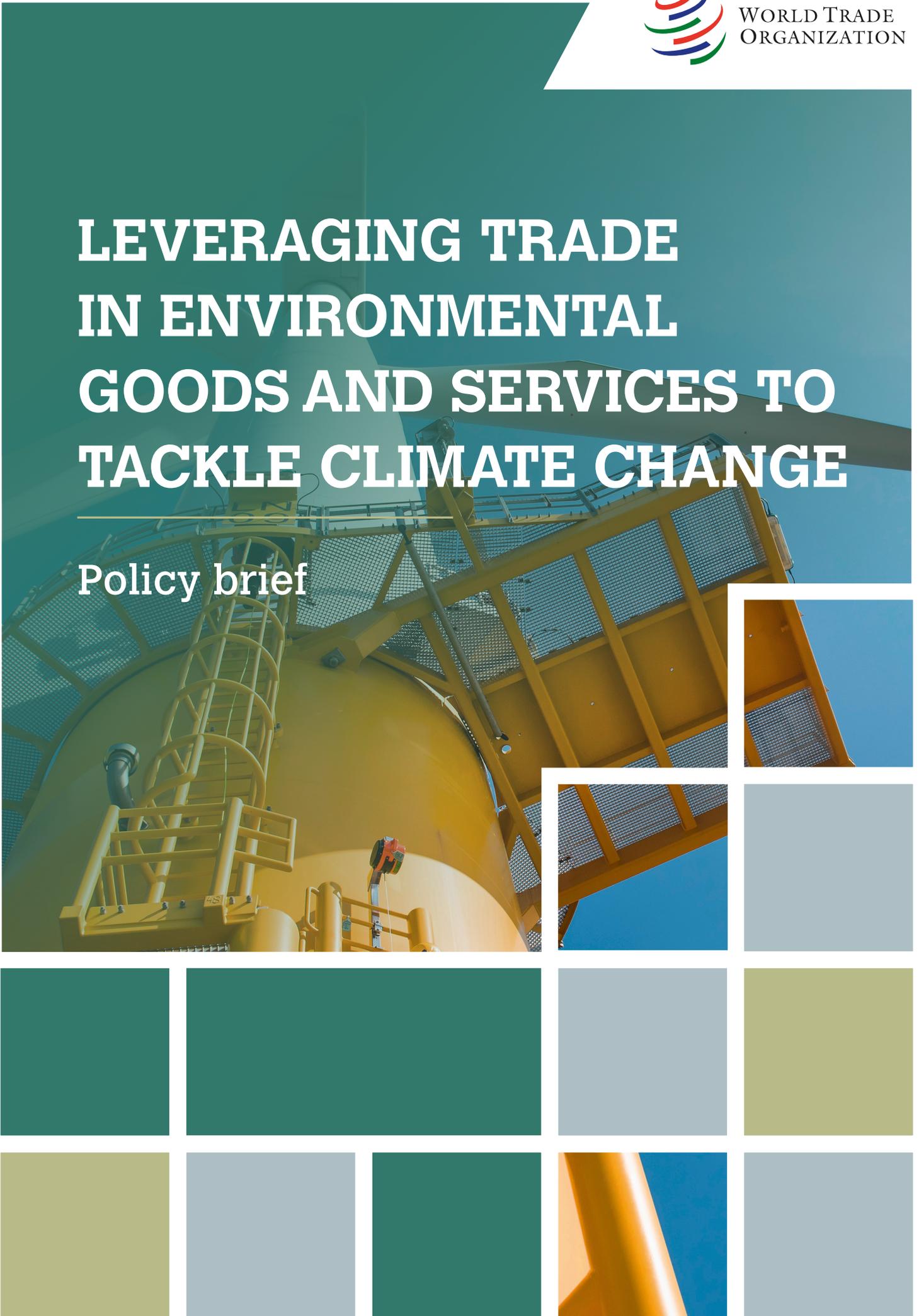




# LEVERAGING TRADE IN ENVIRONMENTAL GOODS AND SERVICES TO TACKLE CLIMATE CHANGE

Policy brief





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This policy brief is based on the World Trade Report 2022, which provides more detailed information on this and other topics related to trade and climate change.

