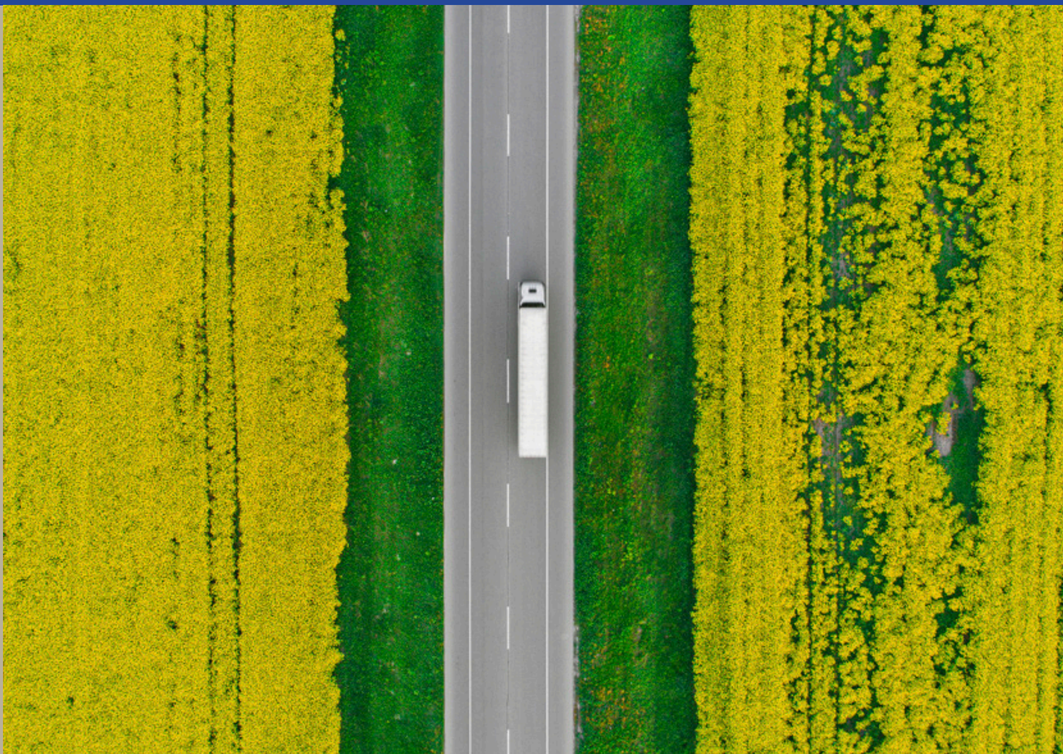
Trade Barriers to Goods and Services Important for Climate Action

– and opportunities for reform



2020

The National Board of Trade Sweden is the government agency for international trade, the EU internal market and trade policy. Our mission is to facilitate free and open trade with transparent rules as well as free movement in the EU internal market.

Our goal is a well-functioning internal market, an external EU trade policy based on free trade and an open and strong multilateral trading system.

We provide the Swedish Government with analysis, reports and policy recommendations. We also participate in international meetings and negotiations.

The National Board of Trade, via SOLVIT, helps businesses and citizens encountering obstacles to free movement. We also host several networks with business organisations and authorities which aims to facilitate trade.

As an expert agency in trade policy issues, we also provide assistance to developing countries through trade-related development cooperation. One example is Open Trade Gate Sweden, a one-stop information centre assisting exporters from developing countries in their trade with Sweden and the EU.

Our analysis and reports aim to increase the knowledge on the importance of trade for the international economy and for the global sustainable development. Publications issued by the National Board of Trade only reflects the views of the Board.

www.kommerskollegium.se/en

The National Board of Trade Sweden, September 2020. ISBN: 978-91-88201-74-4

Foreword

To reach the Paris Agreement goals and achieve climate neutrality by 2050 it is essential to use all policies, including trade policy, to support climate action. With this study, commissioned by the Swedish government, the National Board of Trade hopes to contribute to the ongoing discussion about the role of trade policy in reaching climate goals.

We approach the role of trade policy in climate mitigation by looking at examples of trade barriers for goods and services important for climate action. The examples focus on trade barriers related to renewable energy and cleaner road transport as such barriers could have a substantial significance for green-house-gas emissions. For the same reason we look at examples from major economies, including China, the EU and the US.

Our analysis indicates that there is great potential to use trade policy better in the major economies to facilitate the transition to a carbon-neutral economy. The good news is that, if decision makers give climate action priority, there is a lot that could be done on a plurilateral, bilateral, or even unilateral basis. This study presents some of the possible steps that are relatively simple to implement and that can create a greater coherence between trade and climate policies.

The study has been written by Fredrik Gisselman and Kristina Olofsson, with contributions from Magnus Andersson, Maria Johem, Jonas Kasteng, Isaac Ouro-Nimini and Christopher Wingård, with advice and comments from Nesli Almufti, Per Altenberg, Hannes Jägerstedt and Patrik Tingvall, and with layout and graphics by Loise Näsvall.

Finally, we would like to extend our special thanks to Ronald Steenblik, Senior Fellow at the IISD, for his valuable comments and suggestions as well as to the companies, organisations and governmental agencies that so kindly took their time to share their expertise and experiences with us.

Stockholm, September 2020

Anders Ahnlid
Director-General
National Board of Trade

Summary

The enormous task of reaching net zero emissions globally by 2050, which is necessary to meet the goals of the Paris Agreement, requires the mobilisation of all the available policies, including trade policy. Given the right conditions, international trade can contribute to achieving these goals by enabling the diffusion of more climate-friendly technologies. Given the urgency of climate action, and in the light of the current Covid-19 pandemic, the need for trade policies that enable the transition is more important than ever.

The purpose of this study is to contribute to the discussion about how trade policy can be used to reduce greenhouse gas (GHG) emissions by further enabling the diffusion of more climate-friendly technologies and promoting trade in environmental goods and services. To fulfil this purpose, we identified examples of trade barriers to goods and services related to renewable energy (RE) and cleaner road transport (CRT) conveyances in major economies as these goods and services can contribute to emission reductions in the two sectors responsible for the largest share of emissions globally: *electricity and heat production* and *transport*. To identify the barriers to RE goods, we used the HS codes included in the so-called A-list from the now-suspended Environmental Goods Agreement (EGA) negotiations. As goods relevant to cleaner road transport did not form part of these negotiations, we made a first effort to produce a list of goods relevant to electric vehicles (EVs) to be able to conduct the analysis (see Annex I). We encourage other organisations to build on this work.

Even though all trade policy areas can be relevant in enabling the diffusion of climate-friendly technologies, the focus of the study was on barriers within six trade policy areas: tariffs, trade remedies, countermeasures and retaliatory measures, barriers to a circular economy, rules of origin and service restrictions.

The analysis shows that there still is a range of barriers to climate-relevant goods and services that increase the costs of, and delay the transition to, a climate-neutral world. Our results also indicate that trade policy is underutilised in facilitating the transition to a carbon-neutral economy, suggesting that countries have great potential to accomplish more within this policy area.

One concrete example of this is the fact that most of the countries that we examined still make imports of RE goods and CRT goods more expensive by applying most-favoured-nation (MFN) tariffs to a majority of them. Even though the average tariffs for RE goods are lower than those for industrial goods generally, there are still opportunities for further reductions. This is particularly the case in Brazil and India, with high average tariffs and few duty-free RE goods on an MFN basis. Regarding CRT goods, the average tariffs are substantially higher than those for other industrial goods in several of the countries studied, indicating fewer efforts to liberalise

trade in these goods. All of the countries have significantly higher average tariffs for finished electric vehicles than for raw materials and components. Furthermore, the analysis shows that about two-thirds of the 123 countries covered by the EU's Market Access Database, including China, the EU, India and the United States, apply uniform tariff rates to internal combustion engine (ICE) vehicles and electric vehicles (EVs). However, 23 per cent of the countries, predominantly developing countries, have taken the opportunity to use trade policy to favour EVs, with lower tariffs for EVs than for ICE vehicles.

Applying tariffs to EVs reduces imports substantially and will also push back the day when EVs will become cheaper than ICE vehicles, thus postponing the transformation of the vehicle fleet in many countries. Furthermore, and as an example of the incoherence between trade and climate policies, our analysis shows that tariffs eat up a substantial share of the support offered to buyers of EVs – almost 60 per cent in Sweden's case. Given the urgency of climate action, the EU and other countries should therefore consider unilateral tariff reductions on RE and CRT goods or take initiatives to reduce or eliminate MFN tariffs via plurilateral agreements.

Furthermore, our analysis indicates that, even though trade remedies have been heavily criticised for a long time for targeting environmental goods, RE goods are still subject to anti-dumping, anti-subsidy and safeguard measures in, for example, China, the EU, India and the United States. Countries that want to ensure that such measures are consistent with climate policies should amend their national policies to allow for solid climate considerations in, for example, public interest tests.

Our analysis of recent countermeasures and retaliatory measures shows that most measures do not cover RE or CRT goods. However, there are examples of RE and CRT goods being affected to a large extent. To exemplify, the tariff increases introduced as a consequence of the trade conflict between the US and China targeted almost 90 per cent of RE goods and roughly 80 per cent of CRT goods in both countries. The EU, by contrast, has not included more than a handful of renewable energy goods in the recent countermeasures that it has imposed or proposed. It is unclear whether this is a result of an explicit consideration of climate goals or of other considerations. To ensure that future countermeasures and retaliatory measures do not target climate-relevant goods, the EU and other countries should amend the legislation governing these measures to include climate considerations.

Moreover, our analysis shows that, to the best of our knowledge, there are currently no regional trade agreements (RTAs) with rules of origin (RoOs) that have been specifically adjusted to promote climate goals. Examples from the EU car industry suggest that such considerations have not been taken into account as the RoOs can act as substantial trade barriers to EVs. RoOs have the potential to be used to promote trade in climate-relevant goods, but the question of how they can be used efficiently merits further investigation.

The projected massive expansion of RE and CRT goods suggests that there is an urgent need to enable trade in them when they reach the end of their useful lives and need to be remanufactured, recycled or disposed of. However, as trade policy thus far has not taken circularity into account, and as environmental and circular economy policies have not been designed to facilitate trade, the barriers to trade in end-of-life products hamper circularity. Our case study, focusing on used EV batteries, shows that regulations connected to the transporting of dangerous goods and waste regulations can act as barriers and increase costs or prevent reuse, remanufacturing and recycling. Ultimately, the current regulations in this area lead to unnecessary emissions. Countries should therefore improve their international cooperation on these issues to ensure that environmental policies, circular economy policies and trade policies are coherent.

Lastly, our analysis reveals that several countries have restrictions on services that are indispensable for trade in RE goods. Although these restrictions also affect other economic sectors, the effect on RE goods could be more severe as renewable energy technologies are more dependent on specific knowledge than other goods. Furthermore, local content requirements (LCRs) that target services related to renewable energy and EVs are in place in several of the countries that we investigated, slowing down the deployment of these technologies. To promote the use of climate mitigating technologies more efficiently, countries should remove the LCRs. Our analysis also shows that there is a need for more research on services that are indispensable for the use and deployment of EVs.

To enable the economic transformation needed to reach the Paris goals and achieve climate neutrality by 2050, all the barriers discussed in this report and the possibilities for reform should be assessed by governments.

Content

Abbreviations

ACCTS	Agreement on Climate Change, Trade and Sustainability
BEV	battery electric vehicle
CRT	cleaner road transport
EGA	environmental goods agreement
EV	electrical vehicle
GHG	greenhouse gas
HS	harmonized system
ICE	internal combustion engine
LCR	local content requirements
MFN	most-favoured-nation
OECD	The Organisation for Economic Co-operation and Development
RE	renewable energy
RoO	rules of origin
RTA	regional trade agreement
WCO	World Customs Organization
WTO	World Trade Organization

1 Introduction

Through the Paris Agreement, the world[1] has agreed to keep global warming to well below 2 degrees Celsius (°C), and to pursue efforts to limit it to 1.5°C, to avoid disastrous effects on living conditions. However, current trend shows continued high emissions internationally. In 2019, the world had already reached 1.1°C warming, and the global temperature is increasing by approximately 0.2°C per decade (IPCC, 2018). This underscores the urgency to act.

Meeting the Paris targets is an enormous challenge and will require huge amounts of resources. Therefore, the world's countries need to mobilise all the available policies and measures to create the conditions for their economies to transform in a green direction. This requires the use of a wide range of policy instruments, both national and international, including trade policy instruments. The economic consequences of the ongoing Covid-19 pandemic further amplify the need for efficient and enabling policies.

International trade can contribute to meeting the targets of the Paris Agreement as it enables the diffusion of environmentally sound technologies and, given that market failures are addressed and environmentally harmful subsidies are removed, contributes to efficient resource allocation worldwide.

Even though sound environmental policies are necessary for the transition to a carbon-neutral economy, they are not sufficient. To enable an efficient transition, trade policy needs to facilitate it. Trade barriers increase the cost of trade and thus make goods and services, including those that contribute to reducing emissions, more expensive than necessary. As a consequence, they can delay the diffusion of climate-mitigating technologies and contribute to emissions that could have been avoided.

Although all of the world's countries have agreed to decrease their emissions relatively or absolutely, barriers to trade in goods and services that could contribute to emission reductions are still common (Araya, 2016). Studies attempting to quantify the emission savings from reducing the trade barriers to environmental goods and services indicate that there is significant potential to decrease greenhouse gas (GHG) emissions with better trade policies (see e.g. EU Commission, 2016; OECD, 2010).

