HARVARD PROJECT ON CLIMATE AGREEMENTS

Policy Brief December 2024

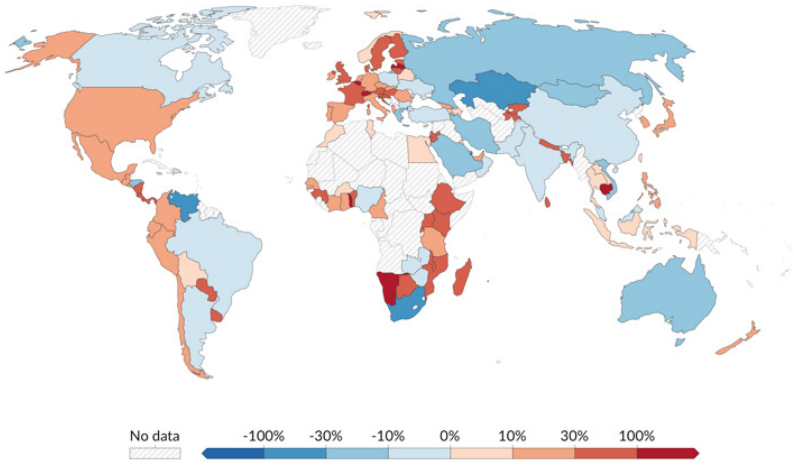
CLIMATE CHANGE AND TRADE POLICY: AN OVERVIEW OF CURRENT ISSUES

A discussion brief supported by the Energy Foundation China

Michael A. Mehling
Massachusetts Institute of Technology

Emission Transfers and the Carbon Loophole

Emission transfers from international trade pose a challenge for global decarbonization. Currently, emissions transfers — that is, emissions associated with the production of goods that are consumed in a different country from where they are produced — account for approximately 20–25% of global emissions. Already, offshoring of emissive activities has allowed countries such as Switzerland or Singapore to reduce their territorial emissions below those associated with goods they import from abroad, illustrating a "carbon accounting loophole": countries can report progress towards their climate targets, but are not necessarily securing reductions in global emissions. It also risks perpetuating a historical pattern in which affluent countries have outsourced polluting activities to less affluent regions, in the process shifting the environmental burdens while transferring accountability for the accompanying emissions. For now, emission transfers between developed and developing countries appear to have stabilized, yet they may soon be exceeded by transfers between developing countries. Indeed, a recent assessment found that trade along China's Belt and Road Initiative already accounts for a majority of all emissions embedded in internationally traded goods.



Share of CO_2 Emissions Embedded in Trade, 2021 (Source: Our World in Data, 2024)

For now, evidence for emissions leakage due to climate policies remains sparse. Most observed emission transfers do not constitute emission leakage, defined by the Intergovernmental Panel on Climate Change as "effects of policies that result in a displacement of the environmental impact, thereby counteracting the intended effects of the initial policies." So far, emission transfers have been mostly due to more favorable factor endowments, such as lower costs of labor and raw materials, coupled with a protectionist bias in trade policy that favors upstream raw materials through lower tariffs. While evidence for emissions leakage due to climate policies remains sparse, accelerated climate action — as required to meet the committed goals of the Paris Agreement — could precipitate a future increase in emissions leakage as the costs of compliance increase and current safeguards, such as exemptions and free allowance allocation, are phased out. Should that occur, it could stall or even reverse progress on climate action. Even the mere risk of industrial relocation can give rise to formidable opposition against increased climate action because it would entail a loss of employment and investment, a deteriorating trade balance, and reduced fiscal revenue.

Industrial Policy at the Nexus of Climate and Trade

Industrial policies and accompanying trade distortions are on the rise. Industrial policies — defined as "government interventions that alter the structure of an economy, encouraging resources to move into sectors that are seen as desirable for future development" — have traditionally elicited criticism for their susceptibility to government failure and political capture, distortion of market signals, and misallocation of resources. Lately, however, they have seen growing support as a means to address various externalities, improve economic coordination, and provide public goods. A shared feature of the current generation of industrial policies is their reliance on provisions that limit or condition access to markets and incentives, such as local content requirements and other import barriers. Not only are these measures regularly censured by trade partners, threatening to destabilize multilateral cooperation, but they also erect barriers to trade and the international flow of goods, services, capital, labor, and knowledge. According to a recent working paper of the International Monetary Fund, over 2,500 industrial policies have been adopted globally — mostly by advanced economies — since 2023, out of which over 70 percent are trade distorting.