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# LEVERAGING TRADE IN ENVIRONMENTAL GOODS AND SERVICES TO TACKLE CLIMATE CHANGE

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## Policy brief

### Key points

- Trade in environmental goods and services can play an important role in the transition to a low-carbon economy by supporting the development, adoption and diffusion of environmental technologies, which help to reduce environmental risk and minimize pollution and resource use.
- Trade in an illustrative list of environmental goods grew by 243 per cent between 2000 and 2020. Trade in traditional environmental services such as waste disposal, recycling and sanitation has grown by 4 per cent annually since 2005.
- Environmental goods continue to face trade barriers. Tariffs applied on an illustrative list of environmental goods range from around 1.4 per cent in high-income countries to 7.3 per cent in low-income countries. Non-tariff measures for environmental goods can also be significant and tend to be higher for high-income countries than for middle- and low-income countries.
- Opening up trade in energy-related environmental goods could raise global exports of these goods by 5 per cent by 2030. Although this would also raise demand for energy, the elimination of tariffs and the reduction of non-tariff measures would still lead to a 0.6 per cent net reduction in global CO<sub>2</sub> emissions by 2030.
- The WTO could make a greater contribution to promoting trade in environmental goods and services by advancing initiatives pursued by different groups of WTO members, such as the Trade and Environmental Sustainability Structured Discussions and the Informal Dialogue on Plastics Pollution and Environmentally Sustainable Plastics Trade. The WTO could also further improve the quality and availability of trade data on environmental goods and services.

# 1. Introduction

Environmental goods, services and technologies, which help to reduce environmental risk and minimize pollution and resource use, are critical to the transition to a low-carbon economy and to adapt to climate change. The environmental technology industry is a dynamic and fast-growing sector, although it is still emerging in many countries.

The scope of environmental goods and services is broad and includes products and technologies that reduce environmental risk and minimize pollution and resource use, such as air pollution control system, renewable energy equipment, and treatment of waste and wastewater. They can also include environmentally preferable products, which cause less environmental harm over their life cycle (i.e., production, consumption, disposal), such as organic agricultural products and electric vehicles.

Well-designed climate policies are essential to signal the market, investors and consumers to make more low-carbon and climate-resilient investment and consumption decisions. International trade and trade policies can contribute to the development, access and deployment of environmental goods and services. In that context, facilitating trade in environmental goods and services can support countries' efforts to achieve their nationally determined contributions, established under the Paris Agreement, to reduce their greenhouse gas (GHG) emissions and adapt to climate impacts.

This policy note addresses three important questions:

- What is the scope for intensifying trade in environmental goods and services?
- How can trade in environmental goods and services contribute to addressing climate change?
- How can greater international trade cooperation increase the development and deployment of environmental goods and services?

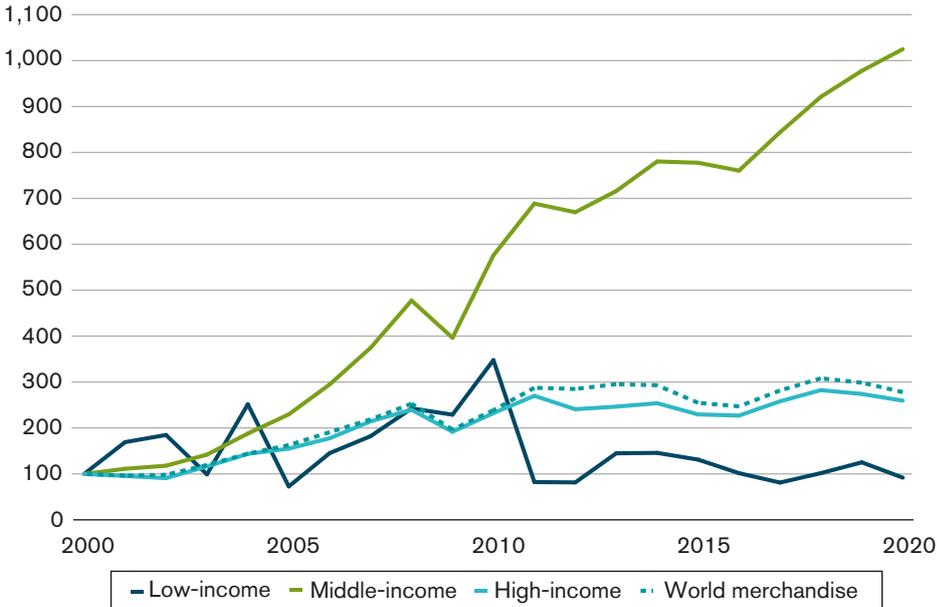
## 2. What is the scope for intensifying trade in environmental goods and services?

