

IMPORTED EMISSIONS: FROM CO-DEPENDENCE TO CO-OPERATIVE ACTION

A collective effort of G20 countries to reduce emissions “embodied” in trade can accelerate the decarbonisation of the global economy





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Acknowledgements

The authors wish to thank Fabienne Montaigne and Nuno Dos Santos Baptista from Eurostat for their kind help, and Andrew Child from ECF for proofreading the report.

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Executive summary

The greenhouse gas emissions from the production of goods and commodities traded internationally have been growing for some time and accounted for approximately a quarter of global emissions, nearing 12.8 billion tonnes of CO₂e in 2021^{1,2}. As countries and regions advance their decarbonisation efforts at different paces, changing their relative competitive positions, it is increasingly likely that one country's reductions could lead to an increase in its trade partners' emissions via carbon leakage³. Behind the immediate economic gain for partners is also an added challenge on their way to reaching their climate mitigation objectives. This risk notwithstanding, embodied emissions are an established fact at the intersection of our globalised economies and global climate goal.

With 81% of all imported emissions in the world⁴, G20 countries' imports represent the lion's share of embodied emissions, through trade amongst themselves and with the rest of the world. Imports tend to be an important part of all G20 countries' carbon footprints, even for the net exporters of GHG emissions.

¹ Due to limitations of Eurostat's FIGARO database, this figure excludes trade between countries in the "Rest of the World".

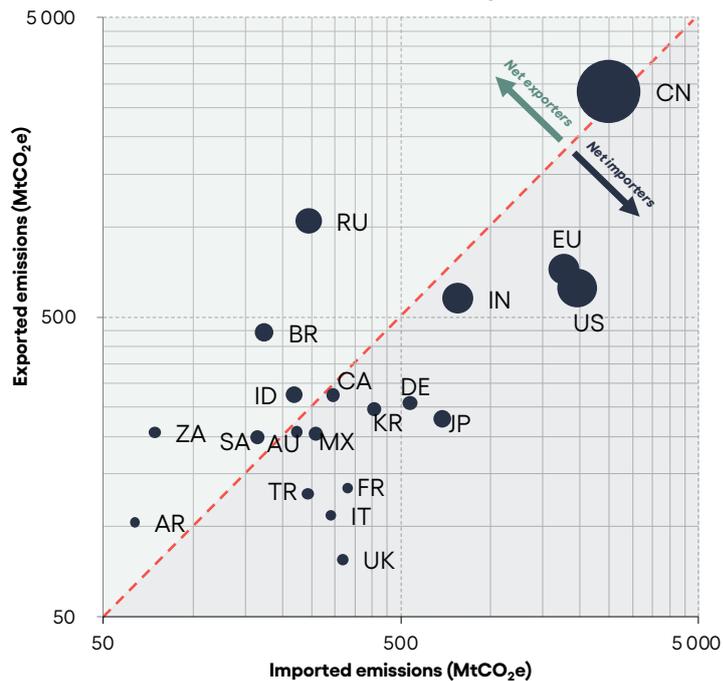
² All traded GHG emissions presented in this paper exclude emissions related to land-use change. As agriculture products are an important part of embodied emissions, they under-estimate the magnitude of this phenomenon.

³ Carbon leakage refers to the phenomenon where efforts to reduce greenhouse gas emissions in one country (in terms of territorial emissions) lead to an increase in emissions in another country. This undermines the effectiveness of climate policies since the overall reduction in global emissions is diminished. In some cases, carbon leakage can even lead to a global increase in emissions if the new production location is more carbon-intensive.

⁴ Excluding trade between non-G20 countries.

Imported and exported emissions of G20 countries

million tonnes of CO₂ equivalent, logarithmic



Countries are placed on a logarithmic scale showing imported (X-axis) and exported (Y-axis) emissions. All points above the red dotted line are net exporters of emissions, all points below are net importers. The size of each bubble represents the volume of domestic emissions.

Trade partners could recognise their co-dependence (my imported consumption = your emissions) to develop, where possible, a cooperative agenda for sector-specific decarbonisation. The data on imported emissions show the pre-eminence of heavy materials and chemicals, agriculture, forestry and fishing, mining and quarrying in trade's carbon footprint (including the indirect emissions from electricity and heat going in their production, and from international transport).

While so-called unilateral trade measures, e.g. new market access rules to avoid carbon leakage, may be necessary to maintain mitigation efforts, cooperation on mitigation can further accelerate on both sides of trade flows. There are international efforts underway on heavy industry (e.g. the Climate Club, Leadership Group for Industry Transition, the Industrial Decarbonisation Initiative), but there will be value in the G20 boosting the policy profile of this issue. This could start with the acknowledgment of countries' carbon mitigation co-dependence, more precise data on embodied carbon, and a possible consolidation of international initiatives around a cooperative mitigation goal. Countries may also wish to set voluntary and transparent objectives for the reduction of their imported emissions.

Countries may also wish to tackle this question bilaterally, based on the most significant sectoral contributions to their traded emissions. This report provides robust data as a first step in this direction.



Imported emissions: context and definitions

Since the signing of the United Nations Framework Convention on Climate Change (UNFCCC), greenhouse gas emissions have been attributed to each country on the basis of what is emitted on its territory. Logically, the Paris Agreement is based on voluntary commitments by countries to reduce emissions measured by their greenhouse gas (GHG) inventories. UNFCCC Parties have been careful to consistently exclude international trade from their business: article 3.5 of the UNFCCC states that ‘measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.’ During COP21, several Parties, including the European Union, had a negotiating mandate not to take any measures that might hinder the development of world trade. For a long time, climate analysts felt trade issues ought to be left under the scrutiny of the World Trade Organisation (WTO), which was seen as a stronger regime, and there is an ample literature debating whether measures to mitigate carbon leakage would be WTO-compatible. However, voices emerged early to argue that the international trade disciplines needed aligning with global climate goals and, later with other Sustainable Development Goals.