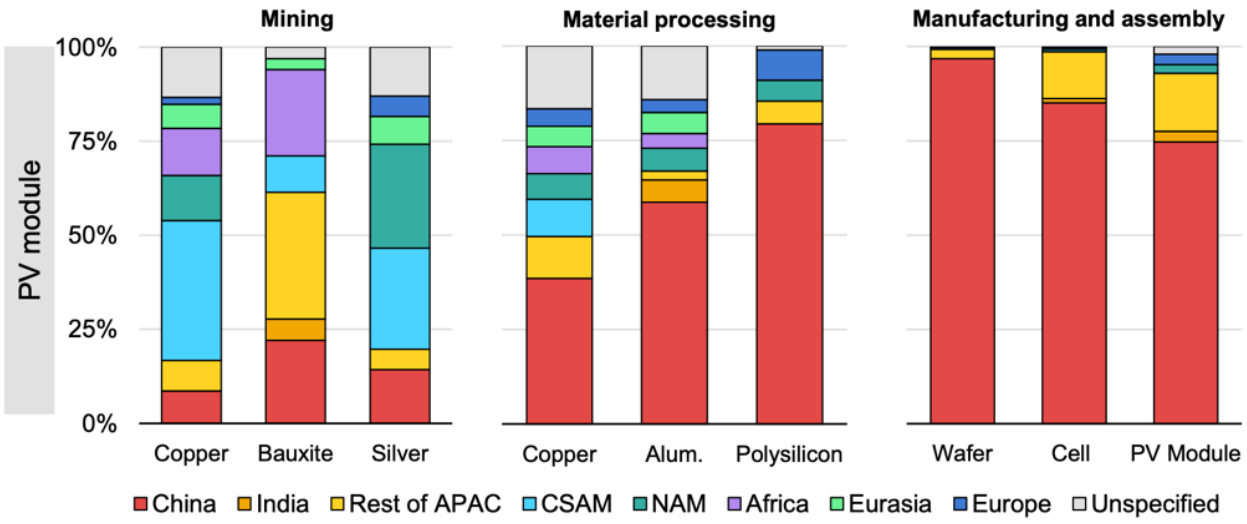
Climate action is now tied to the rise of industrial policy. Whereas traditional industrial policy has focused on productivity enhancements as a lever to ensure growing returns to capital and labor, the current wave of industrial policies also often seeks to advance climate policy objectives. Labelled "green industrial policy", such policies deploy state intervention to help create markets and an enabling context that fosters green innovation, guides investment, and promotes systemic transformation while managing the social impacts and evolving workforce needs of a low-carbon economy. In the United States, for instance, the Inflation Reduction Act — which pursues environmental, economic and social policy objectives through a comprehensive investment program — has been labelled the "most significant piece of climate legislation in the history of the United States." On the other side of the Atlantic, the European Union has responded with a Green Deal Industrial Plan that similarly deploys industrial policies with the accompanying Net Zero Industry Act and Critical Raw Materials Act. With its Made in China 2025 strategy and the 14th Five-Year Plan, China has been supporting "strategically important" low-carbon technologies, contributing to its dominance in relevant markets.

Industrial policy is accelerating decarbonization, but also risks economic fragmentation and trade retaliation. With its sizeable investments in low-carbon technology manufacturing and deployment — initially estimated at $369 billion over a decade, but potentially up to three times higher — the Inflation Reduction Act will significantly reduce the current gap towards achievement of the U.S. Nationally Determined Contribution. Both the level of public support as well as local content requirements that restrict access to investment have contributed to diplomatic tensions between the United States and its trade partners, prompting China to initiate judicial measures before the World Trade Organization (WTO). Conversely, China's surging domestic subsidies have elicited accusations of unfair trade practices that contribute to competitive distortions and excess supplies in key markets, contributing to a long history of trade remedies including, most recently, punitive tariffs on Chinese electric vehicles imported into the United States and the European Union. By provoking subsidy races and trade conflicts, trade-related climate measures — which already affect US$ 6.5 trillion in international traded value — can also impede decarbonization by increasing its cost and timeline.

Trade-Related Climate Measures and Spillover Effects

Border carbon measures are seeing increased interest, but are also controversial. One particular manifestation of trade-related climate measures, border carbon measures, have sparked particular controversy. With the adoption of its Carbon Border Adjustment Mechanism (CBAM) in 2023, the European Union has been a frontrunner of border carbon measures, although other countries, including Australia, Canada, the United Kingdom, and the United States, are also in various stages of consideration or implementation. Aimed at preventing emissions leakage by imposing a price on certain products from energy-intensive and trade-exposed sectors entering the European Union, the CBAM requires importers to declare the emissions embedded in these products and, from 2026, to purchase and surrender certificates priced at the level of allowances in the European carbon market. Already, the CBAM has faced extensive criticism from trade partners, giving rise to concerns about its economic effects and fairness, including impacts on vulnerable developing countries. European trade partners have accused the CBAM of violating principles of international trade law and the climate regime, threatening to take legal action against the European Union.