**Trade in environmental goods has grown rapidly.** Based on an illustrative list developed by the Organisation for Economic Co-operation and Development and the Statistical Office of the European Communities (OECD and Eurostat, 1999), it is estimated that global trade in environmental goods grew by 243 per cent between 2000 and 2020. This trade accounted for 4.4 per cent of global trade in 2020.

**Although many new environmental technologies are developed in high-income countries, the production of many environmental goods and services is spread across all countries.** Regional and global value chains offer many countries, including developing ones, an opportunity to participate by supplying parts and components and services to produce, distribute and market many environmental goods and services. Around 70 per cent of exports of environmental goods in 2020 came from high-income countries and 30 per cent from middle-income countries, while the share of exports from low-income countries was negligible in global terms. From 2000 to 2020, exports of environmental goods from middle-income countries increased more rapidly than those from high-income countries, while exports of environmental goods from low-income countries stagnated (see Figure 1).

**Around 70% of exports of environmental goods in 2020 came from high-income countries and 30% from middle-income countries.**

**Figure 1: Trade in environmental goods has grown in most regions, but at different speeds**  
Environmental goods export growth index (2000 = 100)



Source: Authors' calculation, based on trade figures from the UN Comtrade database.

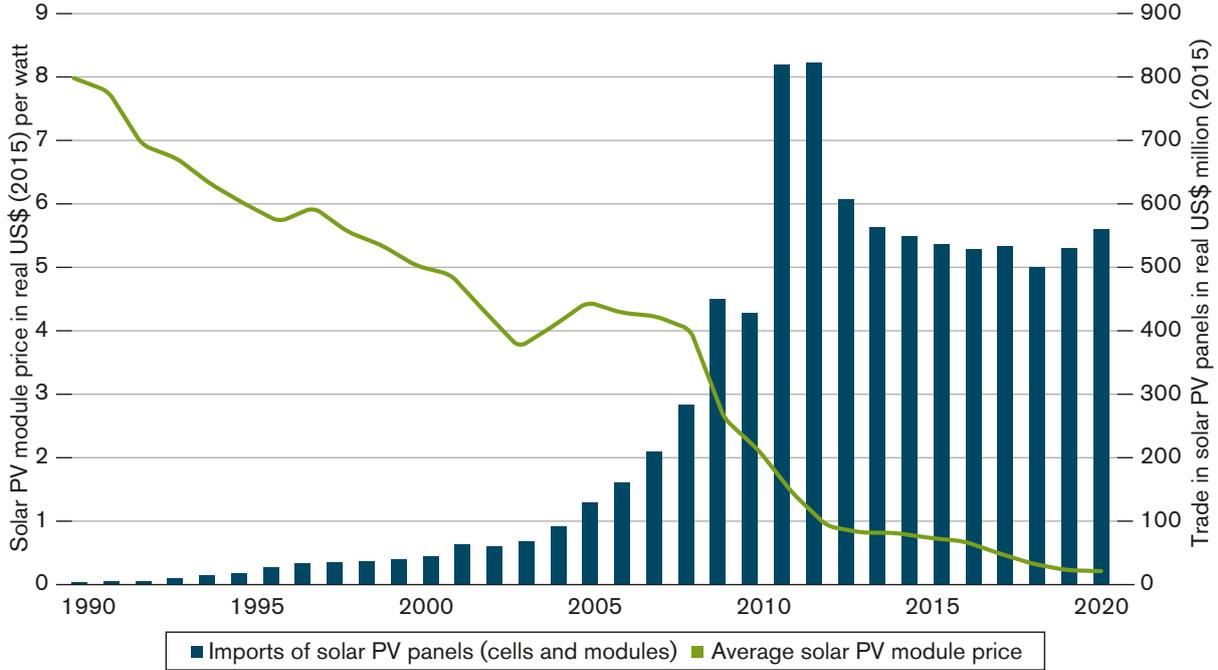
Note: The coverage of environmental goods is based on the illustrative OECD list, which covers 124 tariff lines at the six-digit Harmonized System level. Income groups follow the World Bank's country classification.