At present, countries' current mitigation efforts fall considerably short of the goals of the Paris Agreement to maintain the global temperature increase 'well below 2°C', let alone 1.5°C. According to the latest UNEP report *'Emissions Gap Report 2024: No more hot air ... please!'* the actual contribution from the States will take us towards a world of between +2.6°C and +3.1°C by the end of the century. This is even higher than was forecast in the UNEP's 2023 report *'Broken Record - Temperatures hit new highs, yet world fails to cut emissions (again)'*, which predicted a rise of between 2.5°C and 2.9°C. It is important to ask if measures to reduce territorial emissions could be supplemented by collaborative efforts to reduce emissions embodied in imports (hereafter "embodied emissions").

Embodied emissions in trade account for 22%⁵ to 25%⁶ of global CO₂ emissions, and roughly 24% of global GHG emissions^{7,8}. **Approximately a quarter of global emissions are then generated by countries for other countries' final consumption.**

All GHG emissions taking place in one country to contribute to the production of goods or services that will eventually be consumed in foreign countries are called "**exported emissions**". Inversely, when country A consumes goods and services, the volume of emissions that occurred outside of Country A to produce these goods and services are called "**imported emissions**".

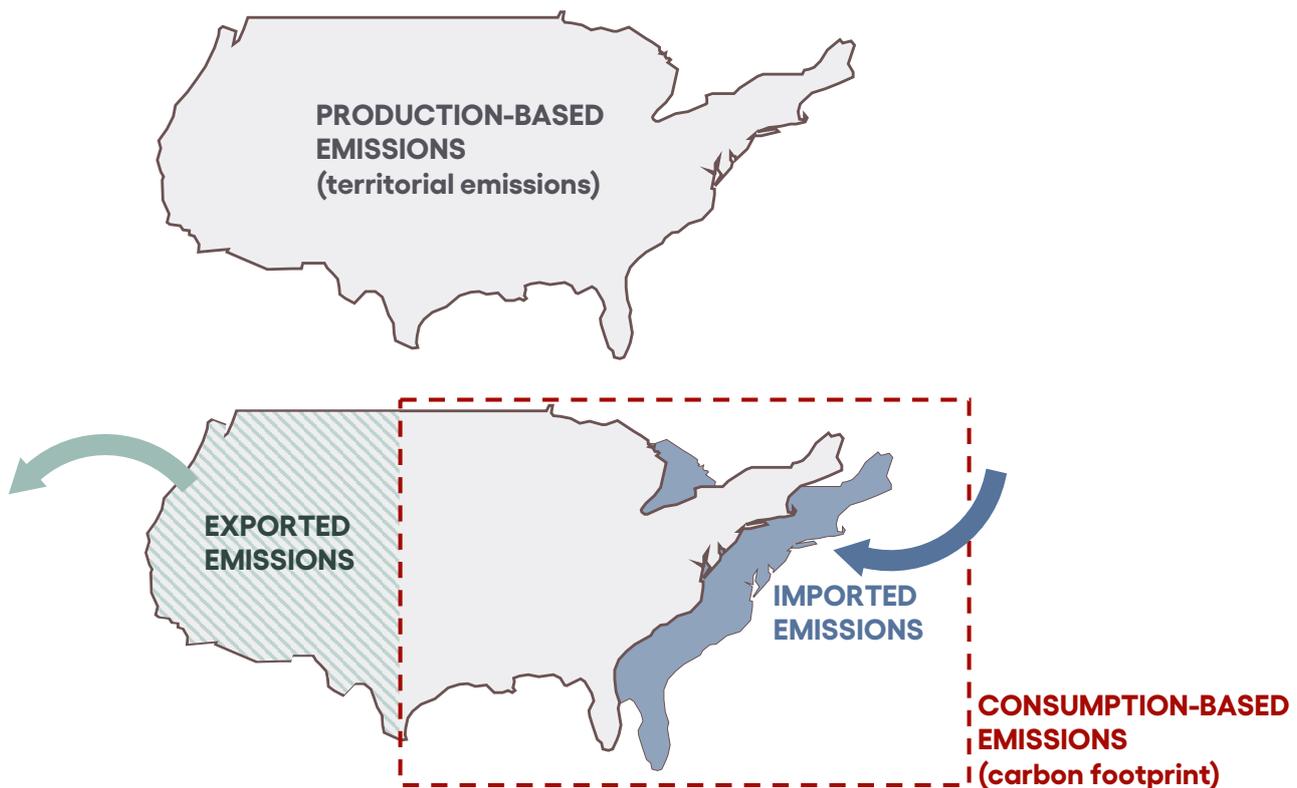
By combining a country's territorial and imported emissions and subtracting exported emissions, we can determine a country's "**consumption-based emissions**" (CBE) or "**carbon footprint**". A country's **carbon footprint** represents the amount of GHG emissions that have been generated to fulfil the national final demand of goods and services. The **consumption-based** accounting approach is complementary to the **territorial** accounting approach, which measures the volume of greenhouse gases emitted inside a country's geographical boundaries. For a given country, the difference between its **territorial emissions** and its **carbon footprint** is the amount of **traded emissions**, i.e. the difference between **imported emissions** (i.e. the volume of greenhouse gases that have been generated abroad for the needs of the country's final consumption) and **exported emissions** (i.e. the volume of greenhouse gases that have been generated in the country for the needs of a foreign country's final consumption).

⁵ Source: EXIOBASE / Global Efficiency Intelligence, *Carbon Loophole*.

⁶ Source: Banque de France Bulletin no. 228: Article 1, *CO₂ emissions embodied in international trade* (2020). This paper is based on the OECD Inter-Country Input-Output Database.

⁷ The FIGARO database, which was the primary source of data for the analyses of this report, cannot be used to calculate an accurate figure for GHG emissions embodied in trade, since the database does not include fluxes between countries in the "Rest of the World" (RoW) category. However, it is possible to calculate that all traded emissions excluding fluxes between RoW countries amount to 24% of global GHG emissions (12.8 gigatonnes of CO₂e).