1.1 Purpose and scope

The purpose of this study is to contribute to the discussion about how trade policy can be used to further enable the diffusion of climate-relevant goods and services and thus to reduce greenhouse gas (GHG) emissions. To fulfil this purpose, we identified examples of trade barriers that hamper GHG emission reductions by increasing the costs of climate-relevant goods and services.[2] Our study also suggests ways to make trade policy more consistent with climate goals. While we acknowledge that multilateral solutions are often optimal, we focused on policies that are relatively simple to implement. Consequently, we mainly analysed potential unilateral, bilateral and plurilateral trade policy reforms. The focus of the recommendations is on achieving the largest effect on emission reductions. However, all policy changes should be preceded by impact assessments to take other societal and sustainability goals into account. The examples are mainly taken from large economies, in particular China, the EU and the United States, as their policies have a substantial impact on trade and global GHG emissions.

To limit the scope of the study, we focused primarily on barriers to trade in goods and services related to renewable energy (RE) and cleaner road transport (CRT) conveyances.[3] There are three reasons for choosing these sectors. First, *electricity and heat production* and *transport* are the two sectors that contribute the most to GHG emissions according to the International Energy Agency (IEA, 2019a), being responsible for two-thirds of emissions from fuel combustion (41.4 per cent and 24.5 per cent, respectively, in which road transport is responsible for approximately 18 per cent of the total and 74 per cent of the transport-related emissions). Second, cleaner alternatives are currently available within these sectors, which is not the case to the same extent for all sectors (e.g. basic materials and air transport services). As a result, these alternative goods, services and technologies could be diffused via trade to a greater extent. Third, the two sectors are highly connected, as the contribution of transport electrification to climate mitigation efforts will be greater if it is supported by increasingly decarbonised power systems.

Moreover, based on the assignment from the Swedish Government and discussions with businesses, we limited the study to a subset of trade policies (tariff-related issues, services trade restrictions and circular economy-related aspects) that can increase trade costs and slow down the deployment of cleaner technologies. This does not limit the importance of other trade-related policies to ensuring well-functioning trade flows for environmental goods and services. Lastly, we focused on barriers to trade in goods that could reduce emissions if they were diffused more widely, thus replacing fossil-dependent goods and technologies, but did not consider the potential climate impact that increased trade can have as a result of differences between countries in production techniques.

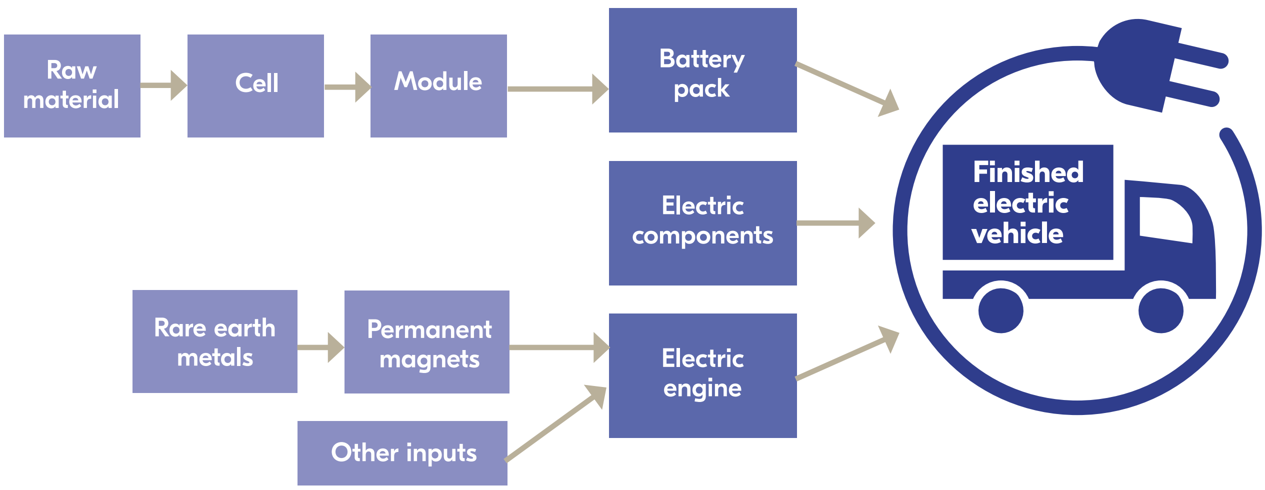
The study is structured as follows. Chapter 2 describes the climate-relevant goods covered by this study. Chapters 3, 4 and 5 address different types of tariffs (MFN tariffs and trade remedies as well as retaliatory measures and countermeasures). Chapter 6 discusses the role of rules of origin in preferential trade of climate-relevant goods. In Chapter 7, the trade barriers that affect the transition to a circular economy are analysed. Chapter 8 examines the barriers to trade in services affecting the renewable energy and cleaner road transport sectors. Lastly, Chapter 9 provides conclusions and recommendations for steps that could be taken to make trade policy more coherent and supportive of climate efforts.

2 Renewable energy goods and cleaner road transport goods

When goods are identified for trade policy purposes, the Harmonized System (HS) nomenclature is used (see Box 1 for a discussion about the connections between HS codes and climate-relevant goods). Regional and plurilateral initiatives on trade liberalisation for environmental goods, as well as work within international organisations, have resulted in definitions and product lists for major categories of environmental goods. In this report, we used a product list from the Environmental Goods Agreement (EGA) negotiations to define *renewable energy goods* (*RE goods*).[4] This list covers goods at the HS 6-digit level (HS subheadings) used for example in the generation of solar, wind and hydroelectric energy. In several cases, the renewable energy good is more narrowly defined than the HS subheading; that is, it is an "ex-out" from the HS subheading.

Goods that are important for the decarbonisation of road transport are not a category of goods that was included in the EGA, nor have goods related to this sector previously been listed by any organisation. We have therefore, with the kind assistance of researchers, business representatives and customs staff, attempted to construct a list of goods relevant to the electrification of road transport, here called *cleaner road transport goods* (*CRT goods*). This list covers parts and components that are specific to electric vehicles and fuel cell vehicles[5] (for example chemical substances, batteries, electric engines and power electronics) as well as the vehicles themselves.[6] The list should be viewed as a first attempt, and we encourage other organisations to develop this work further. The coverage of the list of CRT goods is presented in Annex I.

Supply chain for electric vehicles



Box 1

Amendments to the Harmonized System to enable better tracking of trade in climate-relevant goods

The HS is an international system developed by the World Customs Organization (WCO) to identify goods and achieve a uniform tariff classification as well as for the collection of trade statistics. Consequently, the HS provides countries with a common language for international trade, trade negotiations and trade statistics (WCO, 2020).

A challenge when addressing trade in climate-relevant goods and technologies is that some goods and technologies are not identified separately under their own HS subheadings (6 digits). Instead they are classified under subheadings also covering similar goods that have other uses or goods representing entirely different technologies that might not have the same climate benefits. Climate-relevant goods might be identified specifically in national customs codes, but such codes are not harmonised internationally.

The HS nomenclature and its subheadings might seem to be a very technical issue. However, Steenblik (2020) argued that the choice of goods that are specifically described in the HS can have important ramifications for the environment. With specific HS subheadings for climate-relevant goods, it becomes easier to target climate-relevant goods in trade negotiations, to monitor trade in these goods and to perform trade policy analysis for them.

The HS nomenclature is revised every five years. Currently there is a window of opportunity to suggest new HS subheadings that could be incorporated into the HS 2027 and allow for more precision in trade statistics for climate-relevant goods and related trade policy research. For which goods could such amendments be useful? One potential example is the lithium-ion batteries used in EVs. Such batteries are currently classified under the same subheading as lithium-ion batteries for other uses (HS 8507 60). It could also be appropriate to consider whether more specific tariff numbers are needed for parts and components in the supply chain for batteries, as HS 8507 90 covers parts of battery cells, the cells themselves and modules.

3 Tariffs for climate-relevant goods

Tariffs increase the costs of importing goods, including RE and CRT goods. Consequently, the use of tariffs makes these goods more expensive than necessary and slows down the deployment of important climate-mitigating technologies. Even when the tariffs are relatively small, they can be of significance as firms are often integrated into global value chains and tariff costs cumulate when goods pass borders several times. Having good access to imports furthermore helps firms producing RE goods and CRT goods to become more productive and competitive on export markets (OECD, 2020). Consequently, applying import tariffs to parts and components reduces firms' competitiveness and their opportunities to benefit from broader markets for their products.

3.1 Tariffs for renewable energy goods are still applied but low

The benefits of open trade in environmental goods, including climate-relevant goods, have been recognised by the WTO members taking part in the now-suspended EGA negotiations and the participants in the more recent initiative to create an Agreement on Climate Change, Trade and Sustainability (ACCTS).[7] Increased openness would boost trade in environmental goods, help to meet climate targets and provide cheaper access to the technologies needed (EU Commission, 2015). In general, the tariffs applied to environmental goods, including RE goods, have declined in the last decades both within and outside the OECD (OECD, 2019), partially as a result of liberalisation within regional trade agreements (RTAs). However, liberalisation within RTAs only benefits trade between the parties of the agreements and requires the fulfilment of the rules of origin to be used, implying that MFN tariffs are still relevant to these goods.

Therefore, we conducted an analysis of applied MFN tariff data for RE and CRT goods in six major economies, Brazil, China, the EU, India, South Africa and the United States. The analysis shows that all these countries, except for South Africa, still apply MFN tariffs to a majority of RE goods. The three markets with the largest imports of RE goods, China, the EU and the United States (OECD, 2019), have simple average MFN tariffs of 5.5 per cent, 2.6 per cent[8] and 2.0 per cent. In Brazil and India, the average MFN tariffs are substantially higher, over 9 per cent and 12 per cent, respectively, with tariffs for RE goods reaching 25 per cent in India. Among the countries studied in this report, South Africa has by far the largest share of duty-free RE goods (74 per cent) and a relatively low average MFN tariff (3.2 per cent) in relation to the other emerging economies. All of the examined countries have lower average MFN tariffs for RE goods than for industrial goods in general.

Table 1: Simple average applied MFN tariffs for renewable energy goods and cleaner road transport goods

	Brazil	China	EU	India	South Africa	United States
Renewable energy goods						
Average applied MFN tariff*	12.3%	5.5%	2.6%	9.1%	3.2%	2.0%
Duty-free HS6 codes (share)	8%	19%	21%	5%	74%	41%
Tariff range	0–20%	0–15%	0–8%	0–25%	0–25%	0–7.6%
Cleaner road transport goods						
Average applied MFN tariff**	10.9%	6.1%	4.1%	16.2%	2.1%	3.4%
Duty-free HS6 codes	0%	18%	11%	1%	82%	22%
Tariff range	2–35%	0–45%	0–22%	0–125%	0–25%	0–25%
Average MFN tariff for industrial goods (NAMA) (2018)	13.9%	8.8%	4.2%	13.6%	7.6%	3.1%

* The simple average MFN tariff calculated on the HS6 level. When several MFN tariff rates are applied at the HS6 level, the average of those rates was used. ** For cleaner road transport goods, some HS subheadings were included several times in our calculation to achieve an average for the specific products used in value chains for electric vehicles. Tariff data were extracted from the EU Commissions Market Access Database for Brazil, China, India, South Africa and the United States. If countries use tariff suspensions and these are not included in the Market Access Database, the suspensions were not included in our averages. For the EU, tariff suspensions were not included. With tariff suspensions, the average MFN tariff would be somewhat lower for the EU. The average NAMA tariffs are from the WTO's Tariff Profiles.

3.2 Tariff escalation in supply chains for electric vehicles

The EGA negotiations did not cover EVs or their parts and components, although trade in these goods is of significant importance for countries' opportunities to reduce emissions from road transport. Our analysis of MFN tariff data shows that, on average, China, the EU, India and the United States are less open to trade in CRT goods than they are to trade in RE goods. The situation is different in Brazil and South Africa, where the average MFN tariff for CRT goods is somewhat lower than that for RE goods. South Africa also stands out here, with duty-free market access for 82 per cent of the goods and the lowest average MFN tariff. In contrast, Brazil and India have no or almost no duty-free CRT goods.

A similar trait in the tariff structure applied in all the countries studied is the tariff escalation for CRT goods; that is, the tariffs are higher for finished vehicles than for their raw materials and components. This is particularly the case in India, with the average MFN tariffs for different types of EVs approaching 60 per cent (see Figure 3 in Annex III). However, there are examples of high tariffs for finished electric conveyances in all the studied countries, for example 45 per cent for electric motorcycles in China and 25 per cent for hybrid trucks in the United States. This type of tariff structure favours the domestic production of conveyances and imports of raw materials and components over imports of finished vehicles and might create inefficiencies.

To summarise, although some of the studied countries already have relatively low average MFN tariffs, all of the countries could further improve the market access for RE and CRT goods. This would be beneficial for the diffusion of these technologies even if there has already been preferential tariff liberalisation within RTAs as the administrative burden and costs for meeting preferential rules of origin could be avoided with MFN tariff liberalisation (see the further discussion about RoOs in Chapter 6). A recent example of unilateral tariff liberalisation is the UK's new tariff schedule, the design of which takes climate goals into account (Department for International Trade, 2020). As a consequence, tariffs have been cut for a large share of RE goods.[9]

3.3 MFN tariffs for battery electric motor cars

To exemplify the implications of the tariff structure for EVs in different countries, we chose to look at applied MFN tariffs for EVs in relation to tariffs for vehicles powered by internal-combustion engines (ICE vehicles).

The higher purchase price for EVs than for ICE vehicles has been identified in several studies as a major barrier to their uptake (ACEA, 2018; JRC, 2018). The same ad-valorem (percentage) tariff applied to both types of vehicles will increase an EV's purchase price by a larger absolute amount than an equivalent ICE vehicle. Tariffs on the most significant components of EVs, such as their batteries, also raise the purchase price for EVs.