**Trade in environmental services can support the uptake of environmental technologies.** Preliminary WTO estimates indicate that traditional environmental services (including waste disposal, recycling and sanitation) accounted for just 0.2 per cent of world trade in services in 2017, although trade in this area has grown by 4 per cent annually since 2005 (WTO, 2019). Many environmental services are closely linked with environmental goods, since the provision of environmental services often relies on the use of related environmental goods. This is also true of other ancillary services essential for environmental technologies, such as research and development, engineering and construction, distribution and transport, and the sale, delivery, installation and maintenance of equipment. For instance, more than 70 per cent of labour for solar photovoltaic deployment is concentrated in installation, grid connection, operation and maintenance services (IRENA, 2017).

**Improvements in technology and production have driven down the cost of solar electricity by 97% since 1990.**

**Trade can contribute to the creation of a competitive, dynamic and integrated global marketplace for environmental technologies.** Economies of scale, innovation and the rise of global value chains drive improvements in many environmental technologies. For example, improvements in technology and production have driven down the cost of solar electricity by 97 per cent since 1990 (see Figure 2). A significant part of this cost decline has been attributed to global value chains, which have enabled producers to lower production costs and reap economies of scale by locating different production stages in different countries (WTO and IRENA, 2021). The capacity of solar panels globally traded in 2017 reached almost 80 GW – the equivalent of more than 9 per cent of global electricity generation (Wang *et al.*, 2021).

**Figure 2: As solar panel exports rise, their price falls**

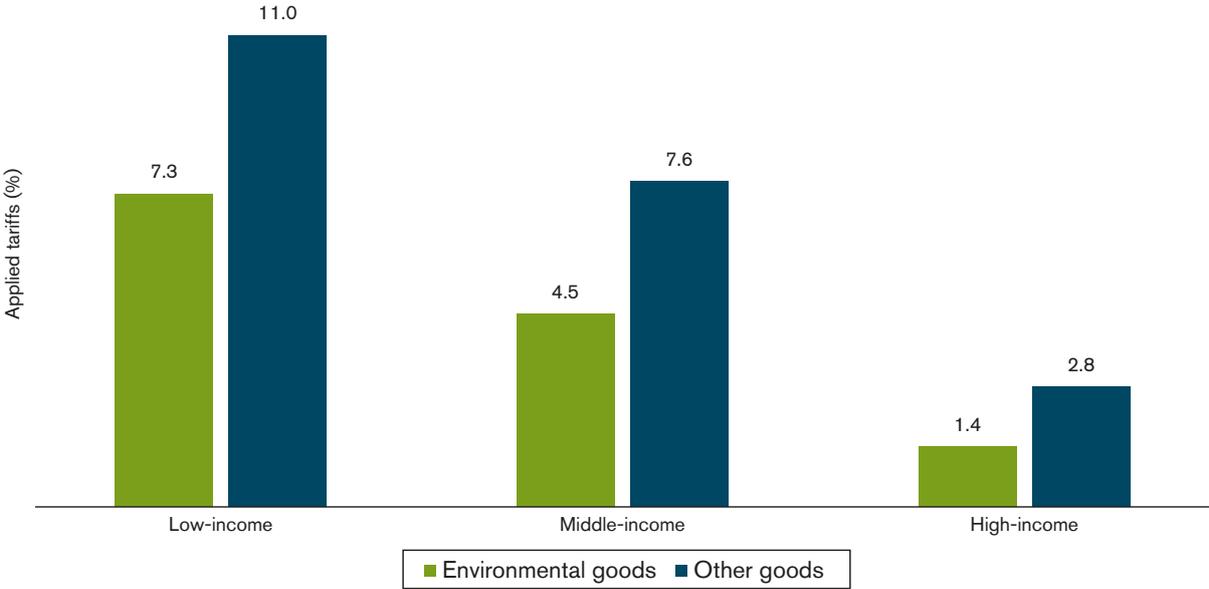


Source: Authors' calculations, based on data on solar photovoltaic (PV) module costs from Kavlak *et al.* (2018) and Bloomberg Terminal and trade figures from the UN Comtrade database.

Note: The trade data covers the Harmonized System code 85414.03, which does not distinguish between solar photovoltaic (PV) cells and modules and products such as light-emitting diodes.