⁸ This figure, as well as all figures in the report, exclude land-use change emissions, since the FIGARO database does not include emissions related to the LULUCF sector.



Consumption-based emissions are defined as territorial emissions minus all emissions generated for other countries' consumption (exported emissions), plus all emissions generated abroad for the country's consumption (imported emissions).

The discussion about imported and exported emissions sheds light on the interdependencies between countries and offers a complement to the territorial emissions (or "inventory") accounting. While the inventory accounting focuses on **where** GHG emissions occur, the consumption-based accounting focuses on **who** (and, more precisely, **whose final consumption**) these emissions have been generated for. This approach allows us to detect whether a country, which could appear to be decarbonised in the sense of its territorial emissions, is relying heavily on foreign, GHG-intensive supply chains to fulfil its domestic consumption. Inversely, countries showing a high GHG emissions inventory may be producing most of their goods and services on behalf of other countries.

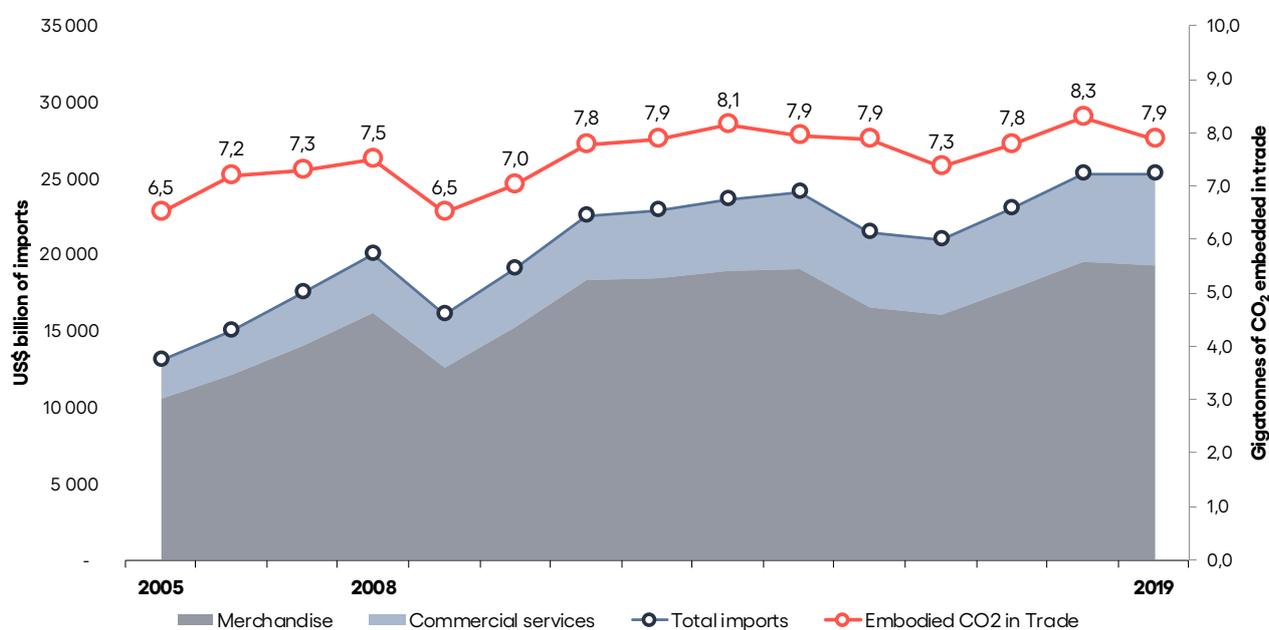
a. A rising trend in volume of traded emissions in the last 15 years

Note: given the nature of the “Rest of the World” data, the FIGARO database cannot be used to analyse global traded emissions. For this section, we therefore use the EXIOBASE and the OECD datasets, which only focus on CO₂. The core analysis of traded emissions of G20 countries, in the next pages of the report, will be based on the FIGARO database and will encompass all GHGs (except CO₂ emissions related to land use).

The volume of traded CO₂ emissions has been increasing by 1.4% per year on average over the last 15 years, albeit more slowly than the value of global imports (+3.4%/year). The share of CO₂ emissions embodied in trade in the total of global emissions has been hovering around 23% in the last 25 years. In 2019, the volume of traded CO₂ amounted to 7.9 billion tonnes of CO₂ (GtCO₂) vs. 6.5 GtCO₂ in 1995, representing 22% of global CO₂ emissions. The share of services in the total imported emissions (goods + services) has been relatively steady, navigating between 19% and 24% over the years.