We examined the applied MFN tariffs for motor cars in a large group of countries and determined whether they apply zero duties or lower duties for EVs than ICE vehicles (see Table 2).[10] The analysis shows that most countries apply tariffs to EVs and that these are seldom more favourable for EVs than for ICE vehicles. Consequently, the tariff structure in these countries does not provide incentives to import EVs over ICE vehicles. For example, the applied tariff for EVs (motorcars) is 35 per cent in Brazil, 15 per cent in China, 10 per cent in the EU and 2.5 per cent in the United States. Notably, only two of the thirteen countries engaged in the Electric Vehicle Initiative (EVI),[11] Norway and Japan, have duty-free market access for EVs, despite the initiative's stated objective of accelerating the introduction and adoption of electric vehicles worldwide.[12] The highest tariff among the countries engaged in the EVI is found in India, with an MFN tariff as high as 125 per cent for EVs.

However, there are examples of countries – predominantly developing countries – that have an MFN tariff regime that encourages trade in EVs over trade in ICE vehicles. These represent 23 per cent of the countries analysed, but only a small fraction (0.2 per cent) of global imports of passenger EVs (HS 8703 80) goes to these markets.

The data on MFN tariffs for EVs (HS 8703 80) suggest that many countries could use their trade policy as a tool to reduce EV prices and encourage the deployment of EVs and cleaner forms of road transport.

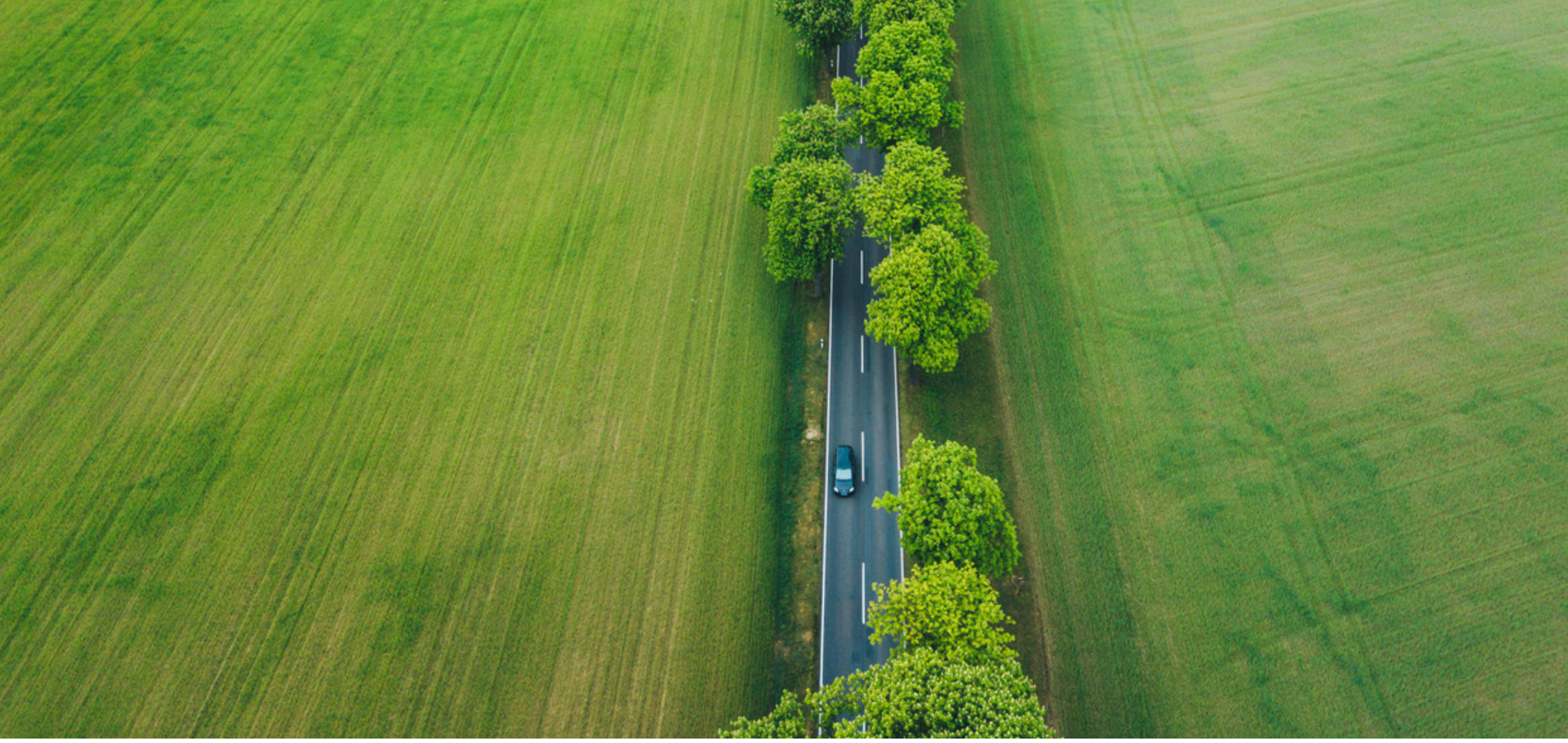
Taking the EU as an example, our calculations show that EU importers paid 292 million euros in tariffs for EVs in 2019. To assess the effects that the tariffs have on imports of EVs, we conducted simple partial equilibrium calculations.[13] Those calculations indicate that reducing the tariffs to zero could increase imports to the EU by a value of 293 million euros annually (approximately 10 per cent), representing roughly 12 300 EVs on an annual basis.[14] Furthermore, these numbers could increase substantially over the coming years as the demand for EVs is projected to increase dramatically (IEA, 2019b). The effect that the tariffs have on emissions could therefore be substantial. The calculations by the IEA (2019b) show that the entire global EV fleet avoided approximately 40 Mt CO_2-equivalent emissions in 2018 compared with the emissions that would have occurred if the EV fleet was instead ICE vehicles powered by fossil fuels.[15]

Additionally, as batteries still account for a large share of the cost of EVs,[16] duty-free imports of batteries and parts and components for batteries could contribute to significant cost reductions for EVs. Parity in purchase prices for EVs

Table 2: Applied MFN tariffs for electric motor cars (HS 8703 80) in countries covered by the EU Commission's Market Access Database (MADB) plus the EU

	Zero tariffs for all motorcars	Lower tariffs for electric motorcars than for ICE motorcars	Tariffs on electric motorcars and no reduction in relation to ICE motorcars
Share of the 123 countries covered	13%	23%	64%
Countries	Albania, the Bahamas, Brunei, Costa Rica, Guatemala, Hong Kong, Iceland, Japan, Jordan, Laos, Mauritius, Moldova, Norway, Panama, Papua New Guinea, Singapore	Afghanistan, Angola, Bermuda, Bolivia, Bosnia-Herzegovina, Colombia, Ecuador, Egypt, El Salvador, Ethiopia, Fiji, Guyana, Honduras, Iran, Kazakhstan, Lebanon, Mexico, Montenegro, Morocco, Myanmar, Pakistan, Paraguay, Serbia, Sri Lanka, Syria, Ukraine, Uruguay, Uzbekistan	*Examples of countries:* Argentina (35%), Australia (5%), Brazil (35%), Canada (6.1%), Chile (6%), China (15%), the EU (10%), India (125%), Kenya (25%), Kuwait (5%), Philippines (30%), South Korea (8%), South Africa (25%), Turkey (10%), the United States (2.5%)
Share of global imports of battery electric motorcars in 2018*	25.9%	0.2%	73.5%

Source: The EU Commission's Market Access Database, data extracted in April 2020. The table is based on data for 123 countries (including the EU). It should be noted that, if there are tariff suspensions that are not included in the database, they are not covered by the table.
* The trade data are from UN COMTRADE.



and ICE vehicles has been predicted to occur by around 2030 (IEA, 2018; Soulopoulos, 2017) or even as early as 2026 (ICCT, 2019). Taking steps to liberalise trade in batteries and EVs, multilaterally, plurilaterally or unilaterally, could advance the breaking point when EVs are similarly priced or even cheaper than ICE vehicles.

3.4 Trade policy can counteract financial incentives for EVs

The IEA (2018) pointed out that financial incentives, in particular those that reduce the purchase price of EVs, are driving the market uptake for EVs. Incentive schemes for EVs have been implemented in many markets in different forms, such as purchase subsidies and VAT derogations (IEA, 2019b). For example, in 2018, 26 countries within the EU had national EV incentives. Among these, France, Italy and Sweden had purchase subsidies as high as 6 000 euros per vehicle, while Bulgaria had subsidies that could reach 10 000 euros (IEA, 2019b). Furthermore, France has recently announced that it will increase the purchase subsidy to 7 000 euros as a way to encourage a green recovery after the Covid-19 pandemic.[17]

In some of these markets, the MFN tariff costs for EVs might be considerable in relation to the fiscal incentives provided to increase EV sales. Taking Sweden as an example, the tariffs paid for an average-priced EV imported from the United States correspond to at least 3300 euros.[18] The tariff thus consumes approximately 58 per cent of the subsidy.[19] It could be argued that, in these cases, the trade policy is not consistent with the climate mitigation policies.

3.5 Conclusions and recommendations

Our analysis of MFN tariffs shows that the economies covered by this study all apply lower average MFN tariffs to RE goods than to industrial goods in general. This implies that the tariff structure to some extent favours trade in RE goods. For CRT goods, the average MFN tariffs are significantly higher than those for RE goods in several of the countries, indicating that fewer efforts have been made to reduce the trade cost of these goods.

Despite the differences between the two sectors and different countries, the tariff data suggest that the EU and other countries could still further accelerate the green transition by reducing the MFN tariffs for RE and CRT goods. This could either be done plurilaterally within initiatives such as a new EGA or ACCTS or unilaterally, as shown by the tariff cuts for climate-relevant goods in the UK's new tariff schedule.

As some goods have dual use, that is, they are not only used for climate purposes, unilateral tariff reductions can sometimes be sensitive. While acknowledging the administrative burden that might be associated with tariff suspensions, countries could assess the effectiveness of tariff suspensions for goods with dual use to target specifically climate-relevant inputs.

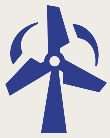
The relatively high tariffs for finished EVs on many markets can slow down the diffusion of EVs and counteract the financial incentives put in place to increase the competitiveness of such vehicles. Taking steps to liberalise trade in cells, batteries and EVs could advance the date on which the purchase price of EVs equals that of ICE vehicles.

4 Trade remedies and climate impacts

The purpose of trade remedies such as anti-dumping measures, anti-subsidy measures (also called countervailing measures) and safeguards is to protect domestic industries from distortive trade practices or from sudden and sharp increases in imports. Although the use of such measures is a legitimate part of the global trading system, they may have a detrimental effect on the pace of diffusion of clean technologies if the measures target environmental goods. Furthermore, unmotivated use of such instruments can undermine potential plurilateral efforts to facilitate trade in environmental goods.

A study by Kampel (2017) showed that 45 trade remedy cases in the clean-energy sector alone were notified to the WTO between 2006 and 2015. Furthermore, the same study concluded that there has been a significant increase in the production of RE goods, partially due to the use of government support. However, the rise in the use of trade remedies in the renewable energy sector cannot be explained only by an increase in unfair trading practices. Rather, many of these measures have probably been motivated by competitiveness concerns and can thus be seen as protectionist measures (Kampel, 2017). Such unmotivated use of anti-dumping measures, anti-subsidy measures and safeguards counteracts the current rapid decreases in the prices of RE equipment and thus also slows down the diffusion of these technologies. As an example, Hufbauer and Cimino (2014) showed, albeit using rather limited calculations, that the trade remedies in place for RE goods between 2008 and 2012 affected a trade value of US$32 billion, which caused a reduction of trade of US$14 billion in the targeted goods.

Table 3: Examples of trade remedies affecting RE goods in force in 2019 in China, the EU, India and the United States

Affected sector	China	EU	India	United States
		Glass fibre products from China (AD + AS), glass fibres from China (AD)	Glass fibres from China (AD), windmills from China (AD + AS)	Wind towers from China (AD + AS) and Vietnam (AD)
	Solar-grade polysilicon from the United States (AS) and South Korea (AD)	Solar glass from China (AD + AS), solar panels from China (AD), solar panels from Malaysia and Taiwan (AS)	Ethyl vinyl acetate sheets for solar modules from China, Korea, Malaysia, Saudi Arabia and Thailand (AD), solar cells (SG)	Solar cells and modules from China (AD + AS), certain crystalline silicon PV products from China (AD + AS) and Taiwan (AD), solar cells (SG)

AD = anti-dumping measures, AS = anti-subsidy measures, SG = global safeguard.
Sources: G/SCM/N/356/CHN, G/ADP/N/335/CHN, G/ADP/N/335/EU, G/SCM/N/356/EU, G/ADP/N/335/IND, G/SCM/N/356/IND, G/SG/N/8/IND/31/Suppl.2, G/ADP/N/328/USA/Rev.1, G/SCM/N/349/USA, G/SG/N/11/USA/6.

4.1 Examples of trade remedies targeting renewable energy

Our study did not map all the new trade remedy cases since 2015. We can therefore not conclude whether the trend to target clean energy is rising or falling. Neither can we assess the potential effects of such measures on trade in the targeted goods. However, we analysed the recent notifications to the WTO and found that, for example, China, the EU, India and the United States all had trade remedies targeting RE goods in force in 2019 (see Table 3).

These examples indicate that the solar and wind industry sectors in these economies have continued to be affected by cost increases due to the use of trade remedies. Criticism of some of these measures and their potential impact on the production of renewable energy has been raised in several countries. As an example, in 2018, India's Parliamentary Standing Committee advised against the introduction of safeguard duties for solar cells as it would have a negative impact on the viability of existing solar projects as well as the incentives for further investments.[20] However, the safeguard duties were introduced despite this advice. In addition, within the EU, climate arguments have frequently been used to question the application of trade remedies to solar panels.[21] Furthermore, in the United States, the Solar Energy Industry Association estimated that the country's global safeguard duties for solar cells and modules introduced in 2018 have slowed down the pace of solar adoption, resulting in 10.5 GW of lost solar deployment (corresponding to 26 million tonnes of CO_2 emissions) (SEIA, 2019).