**Barriers to trade in environmental goods can be significant.** The average tariffs on the illustrative list of environmental goods remain relatively low, ranging from around 1.4 per cent in high-income countries to 7.3 per cent in low-income countries (see Figure 3). However, an increasing number of antidumping duties and countervailing measures – often exceeding 100 per cent – have been applied to some of these environmental goods. The use of other non-tariff measures on environmental goods, including technical barriers to trade such as technical regulations and conformity assessment procedures, tends to be more frequently applied by high-income countries than middle- and low-income countries.

**Figure 3: Tariffs on environmental goods are relatively low, but remain significant in low-income countries**



Source: Authors' calculation, based on 2019 tariff data from the WTO Integrated Database (IDB) and 2019 trade figures from the UN Comtrade database.

Note: The coverage of environmental goods is based on the illustrative OECD list, which covers 124 tariff lines at the six-digit Harmonized System level. Income groups follow the World Bank's country classification.

**Trade barriers in environmental services remain important.** Information about trade restrictions on environmental services is limited. However, the sector has the fewest trade opening commitments under the General Agreement on Trade in Services. As of 2019, only 59 WTO members, counting the European Union as one member, had undertaken specific commitments in at least one of the seven subsectors in traditional environmental sectors, namely sewage, refuse disposal, sanitation, cleaning of exhaust gases, noise abatement, nature and landscape protection, and other environmental protection services.

### 3. How can trade in environmental goods and services contribute to addressing climate change?

**Environmental goods and services particularly relevant to climate change mitigation include clean and renewable energy equipment, and energy- and resource-efficient goods and services.** While increased trade in environmental goods and services increases economic activity and transport, which in turn increases GHG emissions, more trade in environmental goods and services can also enhance the development, access and deployment of environmental technologies, thereby reducing GHG emissions by spurring innovation and driving down costs of low-carbon technologies through greater efficiency and economies of scale. In addition, trade in environmental goods and services can provide economies with greater opportunities to adapt environmental technologies to their local needs.

**A broad range of environmental goods and services can support climate change adaptation.** Trade and trade policies can increase access to climate change adaptation technologies, especially in countries most vulnerable to extreme weather events (WTO, 2022). Examples of environmental goods and services which can help to reduce the negative impacts of climate change include drought resistant crops, early warning weather systems and water conservation and storage systems.

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**More trade in environmental goods and services can enhance the development, access and deployment of environmental technologies, thereby reducing GHG emissions.**

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**Opening up trade in energy-related environmental goods and environmentally preferable products would raise global exports of these types of goods by 5 per cent and 14 per cent, respectively, by 2030.**

WTO simulations indicate that the elimination of tariffs and a 25 per cent reduction in the *ad valorem* equivalent of non-tariff measures on energy-related environmental goods and environmentally preferable products would create new trading opportunities. The increased value of trade in energy-related environmental goods in real terms is estimated at US\$ 109 billion and for environmentally preferable products at US\$ 10.3 billion.

**Opening up trade in environmentally preferable products would raise exports in most regions – in some cases by as much as 30-40 per cent.** Decreases in trade costs would also benefit low-income countries, which have comparative advantages in the manufacture of many environmentally preferable products. However, exports of energy-related environmental goods are not projected to rise by as much, with trade diverting to large exporters benefitting from improved market access (see Figure 4).

**Opening up trade in energy-related environmental goods and environmentally preferable products would raise global GDP by 0.8 per cent relative to the baseline in 2030.** The removal of tariffs and reduction of non-tariff measures would raise GDP even in regions where exports of energy-related environmental goods and environmentally preferable products are projected to fall. Lowering barriers to trade would reduce distortions and increase productivity, owing to lower costs of compliance with non-tariff measures and lower prices for goods that facilitate the more efficient use of energy and materials.

**Opening up trade in energy-related environmental goods and environmentally preferable products would result in a net reduction in CO<sub>2</sub> emissions.** WTO simulations indicate that although opening trade in energy-related environmental goods and environmentally preferable products would increase trade and global GDP – raising the demand for energy and thus increasing CO<sub>2</sub> emissions – the net effect would actually be a small reduction in global CO<sub>2</sub> emissions by 0.58 per cent relative to the baseline in 2030. The projected fall captures only CO<sub>2</sub> reductions resulting from increased energy efficiency and replacing non-renewable energy sources with renewable ones. Further CO<sub>2</sub> reductions can be achieved by the knock-on effects of accelerating the spread of environmental innovation, including by increasing the demand for ancillary services relating to the sale, delivery, installation and maintenance of environmental technologies.