World Imports vs Embodied CO₂ in Trade

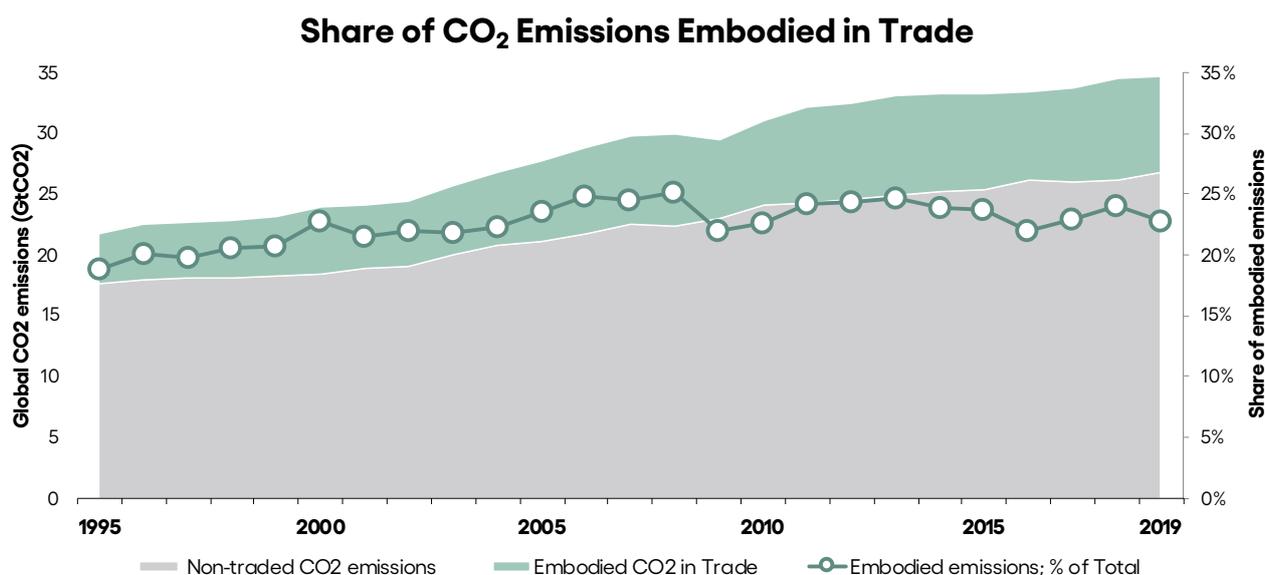
Sources: OECD, EXIOBASE



The volume of traded emissions has been increasing by 1.4% per year on average over the last 15 years, reaching 7.9 GtCO₂ in 2019.

Source: OECD

Although the phenomenon is difficult to estimate at this early stage, the fact that some regions are decarbonising heavy industry and other traded goods more rapidly than others could lead to carbon leakage, and an increase in embodied emissions. To illustrate this: an increase in the EU carbon price on European steel production, if left unchecked, would improve the competitive position of EU trade partners, increasing their exports, steel output, and related emissions.



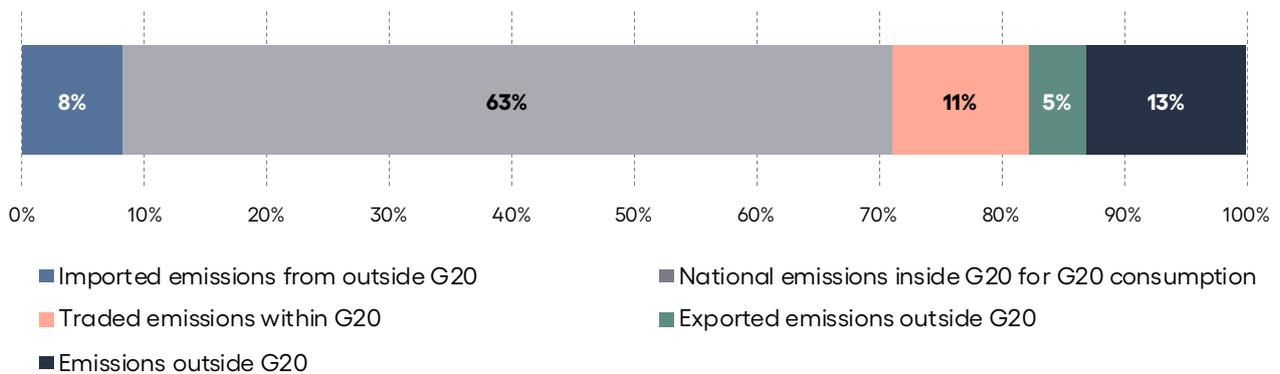
The share of CO₂ emissions embodied in trade in the total of global emissions has been hovering around 23% in the last 25 years. Source: Energy Efficiency Intelligence, *Embodied Carbon in Trade: Carbon Loophole* (2022)

b. G20 countries are over-represented in traded emissions

The pre-eminence of G20 countries in the global economy is naturally reflected in their GHG emissions, including embodied emissions. **The total of traded emissions of the G20**, which includes traded emissions between G20 countries, exported emissions to non-G20 countries, and imported emissions from non-G20 countries, amounts to 12.8 Gt CO₂e, i.e. **24% of global GHG emissions**⁹. The rest of the emissions are made of national emissions inside G20 countries (i.e. emissions for goods and services that are produced and consumed in the same country), as well as GHGs emitted by, or “traded” among non-G20 countries.

⁹ This figure excludes land-use change emissions. FIGARO is not based on UNFCCC inventory data, as it is too aggregated (or unavailable) for most countries. Instead, Eurostat uses emissions (excluding LULUCF) from the JRC’s database as a starting point to their estimation. The EDGAR website states that “According to the latest data, global GHG emissions in 2023 reached 53.0 Gt CO₂e (without Land Use, Land Use Change and Forestry)”. This figure is nevertheless very close to the usual total of global GHG emissions that do include land-use change emissions.

Breakdown of global emissions (%)



The remainder of this paper focuses on the traded emissions of G20, not only as an importer (8% of global emissions) and an exporter (5%) from and to non-G20 countries, but also as a group of countries in interaction with each other, whose mutual imports and exports make up for the biggest share of global embodied emissions in trade, representing 11% of all global emissions.

c. Emissions embodied in trade: not on the policy radar?

The logic of UNFCCC national GHG commitments based on territorial emissions makes intuitive sense. A government can regulate activities – and their emissions – on its territory, not those of another sovereign state. But international trade forces us to take a closer look, especially when one country’s emission reductions could lead to an increase in emissions as domestic output is substituted by imports. Even before we consider this phenomenon known as carbon leakage, international trade means that countries emissions are in part the result of other countries’ economic activities. An increase in demand for aluminium in Europe’s car industry, if met by the Emirates aluminium producers, would imply higher emissions in the producing country.

Only a few countries have started investigating their consumption-based emissions, as a guide for possible measures to reduce their “global” carbon footprint and while climate policymakers are probably aware of the issue, it has not been the target of dedicated

policies (France, Sweden, Denmark, United Kingdom, ...) ¹⁰ - notable exceptions being policies to limit carbon leakage like the European Union Carbon Border Adjustment Mechanism (CBAM), or to avoid “imported deforestation”, such as the Tropical Rainforest Economic & Environmental Sustainability (TREES) Act passed by the State of New York in the United States and the EU Regulation on deforestation-free products in the EU (EUDR). None of this legislation has been accompanied by a quantified reduction target for imported emissions.

