade War. The WTO Should Step In," Peterson Institution for International Economics, 2021, <https://www.piie.com/blogs/trade-and-investment-policy-watch/divergent-climate-change-policies-among-countries-could>.

<sup>66</sup> Ibid.

<sup>67</sup> For example, Elena Ianchovichina and Harun Onder, "Carbon Border Taxes: What Are Their Implications for Developing Countries?" Brookings Institution, October 5, 2021, <https://www.brookings.edu/blog/future-development/2021/10/05/carbon-border-taxes-what-are-their-implications-for-developing-countries/>.

<sup>68</sup> Ben Aylor et al., "How an EU Carbon Border Tax Could Jolt World Trade," Boston Consulting Group, 2020, <https://www.bcg.com/publications/2020/how-an-eu-carbon-border-tax-could-jolt-world-trade>.

<sup>69</sup> See, for example, Warwick McKibbin et al., "The Role of Border Carbon Adjustments in a U.S. Carbon Tax," *Climate Change Economics*, vol. 9, no. 1 (2018).

<sup>70</sup> Samuel Kortum and David Weisbach, "The Design of Border Adjustments for Carbon Prices," *National Tax Journal*, vol. 70, no. 2 (June 2017).

<sup>71</sup> Joseph Aldy and William Pizer, "The Competitiveness Impacts of Climate Change Mitigation Policies," The Harvard Project on Climate Agreements, 2015.

Policymakers have alternatives to BCAs, which could be used to address leakage or competitiveness concerns. For example, within the framework of a cap-and-trade system, one alternative is to provide emission allowances to covered entities at no cost. This has occurred in the EU-ETS, California’s cap-and-trade program, and in the Regional Greenhouse Gas Initiative (RGGI) to a lesser extent.<sup>72</sup> Policymakers could support carbon-intensive, trade-exposed industries by funding research, development, and deployment efforts in particular sectors or for specific technologies. In addition, climate policies could include funding to support transition assistance for specific industries or communities with large concentrations of impacted industries.

## Author Information

Jonathan L. Ramseur  
Specialist in Environmental Policy

Christopher A. Casey  
Analyst in International Trade and Finance

Brandon J. Murrill  
Legislative Attorney

---

## Disclaimer

This document was prepared by the Congressional Research Service (CRS). CRS serves as nonpartisan shared staff to congressional committees and Members of Congress. It operates solely at the behest of and under the direction of Congress. Information in a CRS Report should not be relied upon for purposes other than public understanding of information that has been provided by CRS to Members of Congress in connection with CRS’s institutional role. CRS Reports, as a work of the United States Government, are not subject to copyright protection in the United States. Any CRS Report may be reproduced and distributed in its entirety without permission from CRS. However, as a CRS Report may include copyrighted images or material from a third party, you may need to obtain the permission of the copyright holder if you wish to copy or otherwise use copyrighted material.

---

<sup>72</sup> The Regional Greenhouse Gas Initiative is a regional cap-and-trade system on CO<sub>2</sub> emissions from electric power plants in 11 U.S. states: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Vermont, and Virginia.