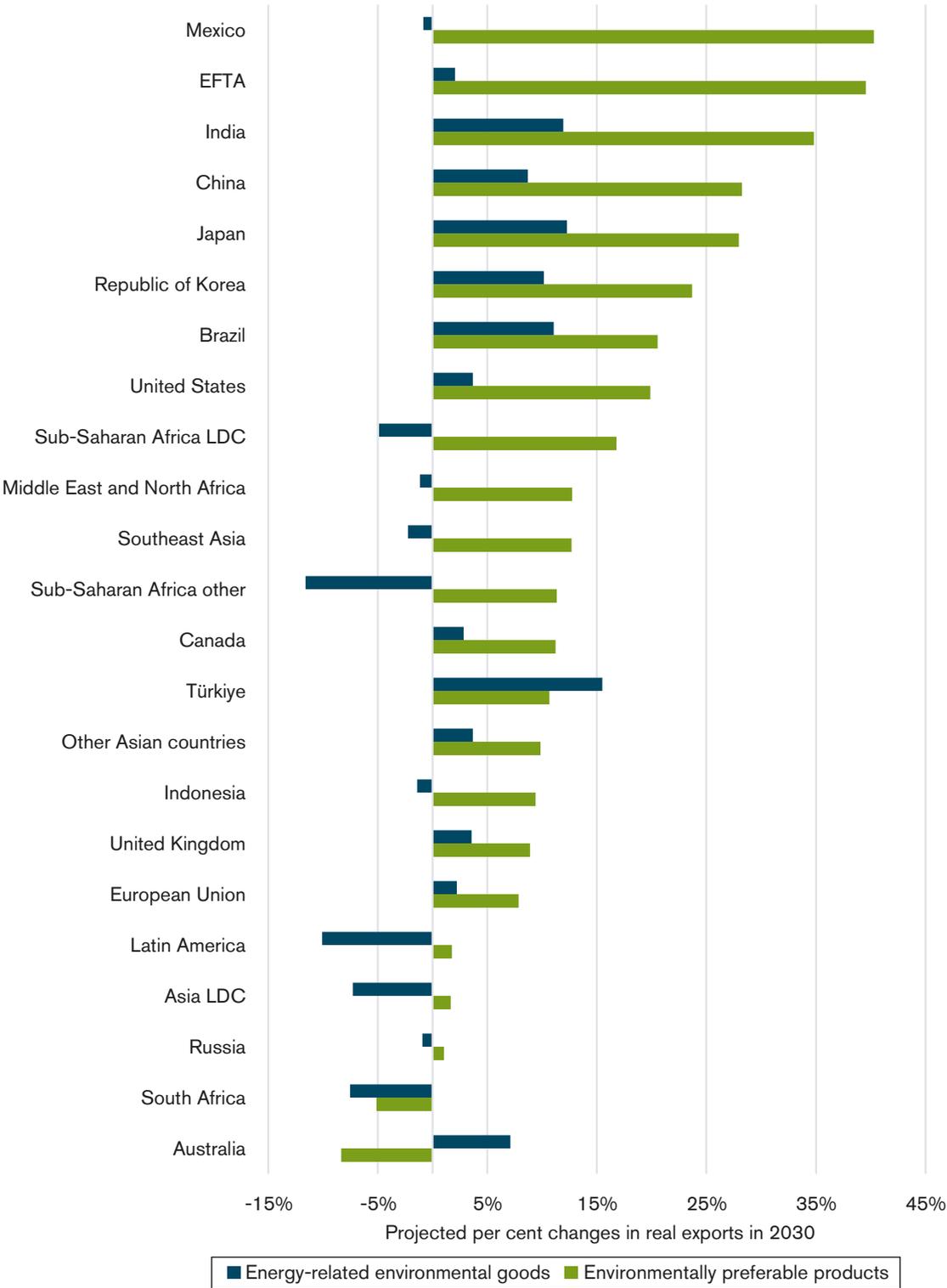
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**The development and adoption of environmental technologies also rely on well-targeted and adequately financed investment into energy and infrastructure.**

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**The contribution of trade in environmental goods and services in accelerating the transition to a low-carbon economy could be enhanced by ambitious, credible and timely climate policies.** The development and adoption of environmental technologies also rely on well-targeted and adequately financed investment into energy and infrastructure. Policies to reduce uncertainty in low-carbon investment are essential. Well-functioning quality infrastructure can also help to ensure the supply of high-quality environmental goods and services.