Navigating tradeoffs between supply chain resilience and comparative advantage. Supply chain disruptions resulting from the economic shocks of a global pandemic and escalating military conflicts in different regions of the world have heightened awareness of global supply chain vulnerabilities. In the area of low-carbon technologies, high levels of dependence on China for both technology components and critical raw materials have emerged as a particular concern. Trade partners in Europe, North America, and elsewhere are seeking greater supply chain resilience and pursuing strategic autonomy through policy interventions aimed at onshoring manufacturing and diversifying supply chains. While different market failures can justify these policy interventions, they can also interfere with the efficient allocation of resources based on comparative advantage. China has greater economies of scale, a larger domestic market and highly integrated firms and facilities along low-carbon technology supply chains. In the short term, measures to reduce dependence on Chinese supplies can thus affect both the cost and availability of essential low-carbon technologies. Still, they may be considered necessary to sustain political acceptance for the energy transition.



Geographic concentration of solar photovoltaic production by supply chains stage, 2021 (Source: IEA, 2022)

Spillover effects of trade-related climate measures matter for climate action. International spillover effects can both impede and advance climate action. As mentioned earlier, emissions leakage can undermine decarbonization efforts. Innovation spillovers, by contrast, can accelerate the diffusion of low-carbon technologies. Research suggests that the demand pull from German policies to support renewable energy, for instance, was the single most important factor in driving down technology cost to make solar energy competitive with conventional energy sources. As a result, almost 90% of the solar energy adoption attributable to these policies have occurred outside Germany. Prospective studies expect the Inflation Reduction Act to drive down emerging climate technology costs by up to 25%, over time catalyzing greater deployment outside the U.S. than within its borders. Trade-related climate measures can interfere with these spillover effects, with research suggesting cost increases from reduced technology learning effects. At the same time, they can also generate beneficial policy spillovers: circumstantial evidence suggests that the CBAM, for instance, is already contributing to accelerated diffusion of carbon pricing across major European trade partners.

International Cooperation on Trade and Climate

Trade and climate cooperation have evolved separately, but are increasingly intersecting. Historically, cooperation on international trade under the auspices of the WTO has evolved in separation from climate cooperation under the regime created by the United Nations Framework Convention on Climate Change and its daughter treaties, including the Paris Agreement. Expanded use of trade-related climate measures has, however, prompted increased tensions and a growing number of trade disputes at the intersection of both regimes. Institutional space for the discussion of such frictions has included a forum on the impact of response measures, and the WTO Committee on Trade and Environment. Such discussions have failed to generate multilateral solutions that could accommodate rising climate ambition, such as enhanced institutional coordination or amendments, waivers and authoritative interpretations of free trade disciplines. In fact, concern about the unilateral deployment of trade-related climate measures has recently prompted developing country parties to issue formal

calls within both the trade and climate regimes for developed countries to abandon such practices, risking agenda fights and complicating already frayed negotiation processes.

Cooperation on climate and trade is accelerating outside multilateral settings. While there has been growing pressure to address the intersection of climate and trade policy in multilateral settings, leading, *inter alia*, to the launch of Structured Discussions on Trade and Environmental Sustainability within the WTO, greater momentum is apparent outside the multilateral regimes. A growing number of bilateral and regional trade agreements has begun incorporating climate provisions, including the Agreement on Climate Change, Trade and Sustainability, which was signed by several countries in November 2024. Because of their greater flexibility and latitude for progress, less formal venues with limited participation, such as the Climate Club launched by the Group of Seven and the Inclusive Forum on Carbon Mitigation Approaches, along with several private sector and civil society initiatives, have advanced cooperation on common practices, principles, metrics, and methodologies. At the lowest level of participation, yet often with deeper commitments, are country platforms and bilateral arrangements that entail reciprocal obligations to provide financial and technical resources in return for access to markets or critical raw materials. Examples include the announcement of EU Clean Trade and Investment Partnerships or the proposal of a Clean Energy Marshall Plan for the United States.

AUTHOR AFFILIATION

Michael A. Mehling is Deputy Director of the Center for Energy and Environmental Policy Research (CEEPR), a research center at the Massachusetts Institute of Technology (MIT).

ACKNOWLEDGEMENTS

The author and the Harvard Project on Climate Agreements are grateful for support from Energy Foundation China for the preparation of this brief and a larger project titled *Climate Change and Trade Policy: Reducing Emissions and Advancing Mutual Prosperity*. This brief serves in part to provide background for discussions at an initial workshop in Shanghai, China in December 2024.

ABOUT THE HARVARD PROJECT ON CLIMATE AGREEMENTS

The Harvard Project on Climate Agreements is a Harvard-University-wide initiative established in 2007 to identify and advance scientifically sound, economically sensible, and politically pragmatic public policy options for addressing global climate change. Drawing upon leading thinkers from around the world, the Harvard Project conducts research on policy architecture, key design elements, and institutional dimensions of international and domestic climate-change policy. The Harvard Project is directed by Robert N. Stavins, A.J. Meyer Professor of Energy and Economic Development, Harvard Kennedy School. For more information, see the Harvard Project's website: www.hks.harvard.edu/hpca.

Harvard Project on Climate Agreements

79 John F. Kennedy Street
Cambridge, Massachusetts 02138, USA

+1 617 496 8054
www.hks.harvard.edu/hpca

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