4.2 Possible ways to consider climate concerns

During the last decade, several reports have proposed solutions for limiting the use of trade remedies for environmental goods (see e.g. Horlick, 2013; Kampel, 2017; Kasteng, 2013). The recommendations include propositions for changes to multilateral agreements (e.g. making green subsidies non-actionable in the WTO Agreement on Subsidies and Countervailing Duties), ideas on the form of plurilateral agreements (provision for non-use of trade remedies in a potential environmental goods agreement), suggestions for bilateral agreements (eliminating trade remedy tools in regional trade agreements) and unilateral suggestions (raising the *de minimis* levels for the share of imports affected or the size of the injury, including climate interests in public interest tests and cost–benefit analyses of the introduction of trade remedies).

All the above-mentioned proposals could be investigated further. We focused on one of the suggested unilateral solutions: to include climate interests in the so-called public interest test. To put it simply, a public interest test gives a decision maker the discretion *not* to impose anti-dumping or anti-subsidy measures if they would harm the public interest more than they would benefit the allegedly harmed sector. There are no mandatory provisions on public interest tests in the relevant agreements in the WTO. However, some WTO members have chosen to incorporate a public interest test into their legislation on trade remedies, for example Argentina, Brazil, China, Canada, the EU, New Zealand, Thailand and Ukraine (Kotsiubska, 2011).[22]

In the EU, for example, a public interest test (*the Union interest test*) is performed to ensure that the measures do not cause more harm to the overall economy than the relief brought to the domestic industry affected by the imports. In this test, the interests of other producers, industrial users, importers and consumers are also taken into account (EU Commission, 2018c).[23] However, the EU would only refrain from introducing trade remedies when it can be proved that they would be against the union interest. Many stakeholders have argued that climate-related policies should be taken into account in the Union interest test. So far, such considerations have explicitly affected the European Commission's decision on trade remedies on one occasion, when anti-dumping and anti-subsidy measures for solar panels originating in China were not extended.[24] According to the EU Commission's public statement, the EU's renewable energy targets were taken into account in the decision (EU Commission, 2018b). To ensure that climate concerns are fully taken into consideration in the Union interest test, it could be useful to introduce environmental impact assessments and a cost-benefit approach to environmental concerns.

The United States, on the other hand, does not have a public interest test in its legislation. According to the legislation, all parties that qualify as interested parties in investigations for anti-dumping and anti-subsidy measures must have an economic interest in the measure at issue[25]. As there is no public interest test in the United States' legislation, there is no policy space for the United States International Trade Commission to consider non-economic factors in the determination of trade remedies. A change in the legislation would be necessary to provide for this possibility.

4.3 Conclusions and recommendations

Targeting climate-relevant goods or inputs for such goods with trade remedies makes imports more expensive and results in increased costs for the diffusion of the technologies needed for climate mitigation. Despite this effect having been discussed for more than a decade, countries are evidently still using trade remedies for RE goods. The EU and other countries should therefore carefully evaluate whether the benefits of introducing trade remedies are greater than their associated costs, including environmental costs and benefits. Among the alternatives listed in previous research, a low-hanging fruit for countries that take their climate targets seriously would the inclusion of climate considerations, and possibly environmental impact assessments, in their public interest test. For countries that currently do not apply a public interest test, the first step would be to introduce such a test into the national legislation and to ensure that it recognises climate goals. A means to encourage countries to consider such a move could be to include a pledge on climate-consistent trade remedy measures in a potential plurilateral agreement on climate-relevant goods.

5 Retaliatory measures, countermeasures and climate-relevant goods

In addition to MFN tariffs and trade remedies, market access for climate-relevant goods can in some cases be affected by countermeasures or retaliatory measures in trade disputes. These measures mostly take the form of additional tariffs applied to a specified list of goods originating in another WTO member. The purpose of such measures can be to rebalance the bilateral trade flows when safeguard measures have been introduced by another WTO member (countermeasures)[26] or to induce compliance with international obligations or with the outcomes of trade disputes in the WTO (retaliatory measures).

5.1 An example: measures in the US—China trade conflict targeting climate-relevant goods

There are several recent examples of such measures in China, the EU, the United States and other countries. It could be reasonable to expect that WTO members that have previously been engaged in the plurilateral negotiations to liberalise trade in environmental goods or that are signatories to the Paris Agreement would avoid imposing additional tariffs on climate-relevant goods. Therefore, we examined the extent to which some of these measures have covered RE goods and CRT goods.[27] We found that the countermeasures introduced to rebalance the United States' Section 232 steel and aluminium tariffs by, for example, Canada, China, the EU, India and Mexico only affected a handful of the climaterelevant goods discussed in this report.[28]

However, it appears that climate considerations have not been made for tariffs imposed in the trade conflict between the United States and China. The tariffs imposed by the United States (Section 301 measures) on goods from China in 2018 and 2019 cover 88 per cent of the RE goods and 76 per cent of the CRT goods. In fact, the measure targets products related to the Made in China 2025 Initiative, a policy that covers, for example, renewable energy and electric vehicles.[29] As a consequence, the additional tariffs in combination with the steel tariffs have raised the costs of wind projects in the United States by about 20 per cent, according to estimates made by the consultancy Wood Mackenzie.[30] At the same time, China's tariffs imposed in 2018 and 2019 on goods from the United States cover 86 per cent of the RE goods and 78 per cent of CRT goods.

To establish how and whether climate concerns have been considered, we examined the legislation that governs countermeasures and retaliatory measures in the EU and the United States, respectively. A special focus was on the interests and criteria that the legislation mandates to be taken into account when designing such measures.[31] The EU legislation includes a number of such criteria and interests.[32] However, there is no reference to climate or sustainability. In the United States, the relevant legislation appears primarily to take commercial interests into account.[33] This is also reflected in the

consultations before measures are imposed, in which the public is explicitly invited to comment on "disproportionate economic harm to U.S. interests" but not on the climate- or environment-related impact of the proposed measures.

5.2 Conclusions and recommendations

Our analysis of recent countermeasures and retaliatory measures shows that most measures do not cover RE or CRT goods. Whether the exclusion of these goods is the result of climate concerns is hard to tell. However, there are examples of RE and CRT goods having been affected extensively. The retaliatory measures applied in the trade conflict between the United States and China cover most RE goods and CRT goods in both directions. Consequently, those measures are likely to affect the climate efforts in both countries.

To ensure that the use of countermeasures and retaliatory measures does not impede climate work, the impact on the deployment of climate-mitigating technologies would need to be taken into account before determining which goods should be targeted by the measures. The introduction of a requirement in national trade legislation to consider climate goals when designing such measures could be one way of achieving this.

6 Rules of origin and climate-relevant goods

As mentioned earlier, the best solution to liberalise trade in climate-relevant goods would be to reduce the MFN tariffs to zero for these goods multilaterally, plurilaterally or unilaterally. However, due to the proliferation of regional trade agreements (RTAs), liberalisation mainly takes place on preferential terms within RTAs. To benefit from preferential treatment, goods must meet the RTA's rules of origin (RoOs).

6.1 Linkages between rules of origin and climate mitigation

The design of rules of origin affects producers' sourcing options as it determines the amount of locally sourced materials needed to benefit from preferential tariffs. To access a preferential tariff, a producer might have to increase the amount of originating materials. A generous origin rule would allow for a large amount of third-country inputs, whereas a strict origin rule entails the opposite. RoOs can thus limit sourcing options and increase costs for companies producing climate-relevant goods.

However, to our knowledge, there are no RTAs with rules of origin that are specifically adjusted to promote climate mitigation goals. The links are indirect at best. An example of an indirect link is a generous origin rule that happens to apply to a climate-relevant good, and the good can then be traded at a reduced tariff rate.

Considering this link and the origin rule's ability to affect sourcing options, it is possible to give the rules of origin a more active role in facilitating trade in climate-relevant goods. There are numerous ways to achieve this. A more generous product-specific origin rule is one option. Horizontal provisions such as cumulation[34] or tolerance[35] could also be used. A recently released report by the National Board of Trade (2020) discussed these potential options in more detail.

6.2 An example: rules of origin for batteries and EVs

To highlight that RoOs can have a significant impact on trade in climate-relevant goods, we have included an example raised by several European manufacturers of EVs.

According to a paper from the German Association of the Automotive Industry (VDA, 2020), there is currently a lack of battery production capacity in the EU, and large amounts of the materials needed for batteries must be imported. The RoOs for EVs in, for example, the modernised free trade agreement between the EU and Mexico imply that there is a limit of 45 per cent for third-country materials. As batteries make up a large portion of the value of an EV (30–50 per cent), and since it is difficult to produce a battery with EU origin, it is very difficult to satisfy the origin criterion for the finished car in EU RTAs. The VDA therefore calls for changes in the origin rules to allow for a larger share of third-country materials.

6.3 Possible ways to incorporate climate considerations

For types of climate-relevant goods other than EVs, other technical solutions might be available. They could, for instance, involve creating certain origin provisions that target SMEs producing green goods or special criteria for recycled materials. However, a number of difficulties are associated with designing specific rules for certain products, including how to choose the products. Another challenge is to ensure that an exemption for climate-relevant goods does not lead to an increased administrative burden. If, for example, a producer were to have more generous origin rules if it used recycled or other sustainable materials, how would he or she weigh that option against the cost of proving that the materials are in fact “green”? Directing the sourcing of materials in itself creates an efficiency loss in pure economic terms since the producer then cannot choose from where to source freely (an inherent problem with rules of origin in general).

There are currently no countries that apply specific origin provisions to climate-relevant goods, but there are precedents for rules of origin being used to promote sustainable development, for example the EU’s Everything But Arms (EBA) agreement, in which the least developed countries (LDC) have access to the European market on very generous rules of origin conditions. Another example is the EU–Jordan Compact,[36] under which producers in Jordan who hire a significant number of refugees from Syria are offered improved access to the EU market via relaxed rules of origin. As rules of origin have been used to promote one sustainable development purpose, a relevant question to ask is whether they could also be used to promote other aspects of sustainability.

6.4 Conclusions and recommendations

Rules of origin are not currently used to promote trade in climate-relevant goods. The example from the European car industry indicates that, in some circumstances, RoOs can even disfavour the more climate-friendly goods in comparison with the fossil-based alternatives. Therefore, countries should explore the potential to use rules of origin to facilitate preferential trade in climate-mitigating technologies and identify sectors that could serve as a starting point for such a discussion.

There is precedent from the EU for other sustainability goals affecting the application of RoOs, suggesting that rules of origin could also be designed for climate purposes.

7 Trade barriers and circularity

Goods used for generating heat or electricity from renewable energy and cleaner road transport decrease emissions if they replace other, more CO_2-emitting technologies. Nevertheless, many of these technologies demand emission-intensive materials and inputs and create substantial emissions when produced. This is the case for solar cells (Chandrasekharam and Ranjith Pathegama, 2020), wind turbines (Wang et al., 2019) and EVs (Transport and Environment, 2020). In addition, as the demand for these technologies is expected to increase extensively over the coming decades, the carbon footprint can be significant. Furthermore, there are challenges concerning waste from solar panels, wind turbines and EVs that need to be addressed.

Replacing fossil-based technologies with renewable-energy alternatives must therefore be performed in a way that minimises their environmental impacts. It is thus important to adopt circular economy thinking regarding these products to extend their lifetime, enable their repair, reuse, refurbishment or remanufacturing and, at a later stage, create an enabling environment for recycling to make use of the embedded resources. This imperative has been recognised by many countries, and more and more countries are introducing circular economy policies (OECD, 2018). However, to enable an efficient circular economy, it is necessary to make use of the gains of specialisation that international trade enables.

Nevertheless, trade policy and national product regulations are predominantly designed to handle trade in newly produced goods and circular economy policies are often not designed to facilitate trade (OECD, 2018). As a consequence, many products that have the potential to be repaired, reused, refurbished or remanufactured needlessly become waste.

7.1 Linkages between trade and circularity — the case of EV batteries

To illustrate the interconnectedness between the circular economy, trade and climate action, we present the example of EV batteries. Depending on, among other factors, the energy mix used in electricity production, the production of an EV battery with a discharge capacity of 75 kWh (ca 500 km driving range) emits between 4.5 and 8 tonnes of CO_2 equivalent,[37] the lower estimate being almost on a par with the emissions that an average Swede causes on a yearly basis.[38] As EVs require high-performance batteries, these need to be replaced after a certain amount of recharging cycles. However, to meet the increasing demand without causing more emissions, batteries could be reused, remanufactured or recycled. Generally, EV batteries have 70–80 per cent of their original capacity left at the time of substitution (Drabik and Rizos, 2018). Therefore, there is considerable potential for cells that have been used in EV batteries to be remanufactured and provided with a second life, for example as energy-storage devices in renewable electricity systems (Drabik and Rizos, 2018). Moreover, recycling can contribute to substantial reductions in emissions. A study by IVL (2017) showed that recycling EV batteries can save approximately 1 kg of CO_2 equivalent per kg of batteries recycled. Consequently, all barriers to the recycling of EV batteries, including trade barriers, can result in 250–600 kg CO_2-equivalent increased emissions per battery not recycled.[39]

7.2 Examples of barriers to trade in end-of-life EV batteries

Interviews with businesses have revealed that the legislation connected to the transport of dangerous goods and trade in waste might hamper the possibility of trade in used batteries. This impairs the ability to recycle or remanufacture where it can be performed most efficiently. One concrete example is that regulations governing the transport of lithium-ion batteries require certain tests simulating transport conditions to be undertaken, such as the ability of the battery to handle pressure, temperature or crushing.[40] Producers and subsequent distributors must be able to provide the test summary; otherwise, the battery is not allowed to be transported.