The importance of trade in the world’s economy and, as this paper shows, of emissions embodied in trade, should draw countries’ attention, at least to avoid seeing their climate policies result in displaced emissions. A systematic statistical framework to measure consumption-based emissions, as provided here in aggregate terms, would be a good start.

For a long time, trade and climate talks were kept separate. This may have been understandable, in order to avoid further complicating the already difficult international climate negotiations. Today, however, it is clear that the greatest trade tensions are over climate policies. The above-mentioned CBAM and EUDR have led to heated discussions between the EU and a number of its partners. The same applies to the Inflation Reduction Act (IRA), which has given rise to a great deal of opposition, including between the USA and its European and Asian allies, led by Japan and South Korea. More recently, the increase in tariffs on electric vehicles from China imposed by the United States (from 25% to 100%), the EU (an increase of up to 35%), Turkey (40%) and India (between 70 and 100% depending on the model) also illustrate that the ecological transition is at the heart of commercial and geopolitical tensions. It is therefore important to begin a serious and calm discussion on embodied emissions, at least for the G20 countries.

The aim of this paper is to open the discussion by taking a close look at the data on GHG emissions embodied in G20 countries’ trade (I) and indicating ways to build on this co-dependence to accelerate mitigation (II).

¹⁰ France has several legal frameworks addressing CBEs, including national low-carbon strategies and a Climate and Resilience Law. Reduction targets on CBEs will be included in future revisions of the national strategy (<https://www.statistiques.developpement-durable.gouv.fr/lempreinte-carbone-de-la-france-de-1995-2021>). Sweden has not planned to include targets on CBEs in future revisions of legislation. However, indirect targets/measures have an impact on relevant sectors regarding CBEs and there are some targets at the municipality level (<https://doi.org/10.3389/frsus.2023.1196373>). Although there is currently no national target for CBEs in Denmark, studies are underway to evaluate the impact of such targets and how calculation methods could be improved (<https://www.kefm.dk/Media/637995217763659018/Klimaprogram%202022.pdf>). The UK monitors its CBEs but does not have targets on this topic (<https://www.theccc.org.uk/publication/progress-in-reducing-emissions-2024-report-to-parliament/>).



I) What can we learn from the data?

a. How to read the FIGARO data

i. Technical explanation of the source of the data

The results of this section are based on the FIGARO database produced by Eurostat. FIGARO stands for “Full International and Global Accounts for Research in input-Output analysis”. It is a statistical tool that compiles EU inter-country supply, use and input-output tables and enables the analysis of environmental effects of trade between countries.

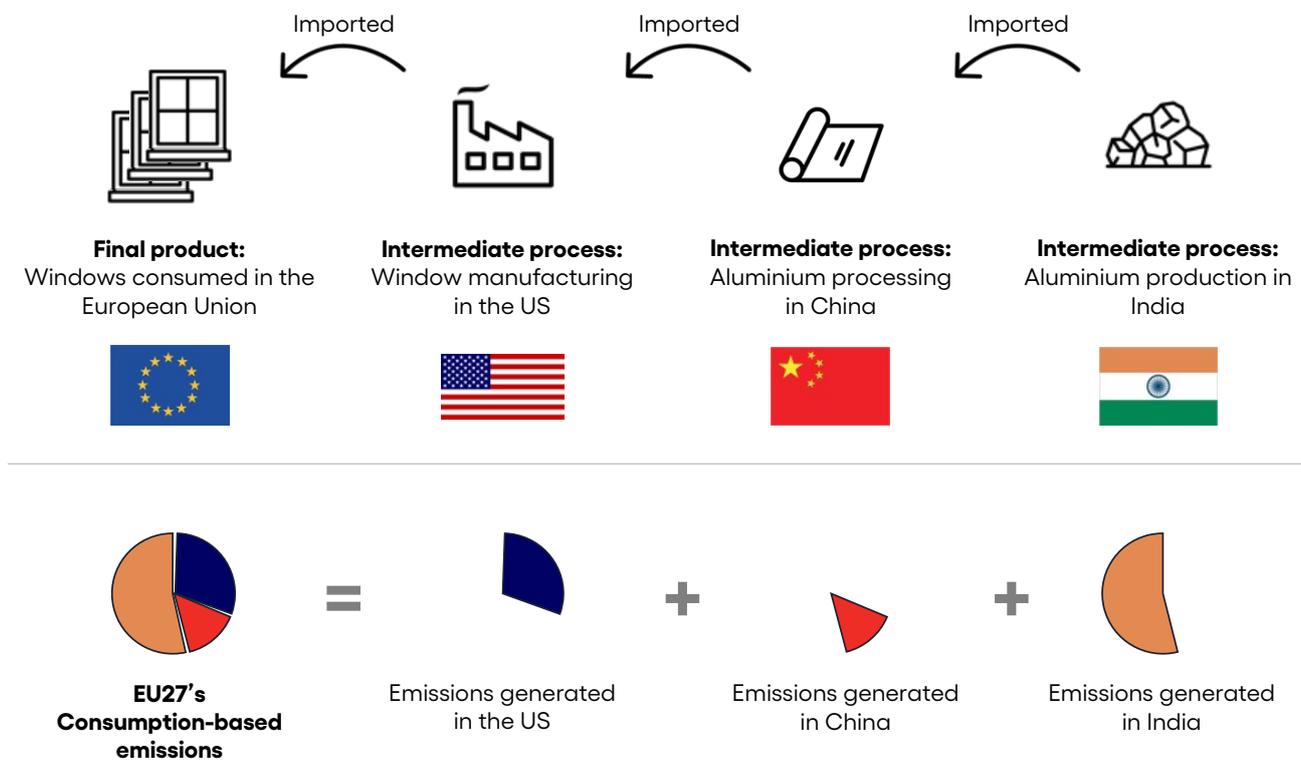
In practice, our work used the GHG emissions footprint estimates based on the FIGARO inter-country input-output tables (ICIOTs), which give all domestic and international flows on 64 activities and products, based on the NACE Rev. 2 nomenclature. Eurostat produced this data by using FIGARO’s economic input-output tables as the main input, and by combining it with Eurostat’s “Air Emissions Accounts”, an environmental extension that gives the national GHG emissions for each country.