**Figure 4: Opening up trade in environmentally preferable products would raise exports in most regions**



Source: Bacchetta *et al.* (2022).

Note: The figure displays the percentage changes in exports of energy-related environmental goods and environmentally preferable products projected with the WTO Global Trade Model for 2030 relative to 2021 assuming the elimination of tariffs and a 25 per cent reduction in the *ad valorem* equivalent of non tariff measures. EFTA – European Free Trade Association. LDC – least-developed countries.

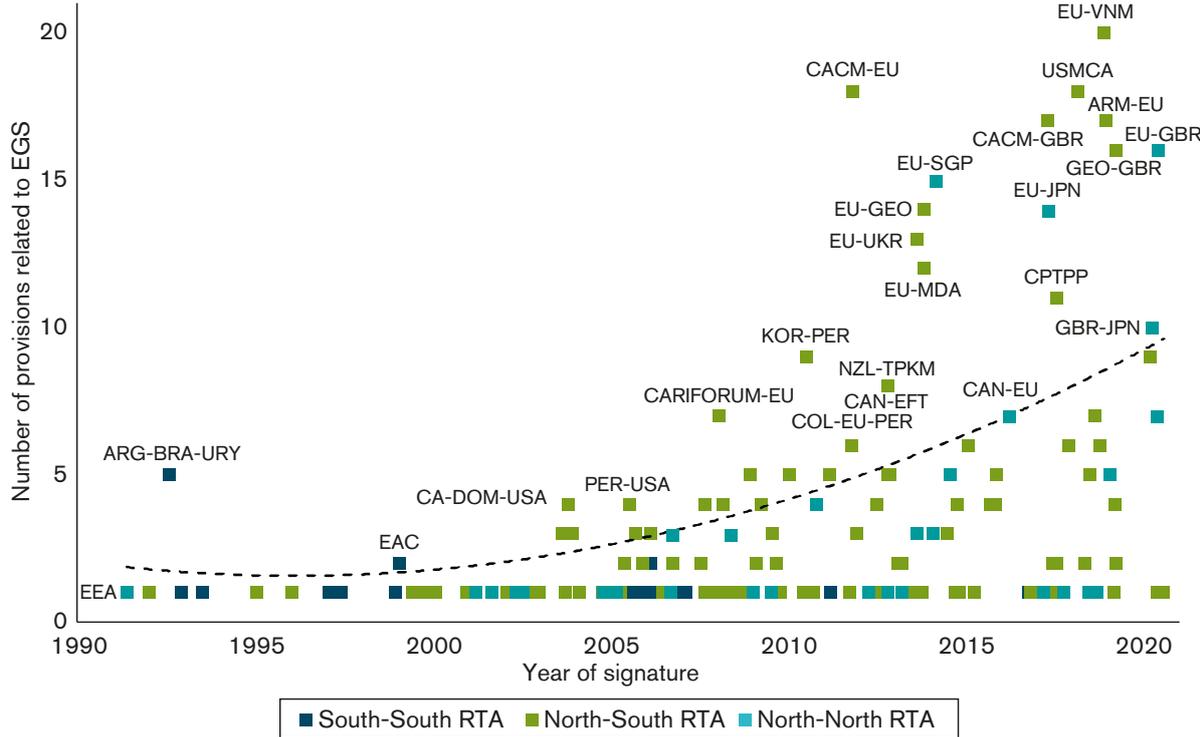
# 4. How can greater international trade cooperation increase the development and deployment of environmental goods and services?

**International cooperation plays a critical role in facilitating trade and investment in environmental goods and services.** Addressing the barriers that hinder the adoption and diffusion of environmental technologies requires trade cooperation at the regional and multilateral levels.

**Addressing the barriers that hinder the adoption and diffusion of environmental technologies requires trade cooperation at the regional and multilateral levels.**

**Regional trade initiatives and agreements have been the main avenue to promote trade in environmental goods and services.** In 2012, members of the Asian Pacific Economic Cooperation agreed to reduce by the end of 2020 their respective applied tariff rates to 5 per cent or less on a set of 54 environmental goods (including solar panels, wind turbines and bamboo flooring). Facilitating and promoting trade and foreign direct investment in environmental goods and services are also explicitly addressed in an increasing number of regional trade agreements (see Figure 5). However, only two trade agreements – negotiated by New Zealand with Chinese Taipei and the United Kingdom – explicitly eliminate tariffs on a list of specific environmental goods. Some recent regional trade agreements call on the parties to address potential non-tariff measures on environmental goods and services. Some of these new provisions on environmental goods and services could provide a template to advance work at the multilateral level.