These regulations might not pose a barrier to the transportation of newly produced batteries. However, if a firm wants to import end-of-life batteries from, for example, EVs to manufacture or recycle, it might be problematic to obtain a test summary from their original manufacturer, especially since most batteries that need to be replaced have been produced over 10 years ago and their manufacturer in turn has sold them to car manufacturers, who in their turn have exported the vehicles to other firms that have re-installed the batteries. Today, this circumstance can prevent the reuse of batteries at the end of their useful lives and thus generate unnecessary emissions. However, the problem has the potential to be solved quite easily by creating alternative tools to track lithium-ion batteries. For example, easily accessible online tools could be used to provide test summaries digitally.

In addition, there is currently a range of regulatory uncertainties affecting the possibilities to trade in used EV batteries. Among other issues, these uncertainties are connected to whether the used EV batteries should be treated as hazardous, whether remanufactured batteries should be viewed as new products and whether the initial producer or the remanufacturer is responsible for remanufactured batteries.[41]

7.3 Conclusions and recommendations

The goods needed for the green transition will cause emissions during their production. Because of this, and in connection to a substantial increase in the demand for rare materials, it is vital that a large proportion of goods and materials that have already been manufactured can be reused, repaired, remanufactured or recycled. Today, barriers to trade in used products hamper the circular use of the goods and materials that are necessary for the transition to a climate-neutral economy.

Therefore, it is important to review specific barriers to trade in goods for repair, reuse, remanufacturing and recycling as well as barriers to trade in repaired, reused, remanufactured and recycled goods and materials. In particular, the focus should be on finding digital solutions to enable the tracing of batteries and enhance the availability of test summaries. Furthermore, waste regulations should be scrutinised to assess the potential for facilitating trade in these goods without causing unwanted effects such as increased risks of environmental dumping.

8 Trade in services and climate mitigation

So far, we have focused on barriers to trade in climate-related goods in this study. Here we turn to services and the implications that barriers to trade in services could have for the renewable energy and cleaner road transport sectors. Trade in services and trade in goods are closely intertwined as all manufacturing companies, including those producing renewable energy equipment or EVs, use a variety of services in both production and trade. Many of them also provide after-sales services as part of their business model.

8.1 Linkages between trade in services and climate mitigation

Two types of services are directly linked to the sectors addressed in our study, energy services and transportation services. An analysis of the service trade restrictions in Brazil, China, the EU, India, South Africa and the United States shows that there are few trade barriers to these services (USITC, 2013). In fact, restrictions on non-renewable energy services might be more common than restrictions on renewable energy services[42] along with rules that discourage emission-heavy modes of transport in favour of green transportation.

By contrast, the uptake of renewable energy and cleaner road transportation technologies is hampered by trade barriers to *indispensable services*, that is, the services required for the functioning of RE projects or cleaner road transportation. These services are often sold as a package with goods such as wind turbines. There is no agreed-upon definition of indispensable services for RE projects, but a number of studies, both quantitative[44] (OECD, 2017) and qualitative (APEC, 2017; National Board of Trade, 2015; USITC, 2005), have arrived at more or less the same list (Box 2).

Box 2

Indispensable services for renewable energy projects

- Engineering services
- Consulting services
- Design services
- Computer and related services
- Construction services
- Architecture services
- Accounting services
- Legal services
- Educational services[43]

RE projects are often highly complex and, apart from the goods, require both specialised know-how and equipment for assembly and installation. A study by the National Board of Trade (2015) found that, in almost all cases, assembly and/or installation services accompanied the sale of such goods. The maintenance of RE goods can also be a complex task, necessitating skilled personnel with special equipment. Providing such services often involves sending staff across borders.

Given this increased complexity compared with non-renewable technologies, barriers to trade in indispensable services may be even more detrimental to RE and cleaner transportation technologies (OECD, 2017).

8.2 Two critical types of barriers to indispensable services

Barriers to trade in services that are indispensable for RE and cleaner transportation technologies can come in many forms. We focus on two of the most critical barriers (APEC, 2017; OECD, 2015a, 2017; National Board of Trade, 2015): local content requirements (LCRs) and restrictions on the movement of natural persons.

LCRs are rules that require investors to source a minimum share of goods or services, or both, locally to qualify for government support such as subsidies (Hansen et al., 2019). Experiences from Brazil, China and India have shown that these restrictions can raise the cost of indispensable services through effects such as inefficiencies, distortion of competition and delaying the attainment of economies of scale. These effects in turn can increase the price of electricity generated from renewable energy and lead to less or slower deployment of solar and wind energy technologies (OECD, 2015a). The same OECD study estimated that removing LCR restrictions could decrease the welfare costs associated with a subsidy programme in Canada by 30 per cent and that LCRs in India lead to a 12 per cent rise in the cost of solar modules.

As manufacturers of RE goods often supply the related services, LCRs can block these manufacturers from providing services that are indispensable to the functioning of the goods that they sell (APEC, 2017; National Board of Trade, 2015).

Some markets also feature LCRs for EVs. These LCRs primarily target the manufacturing of EVs, goods rather than services, though government support programmes may still affect services as well. One example would be charging stations built with government support in China that could only be used by vehicles produced by Chinese carmakers and joint ventures (OECD, 2015b). As in the scenario with RE services, LCRs for EVs are detrimental in that they can increase prices and hinder the deployment of EVs (ibid.). The goal of LCRs is to promote local industrial development; whether they actually contribute to this goal is disputed (Hansen et al., 2019; OECD, 2015a).

Restrictions on the movement of natural persons for short-term work (commonly known as "Mode 4"), the kind often required by service providers, are common. Statistics from the OECD's Services Trade Restrictiveness Index (STRI) show varying degrees of restrictions on mode 4 for several indispensable services related to RE (see Box 4). Restrictions on visas or labour regulations may also be designed with the purpose of protecting domestic service suppliers (APEC, 2017).

Box 3

Examples of local content requirements for services linked to government support for RE projects

- Brazil (low-interest loans)
- China (tender eligibility and grants)
- EU member states (feed-in tariffs)[45]
- India (feed-in tariffs)
- South Africa (feed-in tariffs)
- United States at the sub-federal level (feed-in tariffs, tax rebates and energy credits earned)[46]

Box 4

OECD data on trade restrictions on indispensable services for renewable energy goods

The OECD's *Services Trade Restrictiveness Index* (STRI) provides information about the level of restrictions on trade in different service sectors and modes of trade. The figures below include data on restrictions on the movement of people and foreign entry (henceforth establishment) for six types of indispensable services for trade in RE goods. Data for Brazil, China, France, Germany, India, South Africa, Sweden and the United States are presented.

All the markets covered in this study have restrictions on the movement of people and establishment for indispensable services. However, some markets stand out from the others. China, France and India have more extensive restrictions than the other countries on the movement of people in legal services and accounting. This is also the case for architecture services in France and India. Regarding establishment, China and India have significantly stronger restrictions than the other countries on legal services and accounting as well as on architecture services in the case of India.

The data presented below suggest that there is potential to cut the costs of RE projects by reducing the restrictions on the movement of people and establishments in the indispensable services sectors. In particular, this seems to be the case for China and India.

Figure 1: Index of restrictions on movements of people, 2019, STRI
(0 = market open, 1 = market closed)

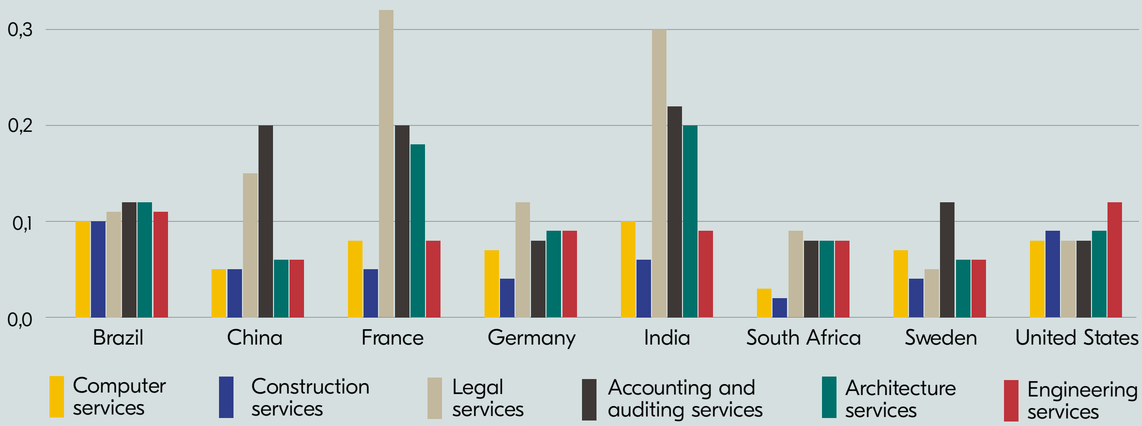
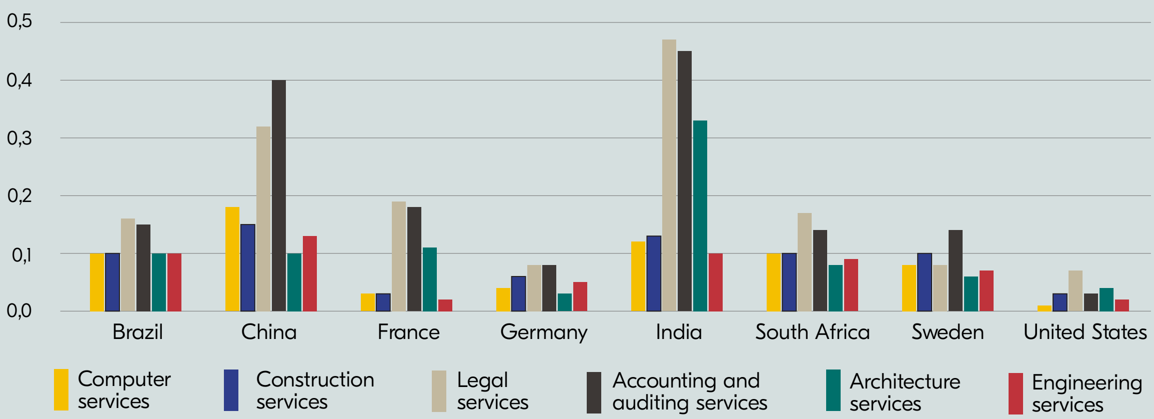


Figure 2: Index of restrictions on establishments, 2019, STRI
(0 = market open, 1 = market closed)



Source: OECD, STRI database, https://stats.oecd.org/Index.aspx?DataSetCode=STRI

At the same time, services requiring mode 4 form an important part of RE projects. The personnel who provide these services are often highly skilled but do not necessarily have an academic degree, which is often a requirement for provisions in regional trade agreements that facilitate mode 4 (National Board of Trade, 2015). The relative complexity of these projects and the scarce supply of skilled technicians make facilitating mode 4 even more important. In some developing countries, the lack of skilled technicians to install RE equipment has been cited as a barrier to the increased deployment of renewable energy (APEC, 2017).

8.3 Conclusions and recommendations

Removing barriers to related and indispensable services could help to promote the diffusion of RE and EV technologies. The data from the OECD on services trade restrictions suggest that there is potential to cut the costs of these services in several major economies.

While indispensable to RE projects, the related services are used in many other economic activities as well, some of which may be environmentally harmful. Still, many of these services are more indispensable to RE than fossil-based energy, given the complexity and reliance on advanced technology of RE projects. There are also likely to be fewer skilled technicians with the know-how required, making RE relatively more dependent on services. Liberalising trade in these services could therefore yield greater positive effects for RE technologies.

This is especially true for mode 4, for which there is much room to simplify administrative procedures, broaden personnel categories and adjust the criteria that make it difficult to send technicians with the specific know-how required but a lack of academic degrees across borders.

There are also barriers that specifically target services related to RE and EVs without necessarily affecting other economic activities, which end up hindering the deployment of these technologies: LCRs. Removing these LCRs would be a targeted way of promoting RE and EVs.

Finally, there is a need for more research to determine which type of services EV manufacturers rely on and which services are required to use and deploy EVs. Once identified, there could be untapped potential for liberalising trade in these services to support the use of EVs.

9 Conclusions

Through the Paris Agreement, the world has committed to preventing catastrophic climate change and reducing GHG emissions, and an increasing number of countries are adopting goals of climate neutrality. To enable this transition to the lowest societal cost, openness to trade in climate-related goods is needed. In this context, trade policy has been recognised as an important tool for facilitating the diffusion of goods and technologies that could contribute to this effort.

Tariffs counteract the diffusion of RE and CRT goods

One of the most concrete examples of this is the fact that a majority of the countries that we examined still makes imports of renewable energy goods and cleaner transport goods more expensive by applying MFN tariffs to them. Even though the average tariffs for RE goods are lower than those for industrial goods more generally, there are still opportunities for further tariff reductions.

Regarding CRT goods, in several of the countries studied, the average MFN tariffs are substantially higher than those for RE goods, especially for finished vehicles. In some cases applied MFN tariffs for EVs are very high, for example 125 per cent for electric motor cars in India, 45 per cent for electric motorbikes in China and 25 per cent for hybrid trucks in the United States. These high tariffs slow down the transition to a decarbonised vehicle fleet and delay the time when electric vehicles will become cheaper than vehicles with an internal combustion engine. Furthermore, the incoherence between trade and climate policies can be exemplified by the fact that tariffs consume a substantial share of the support offered to buyers of EVs. In Sweden's case, the MFN tariff counteracts almost 60 per cent of the subsidy.

The EU and other countries should therefore take initiatives to reduce MFN tariffs via plurilateral agreements or, given the urgency of climate action, carefully consider unilateral action.

New HS subheadings needed for climate-relevant goods

Several climate-relevant goods and technologies are not identified separately under their own HS codes. Our work on compiling the list of CRT goods suggests that this is the case for some essential goods in the value chains for EVs, for example, and that there is a need for more specific HS codes for goods that are important for the green transition. The EU and other countries should therefore engage in the ongoing review of the HS nomenclature to ensure that climate-relevant goods can be targeted better in trade negotiations and trade analysis.