FIGARO’s data covers 45 countries, including the 27 EU Member States, and a “Rest of the World” aggregate. This report is based on the latest available data as of November 2024, which covers the six main greenhouse gas emissions (CO₂, CH₄, N₂O, HFC, PFCs, NF₃ and SF₆) from 2010 to 2021.

ii. How to interpret emissions imports and exports

For each country covered and each NACE sector, the FIGARO database indicates how much domestic emissions have been generated for another country's final consumption. It therefore maps the full "exported emissions" of a given country, for each of its sectors, and indicates which other country's final consumption it has generated these emissions for.

Inversely, the FIGARO database can also be read in terms of "imported emissions": it allows us to understand, for each country covered, the level of GHG emissions this country's final consumption has induced in other countries.

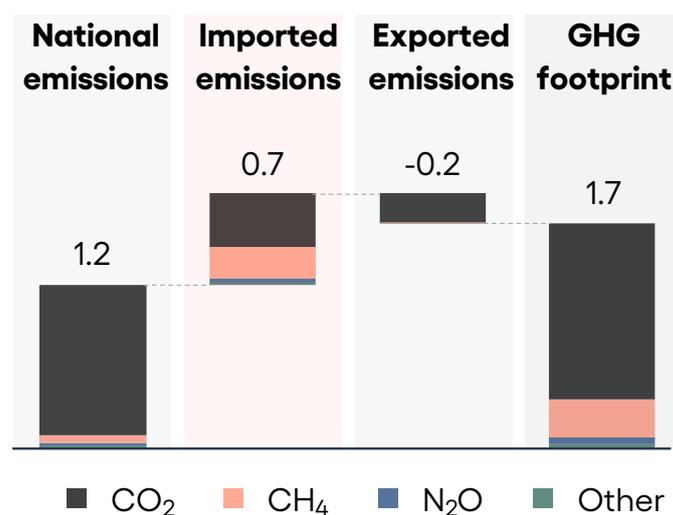


In this illustrative example, the purchase of windows by households in the European Union induced emissions in several countries along the production chain: in the US (manufacturing of the windows), in China (processing of the aluminium used by the US manufacturing factory) and in India (production of the raw aluminium used by the Chinese processing factory). All emissions are accounted for in the EU27's consumption-based emissions. The EU27 will then be an "importer" of emissions from all three countries. Note: the example is not meant to be representative of the real aluminium value chain. The shares of emissions are also purely illustrative.

This "consumption-based" perspective is a complement to the classic "production-based" perspective that looks at emissions that occur inside a country's territory. Consumption-

based accounting attributes emissions to the consumer of the final product, irrespective of where the emissions take place. It is worth noting that the FIGARO database enables the user to trace the localisation of *all* emissions that occurred throughout the production chain of a final product. For instance, if the EU imports one tonne of windows from a factory in the USA, which itself imported processed aluminium from a factory in China, which itself imported raw aluminium from India, then the FIGARO database will consider that the EU imported emissions from the USA (for the manufacturing of the final product), China (for the processing of aluminium) and India (for the production of aluminium).

The difference between **consumption-based emissions** (also named “carbon footprint”) and **production-based emissions** (also named “domestic emissions” or “territorial emissions”) is the volume of **traded emissions**. Traded emissions are the difference between imported emissions (i.e. emissions that the country’s final consumption generates in other countries) and exported emissions (i.e. emissions that foreign final consumption generates in the country).



For example, Japan’s GHG footprint (consumption-based emissions) is the sum of its national emissions (production-based emissions) and its imported emissions, minus its exported emissions (see Annex – Japan Country Factsheet)

Each row in the FIGARO environmental database represents one unique flow of GHG emissions, determined by unique characteristics:

- The country in which these emissions occurred
- The specific sector that generated these emissions in this country
- The foreign country that “triggered” these emissions through its final consumption
- The type of final consumption (general government, households, nonprofits, fixed capital formation) in the country that induced the emissions

- The amount of emissions, in tonnes of CO₂e

For example, let's look at a random row of the FIGARO environmental database. It indicates that **Argentina's final consumption expenditure of general government** has induced **21.6 kilotonnes** of CO₂e in the **United States**, generated by the **Crop and animal production, hunting and related service activities sector**, in **2021**.

	Year	Emitting country	Industry	Consuming country	Consumption type	GHG value	Unit	Multiplier
FIGARO data	2021	US	A01	AR	P3_S13	21.6	TN	3
Details	2021	United States	Crop and animal production sector	Argentina	General government	21.6	tonnes of CO ₂ equivalent	kilo
Interpretation	In 2021, final consumption expenditure of general government in Argentina induced 21.6 kilotonnes of CO ₂ equivalent by the Crop and animal production sector in the United States.							

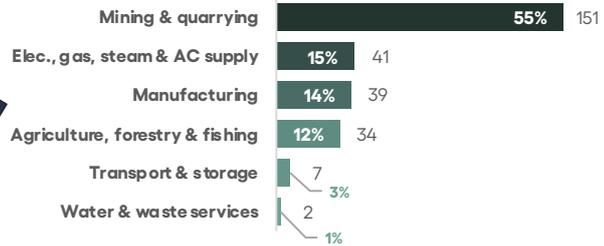
Extract from a random row in the FIGARO database (row 1), explanation (row 2) and literal interpretation (row 3)

Aggregating the rows for one given country allows us to establish the full picture of all imported and exported emissions regarding this country, broken down into the emitting NACE sector or product. For example, aggregating all rows related to Indonesia's emissions induced by other countries' final consumption allows us to establish the list of the Indonesian sectors that generate the most emissions for foreign consumption, with the amount of GHGs emitted, and the top countries that trigger these emissions (i.e. the destination of Indonesia's exported emissions). We can then learn that Indonesia's top exporting sector is the mining and quarrying sector, which encompasses all direct greenhouse gas emissions generated by their mining and quarrying activities (especially the combustion of fossil fuels for the operation of mining machinery). China is the biggest destination of Indonesia's exported emissions: the Chinese final consumption triggers 84 million tonnes of CO₂ in Indonesia, which represents almost a third of all emissions that Indonesia produces for other countries' final consumption.