**Figure 5: Provisions on environmental goods and services are increasingly included in regional trade agreements**



Source: Monteiro (2022).

Note: Analysis based on regional trade agreements (RTAs) notified to the WTO. “North” is defined as high-income countries, whereas “South” is defined as middle- and low-income countries according to the World Bank’s country classification. EGS – environmental goods and services.

**WTO disciplines ensure that trade in environmental goods and services flows as predictable and freely as possible.** While past multilateral and plurilateral negotiations at the WTO were inconclusive, environmental goods and services have benefitted from trade opening as part of the Uruguay Round establishing the WTO. In addition, trade in environmental goods and services is fostered by the non-discriminatory, transparent and predictable trade environment underpinned by WTO rules. For instance, the Agreement on Technical Barriers to Trade ensures that technical regulations, standards and conformity assessment procedures on environmental goods do not create unnecessary obstacles to trade and are based on relevant internationally agreed standards. The protection and enforcement of intellectual property rights under the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights are also essential to support innovation in environmental technologies while also promoting the transfer of technology.

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**The Agreement on Technical Barriers to Trade ensures that technical regulations, standards and conformity assessment procedures on environmental goods do not create unnecessary obstacles to trade.**

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**The WTO could further improve the quality and availability of publicly available data on environmental goods and services by strengthening its collaboration with national statistical agencies, government offices and international organizations.** More detailed information on trade in environmental goods and services, such as disaggregated and comparable data, can support trade negotiations in environmental goods and services. Attempts to define and classify environmental goods and services include the 2022 edition of the Harmonized System Nomenclature, published by the World Customs Organization, which contains new commodity codes specific to several technologies that use solar energy and energy-efficient light-emitting diodes.

**The WTO could make a greater contribution to promoting trade in environmental goods and services by advancing initiatives pursued by different groups of WTO members.** For example, participants in the Trade and Environmental Sustainability Structured Discussions explore opportunities, best practices and possible approaches for facilitating trade in environmental goods and services. The Informal Dialogue on Plastics Pollution and Environmentally Sustainable Plastics Trade also discusses ways to promote sustainable trade in plastics. Members could turn these discussions into concrete actions which foster trade in environmental goods and services.

## References

- Bacchetta, M., Bekkers, E., Solleder, J.-M. and Tresa, E. (2022), "Environmental Goods Trade Liberalization: A Quantitative Modelling Study of Trade and Emission Effects", unpublished, Geneva: World Trade Organization.
- International Renewable Energy Agency (IRENA) (2017), *Renewable Energy Benefits: Leveraging Local Capacity for Solar PV*, Abu Dhabi: IRENA.
- Kavlak, G., McNerney, J. and Trancik, J. E. (2018), "Evaluating the Causes of Cost Reduction in Photovoltaic Modules", *Energy Policy* 123:700-710.
- Organisation for Economic Co-operation and Development (OECD) and Statistical Office of the European Communities (Eurostat) (1999), *The Environmental Goods and Services Industry: Manual for Data Collection and Analysis*, Paris: OECD.
- Monteiro, J.-A. (2022), "Provisions on Environmental Technologies in Regional Trade Agreements", unpublished, Geneva: WTO.
- Wang, M., Mao, X., Xing, Y., Lu, J., Song, P., Liu, Z., Guo, Z., Tu, K. and Zusman, E. (2021), "Breaking Down Barriers on PV Trade Will Facilitate Global Carbon Mitigation", *Nature Communications* 12:1-16.
- World Trade Organization (WTO) (2019), *World Trade Report 2019: The Future of Services Trade*, Geneva: WTO.
- World Trade Organization (WTO) (2022), *Climate Change Adaptation and Trade: Policy Brief*, Geneva: WTO.
- World Trade Organization (WTO) and International Renewable Energy Agency (IRENA) (2021), *Trading into a Bright Energy Future. The Case for Open, High-Quality Solar Photovoltaic Markets*, Geneva: WTO and IRENA.

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