Trade remedies are still increasing costs for RE goods

Our analysis also shows that, even though trade remedies have long been heavily criticised for targeting environmental goods, such goods are still subject to anti-dumping measures, anti-subsidy measures and safeguards in, for example, China, the EU, India and the United States. Countries could pledge, for instance in a ministerial decision in the WTO or in a plurilateral agreement, to avoid targeting climate-relevant goods with trade remedies. In addition, countries that want to ensure that such measures are consistent with climate policies should amend their national policies to allow for solid climate considerations in, for example, public interest tests.

The US–China trade conflict increased the tariffs for most RE and CRT goods

Our analysis of recent countermeasures and retaliatory measures shows that most measures do not cover RE or CRT goods. However, the tariff increases introduced as a consequence of the trade conflict between the United States and China affected imports of almost 90 per cent of the HS subheadings for RE goods in both countries as well as roughly 80 per cent of CRT goods. The EU has, however, not included more than a handful of RE goods in recent imposed or proposed countermeasures. It is unclear whether this is a result of explicit considerations of climate goals or was decided based on other considerations as the relevant legislation does not include climate considerations when deciding the goods on which to impose additional tariffs. To ensure that future countermeasures and retaliatory measures do not target climate-relevant goods, the EU and other countries should amend the legislation governing these measures to include climate considerations.

Rules of origin are currently not designed to promote trade in climate-relevant goods

There are currently, to the best of our knowledge, no RTAs with rules of origin specifically adjusted to promote climate mitigation goals. The examples from the EU vehicle industry rather suggest that, at least for the EU, climate considerations have not been taken into account as the RoOs can act as substantial trade barriers for EVs. RoOs could be given a more active role in promoting trade in climate-related goods, and the EU and other countries should explore whether and how they can be used efficiently.

Trade barriers hamper the circular economy and lead to unnecessary emissions

The projected massive expansion of RE and CRT goods suggests that there is an urgent need to enable trade in them when they reach the end of their useful lives. However, as trade policy thus far has not taken circularity into account, and as environmental and circular economy policies have not been designed to facilitate trade, barriers to trade in end-of-life products hamper the possibilities of circularity. Our case analysis focusing on used EV batteries shows that regulations connected to the transport of dangerous goods and waste products can act as barriers and increase costs or even prevent circular use. This in turn can result in unnecessary emissions and negative social consequences. The EU and other countries should take initiatives for international cooperation regarding these issues to ensure that environmental policies, including circular economy policies, and trade policies are consistent.

Barriers to trade in services affect the renewable energy sector

Our review of trade in services shows that there are restrictions affecting services that are indispensable for trade in renewable energy goods in several countries. Although these restrictions also affect other economic sectors, the effect on renewable energy goods could be more severe as these technologies might be more dependent on specific knowledge than other goods are.

Furthermore, LCRs that target services related to renewable energy and EVs are in place in several of the countries covered by our analysis, slowing down the deployment of these technologies. To more efficiently promote the use of greenhouse gas-mitigating technologies, the EU and other countries should remove LCRs. Our analysis also shows that there is a need for more research on services that are indispensable for the use and deployment of EVs.

Untapped potential to use trade policy to support climate action

The results from the analysis show that a range of trade barriers to climate-related goods and services remains, increasing the costs of, and delaying the transition to, a climate-neutral world. Our results also indicate that trade policy is underutilised in facilitating this transition, suggesting that countries have great potential to accomplish more within this policy area. Therefore, to enable the enormous economic and societal change that is needed to reach the Paris goals, all these barriers and the possibilities for reform should be assessed by governments.

Annex I: List of cleaner road transport goods

Table I: Cleaner road transport goods, that is, raw materials and components used in the production of electric vehicles, and finished electric vehicles

CN code	Product	Description of use
	1. Important inputs for batteries and fuel cells	
	Battery cell	
ex 8507 90 80	Battery cell	Battery cells for accumulators
	Cathode	
ex 8507 90 80	Cathode	Input to battery cell
ex 8111 00 11	Manganese	Input to cathode
ex 2833 29 80	Manganese sulphate	Input to cathode
ex 2836 99 17	Manganese carbonate	Input to cathode
ex 2827 39 85	Manganese chloride	Input to cathode
7504 00 00	Nickel	Input to cathode
ex 2836 99 17	Nickel carbonate	Input to cathode
2827 35 00	Nickel chloride	Input to cathode
2833 24 00	Nickel sulphate	Input to cathode
8105 20 00	Cobalt	Input to cathode
ex 2836 99 17	Cobalt carbonate	Input to cathode
2827 39 30	Cobalt chloride	Input to cathode
2822 00 00	Cobalt oxide	Input to cathode
ex 2833 29 30	Cobalt sulphate	Input to cathode
ex 2805 19 90	Lithium	Input to cathode
ex 2827 39 85	Lithium chloride	Input to cathode
2825 20 00	Lithium oxide and hydroxide	Input to cathode
Classification under discussion in the WCO (CCC), HS 28 or HS 3824	Lithium—nickel—cobalt—aluminium oxide (NCA)*	Input to cathode
Classification under discussion in the WCO (CCC), HS 28 or HS 3824	Lithium—manganese oxide (LMO)*	Input to cathode
Classification under discussion in the WCO (CCC), HS 28 or HS 3824	Lithium—nickel—manganese—cobalt oxide (NMC)*	Input to cathode
	Anode	
ex 8507 90 80	Anode	Input to battery cell
2504 10 00	Graphite, natural	Input to anode
3801 10 00	Graphite, synthetic	Input to anode
	Electrolyte	
ex 3824 99 92	Electrolyte	Input to battery cell
ex 2920 90 10	Ethylene carbonate	Input to electrolyte
ex 2920 90 10	Di-methyl carbonate	Input to electrolyte
ex 2920 90 10	Di-ethyl carbonate	Input to electrolyte
ex 2826 90 80	LiPF6	Input to electrolyte
ex 2826 90 80	LiBF4	Input to electrolyte
ex 2829 90 10	LiClO4	Input to electrolyte
	Other materials (binders, separators, etc.)	
8507 90 30	Separator	Input to battery cell
ex 3904 69 80	Polyvinylidene difluoride binder	Input to battery cell
3902 10 00	Polypropylene	Input to battery cell

CN code	Product	Description of use
	2. Accumulators (batteries)	
ex 8507 20	Electric accumulators: lead—acid (other than for starting piston engines) including separators	Battery type used for other electrified vehicles than BEVs
ex 8507 30	Electric accumulators: nickel—cadmium including separators	Battery type used for other electrified vehicles than BEVs
ex 8507 40	Electric accumulators: nickel—iron including separators	Battery type used for e.g. small electric transport vehicles
ex 8507 50	Electric accumulators: nickel—metal hydride including separators	Battery type used for e.g. some hybrid vehicles
ex 8507 60	Electric accumulators: lithium ion including separators	Battery type used for BEVs. Both modules and packages
ex 8507 80	Electric accumulators: other than lead—acid, nickel—cadmium, nickel—iron, nickel—metal hydride and lithium ion including separators	Potential new battery types for BEVs
	3. Electric motors and inputs	
	Electric motors	
ex 8501 52	Electric motors: AC motors multi-phase of an output exceeding 750 W but not exceeding 75 kW	Motor for EV
ex 8501 53	Electric motors: AC motors multi-phase of an output exceeding 75 kW	Motor for EV
	Permanent magnets and inputs	
ex 8505 11	Neodymium magnet	Input to electric motor
ex 2805 30 20 ex 2805 30 80	Neodymium	Input to electric motor
2846 90 10	Neodymium oxide	Input to electric motor
2805 30 30 ex 2805 30 80	Dysprosium	Input to electric motor
ex 2846 90 20	Dysprosium oxide	Input to electric motor
2846 90 10	Praseodymium oxide	Input to electric motor
ex 2805 30 20 ex 2805 30 80	Praseodymium	Input to electric motor
2805 30 10	Didymium	Input to electric motor
2805 30 30 2846 90 20	Terbium	Input to electric motor
ex 8505 11 00 ex 8505 19 00	Ferrite	Input to electric motor
ex 2805 19 10	Barium	Input to electric motor
ex 2805 19 10	Strontium	Input to electric motor
2805 30 20 2846 10 00	Cerium	Input to electric motor
	4. Other electric equipment	
ex 8501 53 50 ex 8501 52	Electric front axle drive (EFAD) and electric rear axle drive (ERAD)	Electrical and electronic system components
ex 8501 53 50 ex 8501 52	Regenerative braking system (included in ERAD)	Electrical and electronic system components
ex 8504 40 82 ex 8504 40 84 ex 8504 40 88	Power electronics	Electrical and electronic system components
ex 8544 42	(High-voltage) cables	Electrical and electronic system components
ex 8536 69 90	Plug-in socket	Electrical and electronic system components
Classification under discussion in the WCO (CCC), HS 8419 or 8708	High-voltage coolant heater*	Electrical and electronic system components
ex 8504 40 90	On-board charger with a built-in DC/DC converter	Electrical and electronic system components
ex 8504 40 90	On board charger without a DC/DC converter	Electrical and electronic system components

CN code	Product	Description of use
	5. Components for fuel cell vehicles	
7110 11 00	Platinum	Input to fuel cells
ex 2843 90 90	Ruthenium oxide	Input to fuel cells
Classification not determined yet in the WCO (HS 8501 62 or HS 8506)	Fuel cells*	Input to fuel cell vehicle
ex 7311 00 19	Fuel gas tank	Input to fuel cell vehicle
	6. Finished electric vehicles	
ex 8427 10	Fork-lift and other work trucks with an electric motor	Finished vehicles
8702 20	Motor vehicles for the transport of >= 10 persons, incl. driver, with both a diesel engine and an electric motor as motors for propulsion	Finished electric vehicles
8702 30	Motor vehicles for the transport of >= 10 persons, incl. driver, with both a spark-ignition internal combustion reciprocating piston engine and an electric motor as motors for propulsion	Finished electric vehicles
8702 40	Motor vehicles for the transport of >= 10 persons, incl. driver, with only an electric motor for propulsion	Finished electric vehicles
8703 60	Motor cars and other motor vehicles principally designed for the transport of <10 persons, incl. station wagons and racing cars, with both a spark-ignition internal combustion reciprocating piston engine and an electric motor as motors for propulsion, capable of being charged by plugging into an external source of electric power	Finished electric vehicles
8703 70	Motor cars and other motor vehicles principally designed for the transport of <10 persons, incl. station wagons and racing cars, with both a diesel engine and an electric motor as motors for propulsion, capable of being charged by plugging into an external source of electric power	Finished electric vehicles
8703 80	Motor cars and other motor vehicles principally designed for the transport of <10 persons, incl. station wagons and racing cars, with only an electric motor for propulsion	Finished electric vehicles
ex 8704 21	Hybrid trucks	Finished electric vehicles
ex 8704 90	Motor vehicles for the transport of goods with engines other than an internal combustion piston engine (including electric vehicles for the transport of goods)	Finished electric vehicles
8709 11	Vehicles: electrical self-propelled used for short-distance transporting of goods in factories, warehouses, dock areas or airports	Finished electric vehicles
ex 8711 60 90	Motorcycles with an electric motor for propulsion	Finished electric vehicles

This list has been compiled by the National Board of Trade with assistance from researchers and business and customs staff. We do not claim that the list is exhaustive, and it should be viewed as the first attempt to identify goods specific to EVs and fuel cell vehicles. Examples of materials that are not included in this list are graphene and silicon (used for anodes) and polyethylene and polyolefin (used as binders).

* Data on MFN tariffs for these goods were not included in the analysis of this study as the tariff classification is under discussion in the WCO (CCC).

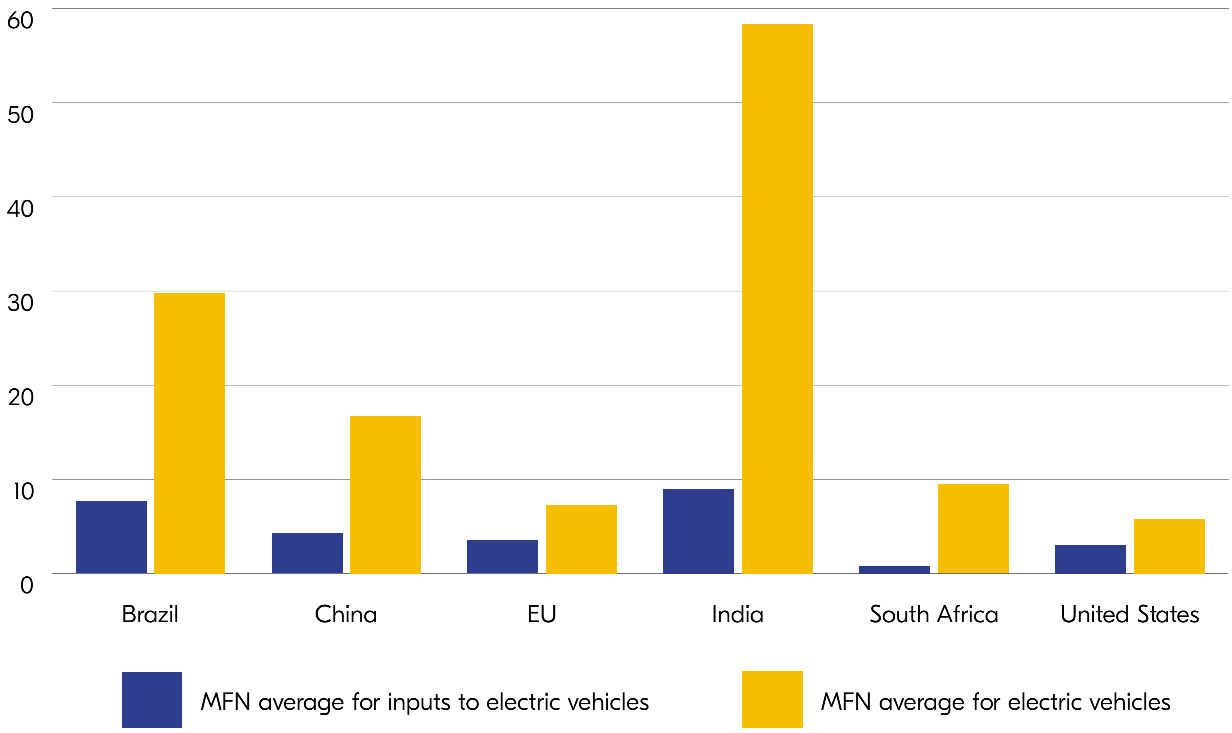
Annex II: Examples of retaliatory measures and countermeasures