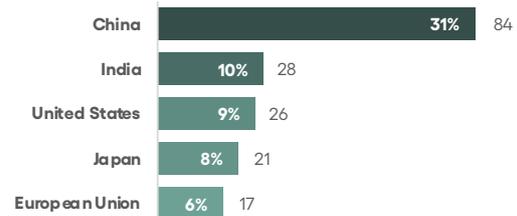
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2021 ID	C26	AR	P9_513	0.025	TN	3	E	F	2024-03-22T13:03:01				
2021 ID	C27	AR	P9_513	0.038	TN	3	E	F	2024-03-22T13:03:01				
2021 ID	C28	AR	P9_513	0.026	TN	3	E	F	2024-03-22T13:03:01				
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2021 ID	C30	AR	P9_513	0.028	TN	3	E	F	2024-03-22T13:03:01				
2021 ID	C4	2021 ID	C24	AR	P9_513	1.813	TN	3	E	F	2024-03-22T13:03:01		
2021 ID	C1	2021 ID	C25	AR	P9_513	0.046	TN	3	E	F	2024-03-22T13:03:01		
2021 ID	D4	2021 ID	C26	AR	P9_513	0.025	TN	3	E	F	2024-03-22T13:03:01		
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2021 ID	H8	2021 ID	E8	2021 ID	C28	AR	P9_513	0.026	TN	3	E	F	2024-03-22T13:03:01
2021 ID	I	2021 ID	G4	2021 ID	C30	AR	P9_513	0.028	TN	3	E	F	2024-03-22T13:03:01
2021 ID	J8	2021 ID	H4	2021 ID	D35	AR	P9_513	11.229	TN	3	E	F	2024-03-22T13:03:01
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2021 ID	L	2021 ID	J8	2021 ID	G47	AR	P9_513	0.968	TN	3	E	F	2024-03-22T13:03:01
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2021 ID	M1	2021 ID	K8	2021 ID	H53	AR	P9_513	0.005	TN	3	E	F	2024-03-22T13:03:01
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2021 ID	N1	2021 ID	L	2021 ID	J8	AR	P9_513	0.001	TN	3	E	F	2024-03-22T13:03:01
2021 ID	N1	2021 ID	M1	2021 ID	J8	AR	P9_513	0.001	TN	3	E	F	2024-03-22T13:03:01
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2021 ID	N1	2021 ID	M1	2021 ID	H65	AR	P9_513	0.001	TN	3	E	F	2024-03-22T13:03:01
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2021 ID	N1	2021 ID	N1	2021 ID	L	AR	P9_513	0.001	TN	3	E	F	2024-03-22T13:03:01
2021 ID	N1	2021 ID	N1	2021 ID	M99_70	AR	P9_513	0.005	TN	3	E	F	2024-03-22T13:03:01
2021 ID	N1	2021 ID	N1	2021 ID	M71	AR	P9_513	0.006	TN	3	E	F	2024-03-22T13:03:01
2021 ID	N1	2021 ID	N1	2021 ID	M72	AR	P9_513	0.01	TN	3	E	F	2024-03-22T13:03:01
2021 ID	N1	2021 ID	N1	2021 ID	M73	AR	P9_513	0.002	TN	3	E	F	2024-03-22T13:03:01
2021 ID	N1	2021 ID	N1	2021 ID	M74_75	AR	P9_513	0.005	TN	3	E	F	2024-03-22T13:03:01
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2021 ID	N1	2021 ID	N1	2021 ID	N78	AR	P9_513	0.002	TN	3	E	F	2024-03-22T13:03:01
2021 ID	N1	2021 ID	N1	2021 ID	N79	AR	P9_513	0.003	TN	3	E	F	2024-03-22T13:03:01

Top 6 exports (% , MtCO₂eq)

Indonesia's exports generate emissions in the following sectors on its territory



Top 5 destinations of Indonesia's exports (% , MtCO₂eq)



FIGARO raw data

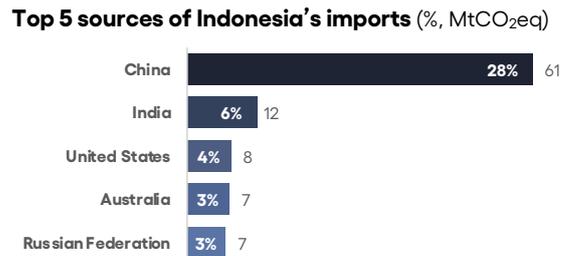
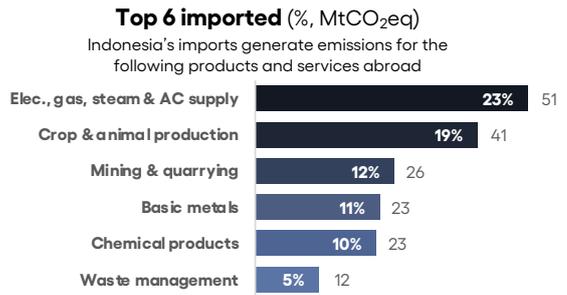
Results of data processing

Processing raw FIGARO data (left) leads to understand Indonesia's top exporting sectors and destinations of its exported emissions (right, extract from Indonesia's country fact sheet – see Annex).