Table II: Share of HS subheadings for RE goods and CRT goods covered by recent retaliatory measures and countermeasures

Country and measure	Share of renewable energy goods affected (i.e. HS subheadings on the EGA A-list from 2016)	Share of cleaner road transport goods affected (i.e. HS subheadings on the list put together by the NBT; see Annex I)
Canada Countermeasures in response to US Section 232 tariffs on Canadian steel and aluminium products (2018). Link to the measure	0.9%	0%
China Rebalancing measures in reaction to the US Section 232 steel and aluminium tariffs (2018). Link to the measure	0%	0%
China's retaliation measures in reaction to the US Section 301 measures	86%	78%
The EU Rebalancing measures in reaction to the US Section 232 steel and aluminium tariffs (2018). Link to the measure	1.7%	1.3%
Proposed retaliatory measures for goods from the US in the Boeing dispute (2019). Link to proposal	1.7%	0%
India Countermeasures/retaliation (in response to the Section 232 measures on steel and withdrawal of GSP). Link to the measure	0%	0%
Mexico Retaliatory measures on goods from the US (in response to the US Section 232 tariffs on steel and aluminium). Link to the measure	0.9%	0%
United States China Section 301 tariff actions. Link to the measure	88%	76%
Retaliatory measures for goods from the EU in the Airbus dispute (2019). Link to the measure	0.9%	0%

Annex III: Applied MFN tariffs for inputs to EVs and finished EVs

Figure I: Simple average applied MFN tariffs for raw materials and components of electric vehicles and for electric vehicles (percentage)



Source: MFN tariffs for Brazil, China, India, South Africa and the United States extracted from the EU Commission's Market Access Database. Note that the EU MFN average for inputs does not include tariff suspensions. With tariff suspensions, the average tariff for inputs is lower.

References

ACEA (2018). *Making the Transition to Zero-Emission Mobility*. https://www.acea.be/uploads/publications/Study_ECV_barriers.pdf

APEC (2017). *Sector Study on Environmental Services: Renewable Energy*. Singapore: APEC Secretariat.

Araya, M. (2016). *The Relevance of the Environmental Goods Agreement in Advancing the Paris Agreement Goals and SDGs. A Focus on Clean Energy and Costa Rica's Experience*. Geneva: International Centre for Trade and Sustainable Development (ICTSD).

Brown, C. P. and Kolb, M. (2020). *Trump's Trade War Timeline: An Up-to-Date Guide*. Updated 13 March 2020. https://www.piie.com/sites/default/files/documents/trump-trade-war-timeline.pdf

Chandrasekharam, D. and Ranjith Pathegama, G. (2020). *CO_2 emissions from renewables: solar PV, hydrothermal and EGS sources*. Geomechanics and Geophysics for Geo-Energy and Geo-Resources, volume 6, article number 13.

Clean Technica (2018). *India Advised against Levying Import Duty on Solar Cells & Modules*. https://cleantechnica.com/2018/03/20/india-advised-levying-import-duty-solar-cells-modules/

Coffin, D. and Horowitz, J. (2018). *The Supply Chain for Electric Vehicle Batteries*. Journal of International Commerce and Economics, December 2018. https://www.usitc.gov/journals.

Department for International Trade, UK (2020). *Public Consultation: MFN Tariff Policy – The UK Global Tariff. Government Response and Policy.*

Drabik, E. and Rizos, V. (2018). *Prospects for Electric Vehicle Batteries in a Circular Economy*. Brussels: CEPS, No. 2018/05.

EU Commission (2015). *The Environmental Goods Agreement (EGA): Liberalising Trade in Environmental Goods and Services.* Brussels: European Commission. http://trade.ec.europa.eu/doclib/press/index.cfm?id=1116

EU Commission (2016). *Trade Sustainability Impact Assessment on the Environmental Goods Agreement.* Brussels: DG Trade, European Commission.

EU Commission (2018a). *EU Adopts Rebalancing Measures in Reaction to US Steel and Aluminium Tariffs*. https://trade.ec.europa.eu/doclib/press/index.cfm?id=1868

EU Commission (2018b). *Commission Decides Not To Extend Trade Defence Measures on Solar Panels from China*. Brussels: European Commission. http://trade.ec.europa.eu/doclib/press/index.cfm?id=1904

EU Commission (2018c). *Trade Defence Instruments, Anti-dumping and Anti-subsidy – A Guide for Small and Medium-Sized Businesses*. https://trade.ec.europa.eu/doclib/docs/2018/may/tradoc_156892.pdf

EU Commission (2019). *WTO Boeing Dispute: EU Issues Preliminary List of U.S. Products Considered for Countermeasures*. Brussels: European Commission. https://ec.europa.eu/commission/presscorner/detail/en/IP_19_2162

European Court of Auditors (2019). *EU Support for Energy Storage*. Briefing Paper. April 2019. https://www.eca.europa.eu/Lists/ECADocuments/BRP_ENERGY/BRP_ENERGY_EN.pdf

Fridstrøm, L. and Østli, V. (2018). *The Demand for New Automobiles in Norway – A BIG Model Analysis*. TØI Report 1665/2018. Oslo: Transportøkonomisk institutt

Government of Canada (2019). *Updated – Countermeasures in Response to Unjustified Tariffs on Canadian Steel and Aluminum Products*. https://www.canada.ca/en/department-finance/programs/international-trade-finance-policy/measures-steel-aluminum-businesses/countermeasures-response-unjustified-tariffs-canadian-steel-aluminum-products.html

Hansen, U. E., Nygaard, I., Morris, M. and Robbins, G. (2019). *Local Content Requirements in Auction Schemes for Renewable Energy: Enabler of Local Industrial Development in Developing Countries?* UNEP DTU Partnership Working Paper Series 2017, Vol. 2.

Horlick, G. 2013. *Trade Remedies and Development of Renewable Energy.* E15 Initiative. Geneva: International Centre for Trade and Sustainable Development (ICTSD) and World Economic Forum.

Hufbauer, G. and Cimino, C. (2014). *Trade Remedies: Targeting the Renewable Energy Sector*. UNCTAD/DITC/TED/2014/3. Geneva: United Nations.

ICCT (2019). *Update on Electric Vehicle Costs in the United States through 2030*. Working paper 2019:06. https://theicct.org/sites/default/files/publications/EV_cost_2020_2030_20190401.pdf

ICTSD (2017). *International Trade Governance and Sustainable Transport: The Expansion of Electric Vehicles*. Issue Paper. Geneva: International Centre for Trade and Sustainable Development (ICTSD).

IEA (2018). *Global EV Outlook – Towards Cross-Modal Electrification*. Paris: IEA.

IEA (2019a). *CO_2-Emissions from Fuel Combustions – Highlights*. Paris: IEA.

IEA (2019b). *Global EV Outlook – Scaling-Up the Transition to Electric Mobility*. Paris: IEA.

IPCC (2018). *Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C above Pre-industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts To Eradicate Poverty*. In Press.

IVL (2017). *The Life Cycle Energy Consumption and Greenhouse Gas Emissions from Lithium-Ion Batteries – A Study with Focus on Current Technology and Batteries for Light-Duty Vehicles*. Report Number C 243. Stockholm: IVL.

IVL (2019). *Lithium-Ion Vehicle Battery Production – Status 2019 on Energy Use, CO_2-Emissions, Use of Metals, Products Environmental Footprint, and Recycling*. Report Number C 444. Stockholm: IVL.

JRC (2018). *Quantifying the Factors Influencing People's Car Type Choices in Europe. Results of a Stated Preference Survey.* European Commission Joint Research Centre. Luxembourg: Publications Office of the European Union.

Kampel, K. (2017). *Options for Disciplining the Use of Trade Remedies in Clean Energy Technologies*. Geneva: International Centre for Trade and Sustainable Development (ICTSD).

Kasteng, J. (2013). *Trade Remedies on Clean Energy: A New Trend in Need of Multilateral Initiatives.* E15 Initiative. Geneva: International Centre for Trade and Sustainable Development (ICTSD) and World Economic Forum.

Kotsiubska, V. (2011). *Public Interest Considerations in Domestic and International Anti-dumping Disciplines*. Bern: World Trade Institute (WTI).

National Board of Trade (2015). *Making Green Trade Happen – Environmental Goods and Indispensable Services*. Stockholm: National Board of Trade.

National Board of Trade (2020). *Rules of Origin for the 21st Century – Including Services, Digitalisation, Sustainability and a More User-Friendly Approach*. Stockholm: National Board of Trade.

OECD (2010). *Promoting Energy Efficiency through Trade*. Paris: OECD Publishing.

OECD (2015a). *Overcoming Barriers to International Investment in Clean Energy.* Paris: OECD Publishing.

OECD (2015b). *Domestic Incentive Measures for Environmental Goods with Possible Trade Implications: Electric Vehicles and Batteries.* Paris: OECD Publishing.

OECD (2017). *Trade in Services Related to the Environment.* Paris: OECD Publishing.

OECD (2018). *International Trade and the Transition to a More Resource Efficient and Circular Economy – Concept Paper.* Paris: OECD Publishing.

OECD (2019). *Report on a Set of Policy Indicators on Trade and Environment.* Paris: OECD Publishing.

OECD (2020). *Trade Policy Implications of Global Value Chains.* Trade Policy Brief. Paris: OECD Publishing.

SEIA (2019). *The Adverse Impacts of Section 201 Tariffs: Lost Jobs, Lost Deployment and Lost Investments.* Washington: Solar Energy Industries Association.

Soulopoulos, N. (2017). *When Will Electric Vehicles be Cheaper than Conventional Vehicles?* Bloomberg New Energy Finance.

Steenblik, R. P. (2020). *Code Shift: The Environmental Significance of the 2022 Amendments to the Harmonized System.* IISD.

Transport & Environment (2020). *How Clean Are Electric Cars? T&E's Analysis of Electric Car Lifecycle CO_2 Emissions.* https://www.transportenvironment.org/sites/te/files/T%26E%E2%80%99s%20EV%20life%20cycle%20analysis%20LCA.pdf

USITC (2005). *Renewable Energy Services: An Examination of US and Foreign Markets.* United States International Trade Commission, Sector Study on Environmental Services: Renewable Energy. Washington: United States International Trade Commission.

USITC (2013). *Renewable Energy and Related Services: Recent Developments.* Washington: United States International Trade Commission.

VDA (2020). *Lithium-Ion Cells and Rules of Origin in the EU's Free Trade Agreements*. VDA Position, 7 April 2020. Berlin: Verband der Automobilindustrie

Wang, S. and Liu, J. (2019). *Life-cycle green-house gas emissions of onshore and offshore wind turbines*. Journal of Cleaner Production, volume 210.

WCO (2020). *What is the Harmonized System?* http://www.wcoomd.org/en/topics/nomenclature/overview/what-is-the-harmonized-system.aspx

Notes

1. The United States has decided to withdraw from the Paris Agreement in November 2020.
2. The Swedish government has commissioned the National Board of Trade to analyse, with a number of examples, how trade barriers, trade remedies and other trade-restrictive measures in the EU and other leading economies have affected climate action.
3. We focused on barriers to components of, as well as finished, electrified and fuel cell conveyances and thus did not analyse barriers to, for example, different types of fuel sources, even though other types of vehicles, depending on fuel use, can contribute to emission reductions.
4. The so-called EGA A-list from 2016.
5. Including battery electric vehicles, plug-in hybrid vehicles and hybrid electric vehicles.
6. The CRT goods list is based on a mapping of value chains for EVs, whereas the RE goods list is the result of negotiations between several countries. The composition of the two lists thus differs, which should be kept in mind when interpreting the results.
7. The negotiations currently involve six countries: Norway, Iceland, Costa Rica, Fiji, Switzerland and New Zealand.
8. Tariff suspensions were not included in the simple average MFN tariff for the EU. With suspension, the average is lower for RE goods and CRT goods.
9. The average MFN tariff for RE goods will be 0.9 per cent and the share of duty-free RE goods will be 77 per cent.
10. The data on applied tariffs were extracted from the EU Commission's Market Access Database.
11. A government policy forum dedicated to speeding up the deployment of EVs worldwide. Established in 2009 under the Clean Energy Ministerial, its members are Canada, Chile, China, Finland, France, Germany, Japan, India, the Netherlands, New Zealand, Norway, Sweden and the United Kingdom. https://www.iea.org/programmes/electric-vehicles-initiative
12. It should be noted that the tariff structure is only one type of policy affecting the deployment of cleaner vehicles. Countries also apply a range of other measures to decrease emissions from the vehicle fleet, such as fuel taxes, subsidies for renewable fuels and emission standards.
13. A partial equilibrium analysis only considers the effects of the modelled policy change in the market that is directly affected and thus does not take other economic effects into account.
14. The partial equilibrium calculations are based on import statistics collected from Eurostat and on the price elasticities of demand for EVs of -0.99 presented by Fridström and Östli (2018). The calculations assume that there is 100 per cent utilisation of preferences in EU RTAs and that the increase in demand does not change the world market prices.
15. The stock of EVs emitted approximately 38 Mt of CO2 equivalent on a well-to-wheel basis, while an equivalent ICE fleet would have emitted approximately 78 Mt of CO2 equivalent.
16. 30 per cent according to the ICTSD (2017) or about 50 percent according to the European Court of Auditors (2019).
17. https://www.reuters.com/article/us-health-coronavirus-france-autos/autonomous-and-electric-cars-to-be-key-part-of-autos-sector-macron-idUSKBN2322D6
18. The average price for an EV imported from the United States was 33 085 euros in 2019. The tariff's effect on price is even stronger as VAT is calculated on a good's value, which includes the tariff.
19. Sweden's maximum subsidy for an EV is SEK 60 000, which is approximately 5 700 euros.
20. https://cleantechnica.com/2018/03/20/india-advised-levying-import-duty-solar-cells-modules/ and https://energy.economictimes.indiatimes.com/news/renewable/70-solar-safeguard-duty-to-dampen-investor-sentiment-par-panel/63294117
21. Commission Implementing Regulation (EU) 1238/2013 preamble section 403; Commission Implementing Regulation (EU) 2017/366 preamble section 671–730.
22. The information on New Zealand is from https://www.bellgully.com/publications/changes-to-new-zealand's-anti-dumping-laws

23. Article 21 in Council Regulation 1036/2016 (anti-dumping measures) and Article 31 in Council Regulation 1037/2016 (anti-subsidy measures).

24. Commission Implementing Regulation (EU) 2017/366.

25. The United States' legislation can be found in the Tariff Act of 1930 Sections 701 (anti-subsidy measures) and 731 (anti-dumping measures). The interested parties in investigations are enumerated in section 771(9) (https://enforcement.trade.gov/regs/title7.pdf).

26. A WTO member can, according to the Agreement on Safeguards (Article 8) and under certain conditions, impose measures in the form of the suspension of concessions (in practice, additional tariffs) for goods from another WTO member applying a safeguard measure. The purpose of such measures is to rebalance trade flows.

27. As some of the climate-relevant goods are ex-outs from the HS subheadings, this approach can somewhat overestimate the impact of countermeasures and retaliatory measures, yet it gives an indication of whether such measures could counteract strategies to reduce GHG emissions.

28. Data on the shares of RE and CRT goods that have been targeted by a number of recent countermeasures and retaliatory measures are presented in Table II in Annex II.

29. https://ustr.gov/about-us/policy-offices/press-office/fact-sheets/2018/june/section-301-product-list-fact-sheet

30. https://www.windpowermonthly.com/article/1671264/china-trade-deal-no-help-rising-us-wind-costs

31. The Chinese legislation was not easily accessible.

32. The legal basis for the EU to suspend concessions is provided by Regulation No. 654/2014, the *Enforcement Regulation*. It establishes a number of criteria that should be used in decisions on, inter alia, countermeasures or retaliation measures, one of them being to minimise the negative economic impact on the Union.

33. The US measures introducing tariffs on goods from China are based on Section 301 in the Trade Act of 1974. According to Section 301, the President "may request the International Trade Commission for its views as to the probable impact on the economy of the United States of the taking of action with respect of such product or service".

34. Cumulation allows one party in an RTA to use the other party's originating materials or inputs as if those inputs were its own. The concept can be extended to include several other parties too. Full cumulation allows the cumulation of production processes, not only originating materials.

35. A tolerance rule offers the producer the opportunity to use a minimal amount of non-originating materials without risking the origin status of the final good. Normally the limit is set at 10 per cent.

36. https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/jordan-compact.pdf

37. Authors' calculations based on the estimations from IVL (2019) that EV batteries emit between 61 and 106 kg CO2-equivalent per kWh capacity, depending among other issues on the electricity mix and heating techniques.

38. https://www.naturvardsverket.se/Sa-mar-miljon/Statistik-A-O/Vaxthusgaser-territoriella-utslapp-och-upptag/

39. Authors' calculations based on examples of batteries weighing 250–600 kg, and in which a new battery is produced instead of an old one being recycled.

40. The regulations are based on the UN Model Regulation and further defined in the International Maritime Dangerous Goods Code for sea transport, the International Civil Aviation Organization's Technical Instructions (ICAO-TI) for air transport and for 51 countries in the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) for road transport and in the International Carriage of Dangerous Goods by Rail (RID) for rail transport. The test must be in accordance with the criteria defined in the UN Manual of Tests and Criteria.

41. The uncertainties are mainly connected to the definitions and legal interpretations of the Basel Convention and, within the EU, the Battery Directive (2006/66/EC) and the Waste Framework Directive (2008/98/EC).

42. Restrictions on foreign ownership in the form of prior authorisation requirements, limits on foreign ownership or other restrictions are in place in France, Germany, India and the United States for some non-renewable energy sources such as coal. Restrictions on investment in nuclear energy are common (https://thelawreviews.co.uk/edition/the-foreign-investment-regulation-review-edition-7, 28 May 2020).

43. This study did not use the CPC or W/120 method of classifying services. The indispensable services mentioned later in this paper fit into one or more of those categories.

44. Econometric results show that restrictions to trade in these services are significantly and negatively correlated with the supply of core environmental services.

45. A feed-in tariff is a policy that guarantees a minimum price (or a premium on the market price), over a certain period, for the sale of electricity.

46. Methodology for Accreditation and Determination of Local Equipment Content, BNDES. RES LEGAL database (www.res-legal.eu); OECD (2015a), *Overcoming Barriers to International Investment in Clean Energy,* p. 38; United States – Certain Measures Relating to the Renewable Energy Sector (2019), WT/DS510/R.

Sammanfattning på svenska
Summary in Swedish

Den enorma utmaning som det innebär att nå nettonollutsläpp på global nivå omkring 2050, vilket är nödvändigt för att uppfylla målen i Parisavtalet, kräver en mobilisering av alla politikområden, inklusive handelspolitiken. Internationell handel kan bidra till att klimatmålen uppnås om rätt förutsättningar finns på plats, bland annat genom att möjliggöra spridning av mer klimatvänliga teknologier. Givet brådskan att minska utsläppen, och att världens ekonomier drabbats hårt av den pågående Covid-19-pandemin, är behovet av en handelspolitik som underlättar klimatomställningen än mer viktig.

Syftet med denna studie är att bidra till diskussionen om hur handelspolitiken kan användas för att minska utsläppen av växthusgaser genom att främja spridningen av mer klimatvänliga teknologier och handel med varor och tjänster som är viktiga för omställningen. För att genomföra analysen, har vi identifierat exempel på handelshinder för varor och tjänster kopplade till förnybar energi och renare vägtransporter i några stora ekonomier. Dessa varor och tjänster valdes ut eftersom minskade handelshinder för sådana varor kan bidra till utsläppsminskningar i de två sektorer som bidrar till de största utsläppen globalt, *elektricitet och värmeproduktion* samt *transporter*. För att identifiera hinder för varor inom förnybar energi (RE-varor) utgick vi från de varor och HS-koder som återfinns på den så kallade A-listan från de avbrutna förhandlingarna om ett miljövaruavtal (EGA). Eftersom varor som är viktiga för *renare vägtransporter* (CRT-varor) inte var en del av dessa förhandlingar när de pågick, har vi sammanställt en egen lista över varor som är viktiga för elektrifiering av fordonsflottan för att kunna genomföra analysen. Vi uppmuntrar andra organisationer att bygga vidare på detta arbete.

Trots att alla områden inom handelspolitiken kan vara relevanta för att möjliggöra spridningen av klimatvänliga teknologier så är denna studie inriktad på hinder inom sex olika handelspolitiska områden: tullar, handelspolitiska skyddsåtgärder, motåtgärder och strafftullar, hinder för en cirkulär ekonomi, ursprungsregler samt hinder i handeln med tjänster.

Analysen visar att det fortfarande finns en mängd handelshinder för varor och tjänster som är viktiga för klimatomställningen. Detta ökar kostnaderna för, och fördröjer övergången till, en klimatneutral värld. Våra resultat indikerar också att handelspolitikens roll för att främja övergången till en klimatneutral ekonomi är underutnyttjad, vilket samtidigt visar att länder kan göra mer för klimatarbetet inom detta politikområde.

Ett konkret exempel på detta är att de flesta länder vi har analyserat tillämpar MGN-tullar för majoriteten av RE-varorna och CRT-varorna. Även om de genomsnittliga tullarna för RE-varor är lägre än för industrivaror generellt, så finns möjligheter för ytterligare sänkningar. Detta gäller särskilt Brasilien och Indien som både har höga genomsnittliga MGN-tullar och låg andel tullfria RE-varor. När det gäller CRT-varorna är genomsnittstullarna högre än för andra industrivaror i flertalet av de länder som analyserats, vilket indikerar att mindre fokus lagts på att liberalisera handeln med dessa varor. Alla länder som har analyserats har dessutom betydligt högre tullar för färdiga elfordon än för råmaterial och komponenter. Analysen visar också att ungefär två tredjedelar av de 123 länder som omfattas av EU:s Market Access Database, inkluderat EU, Indien, Kina och USA, har samma tullnivåer på fordon med förbränningsmotorer som för elbilar. 23 procent av länderna har dock valt att använda handelspolitiken för att främja elbilar genom att tillämpa lägre tullar för elbilar än för bilar med förbränningsmotorer. Dessa länder står dock endast för 0,2 procent av den globala importen av elbilar.

Att tillämpa tullar på elbilar minskar importen väsentligt, och skjuter fram tidpunkten för när elbilar kommer att vara billigare än bilar med förbränningsmotorer, vilket i sin tur medför att omvandlingen av fordonsflottan i många länder kommer att skjutas fram. Resultaten i vår analys visar också ett exempel på att det idag finns en brist på koherens mellan handelspolitiken och klimatpolitiken då de tullar som tillämpas på elbilar äter upp stora delar av länders stöd vid köp av elbilar, närmare 60 procent i Sveriges fall.

Givet brådskan i att agera mot klimatförändringarna borde EU och andra länder överväga unilaterala tullsänkningar på varor som är viktiga för klimatarbetet, eller ta initiativ för att minska eller helt ta bort MGN-tullar via plurilaterala avtal.

Vår analys visar också att trots att handelspolitiska skyddsåtgärder under lång tid blivit kritiserade för att användas mot miljövaror, så är varor kopplade till framställningen av förnybar energi fortfarande föremål för antidumpingåtgärder, antisubventionsåtgärder och skyddsåtgärder i EU, Indien, Kina och USA. Länder som vill försäkra sig om att sådana åtgärder är förenliga med klimatmålen bör göra tillägg i sina nationella lagstiftningar för att tillåta gedigna klimathänsyn, till exempel i så kallade *public interest test*.

Vår genomgång av nyligen tillämpade motåtgärder och strafftullar visar att de flesta sådana åtgärder inte täcker RE-varor eller CRT-varor. Det finns dock exempel på åtgärder där dessa varor omfattas i stor utsträckning. Detta gäller de tullhöjningarna som skett inom ramen för handelskonflikten mellan USA och Kina som täcker nästan 90 procent av varorna för förnybar energi, och ungefär 80 procent av varorna för renare vägtransporter. EU har dock inte inkluderat mer än ett fåtal RE-varor i sina införda eller föreslagna motåtgärder. Det är dock oklart om detta är ett resultat av explicita överväganden av klimatambitioner, eller om andra överväganden lett till detta. För att säkerställa att framtida motåtgärder och strafftullar inte omfattar varor som är viktiga för klimatarbetet bör EU och andra länder ändra de nationella lagstiftningar som styr införande av sådana åtgärder genom att inkludera krav på klimathänsyn.

Vår analys visar vidare att det, utifrån vår kännedom, för närvarande inte finns några frihandelsavtal som har ursprungsregler som specifikt anpassats för att främja klimatmål. Exempel från EU:s bilindustri visar att sådana hänsyn inte tagits i EU:s frihandelsavtal eftersom ursprungsreglerna idag kan fungera som ett betydande handelshinder för elbilar. Det finns därmed en potential att använda ursprungsregler för att främja handel med varor som är viktiga för klimatarbetet. Om och hur ursprungsreglerna kan användas på ett effektivt sätt kräver dock vidare utredning.

Den förutspådda kraftigt ökade efterfrågan på förnybar energivaror och varor för renare vägtransporter innebär att det är viktigt att möjliggöra handel med dessa varor när de blir uttjänta och måste renoveras, återvinnas eller bortskaffas. Eftersom handelspolitiken än så länge inte har anpassats efter cirkuläritet, och eftersom miljölagstiftning och lagstiftning för cirkulär ekonomi inte utformats för att främja handel, motverkar handelshinder cirkuläritet. Vårt exempel med batterier för elfordon visar att regleringar för transporter av farligt gods och avfall kan verka som handelshinder och öka kostnader eller förhindra återanvändning, renovering och återvinning. Sådan lagstiftning kan därför medföra utsläpp som skulle kunna undvikas. Länder bör därför stärka det internationella samarbetet om dessa frågor för att säkerställa att miljölagstiftning, lagstiftning för cirkulär ekonomi och handelspolitiken är konsekvent.

Slutligen visar vår analys att flera av de länder som omfattas av studien har restriktioner för tjänster som är oumbärliga för handel med RE-varor. Även om dessa hinder också påverkar andra ekonomiska sektorer, kan den negativa effekten på förnybar energivaror bli större eftersom dessa teknologier i större utsträckning är beroende av specifik kunskap. I flera av de länder vi analyserat finns dessutom krav på användning av inhemska tjänster (lokalt innehåll) för att få tillgång till statliga subventioner till förnybar energi. Sådana krav fördröjer spridningen av dessa teknologier. För att främja en mer effektiv användning av dessa teknologier bör krav på lokalt innehåll tas bort. Till sist visar vår analys också att det finns ett behov av vidare analys av vilka tjänster som är oumbärliga för användningen och spridningen av elektriska fordon.

För att möjliggöra den ekonomiska omvandling som krävs för att Parismålen ska uppnås bör länder granska alla handelshinder som tagits upp i denna rapport och utvärdera möjligheterna att reformera dessa.

2020 09

Box 6803, S-113 86 Stockholm, Sweden
Phone +46 8 690 48 00 • E-mail registrator@kommerskollegium.se
www.kommerskollegium.se