Conversely, for a given country, it is possible to aggregate all emissions induced by its own final consumption in foreign countries and sectors. For example, doing this for Indonesia again shows that the country's final consumption induces foreign emissions mostly in the sectors of energy production, agriculture and mining. It means that the activities of the Indonesian citizens, NGOs and government triggered the emissions of 51 MtCO₂e in foreign power plants, 41 MtCO₂e in foreign crop and cattle, and 26 MtCO₂e in foreign mines and quarries. China is the biggest source of Indonesia's imports, with 28% of all imported emissions – the second biggest exporting country, India, accounts for only 6% of the total.

2021 ID C24	AR	P3_513	1.813	TN	3	E	F	2024-03-22T13:03:01
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2021 ID J61	AR	P3_513	0.003	TN	3	E	F	2024-03-22T13:03:01
2021 ID J62	AR	P3_513	0.001	TN	3	E	F	2024-03-22T13:03:01
2021 ID J64	AR	P3_513	0.006	TN	3	E	F	2024-03-22T13:03:01
2021 ID J66	AR	P3_513	0.001	TN	3	E	F	2024-03-22T13:03:01
2021 ID J68	AR	P3_513	0.001	TN	3	E	F	2024-03-22T13:03:01
2021 ID L	AR	P3_513	0.005	TN	3	E	F	2024-03-22T13:03:01
2021 ID M71	AR	P3_513	0.006	TN	3	E	F	2024-03-22T13:03:01
2021 ID M72	AR	P3_513	0.01	TN	3	E	F	2024-03-22T13:03:01
2021 ID M73	AR	P3_513	0.002	TN	3	E	F	2024-03-22T13:03:01
2021 ID M74	AR	P3_513	0.006	TN	3	E	F	2024-03-22T13:03:01
2021 ID N77	AR	P3_513	0.024	TN	3	E	F	2024-03-22T13:03:01
2021 ID N78	AR	P3_513	0.002	TN	3	E	F	2024-03-22T13:03:01
2021 ID N79	AR	P3_513	0.003	TN	3	E	F	2024-03-22T13:03:01

FIGARO raw data



Results of data processing

The country factsheet for Indonesia (right) shows top imported emissions and sources of these imported emissions (see Annex).



b. Emissions of G20 countries related to trade account for 24% of global emissions

As described in the introduction, G20 countries are linked to a very significant share of global emissions. Traded emissions between G20 countries represent 11% of global emissions, while their imports from the rest of the world account for 8% of global emissions. In total, consumption-based emissions of G20 countries (including emissions G20 countries generate on their own territory for self-consumption, which are not traded emissions) account for 82% of global emissions.

i. Top traded emissions between G20 countries

Inside the G20, countries are clearly co-dependent. The import flows from and to G20 countries account for 11% of global emissions, and nearly half of all traded emissions in the world¹¹. The five main sectors on which the G20 countries are the most co-dependent are:

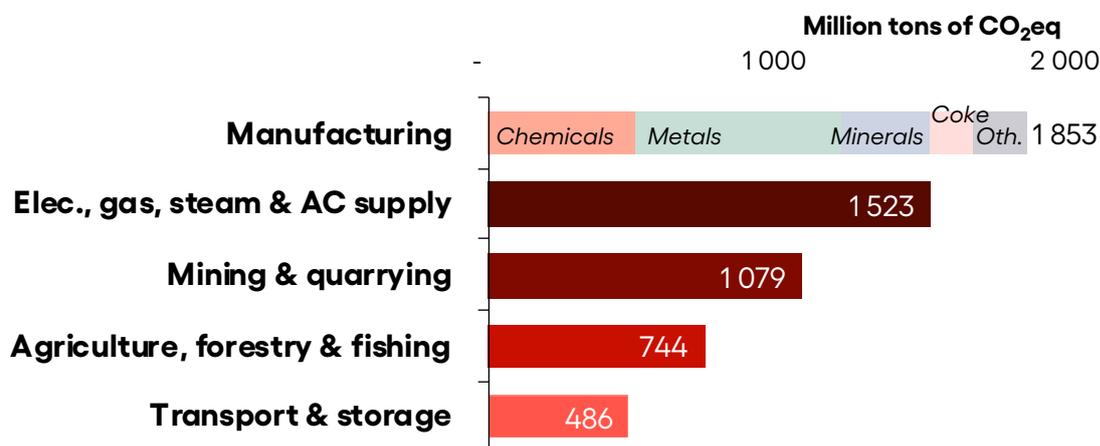
- **Manufacturing**¹² (31% of traded emissions within G20), i.e. direct emissions generated by the manufacture of chemicals (27%), basic metals (38%), non-metallic minerals (17%), coke and petroleum products (8%) and others (food, textiles, paper, pharmaceuticals, computers, etc.) (10%).
- **Electricity, gas, steam and air conditioning** (25%), i.e. direct emissions generated by the generation, transmission and distribution of electricity, gas and steam, as well as steam and air conditioning supply. This means that the products consumed by G20 countries have requested the use of large amounts of electricity, gas and steam in other G20 countries through their production chain.
- **Mining and quarrying** (18%), i.e. direct emissions generated by the extraction of petroleum and gas, as well as the mining of coal, metals, ores and other raw materials.
- **Agriculture, forestry and fishing** (12%), i.e. direct emissions generated by crop and animal production (mostly nitrous oxide and methane emissions), forestry and logging activities, and fishing and aquaculture. Given the structure of the FIGARO database, these emissions **do not include LULUCF emissions** such as deforestation and land-use change.
- **Transport & storage** (8%), i.e. direct emissions generated by land, water and air transport, as well as warehousing and support activities for transportation.

¹¹ Excluding traded emissions between non-G20 countries, which the FIGARO database does not cover.

¹² Section C "Manufacturing", Division 10 to 33 in the NACE Rev. 2 nomenclature.

These five sectors alone represent 95% of all G20's traded emissions.

Top traded emissions within G20



Traded emissions within G20 represent almost 6 billion tonnes of CO₂e (11% of global emissions). The top sector is manufacturing, broken down into the chemical industry (33%), basic metals (28%), non-metallic minerals (21%) and others (19%). The top 5 sectors represent 95% of traded emissions within G20.

ii. Top imported emissions from outside G20

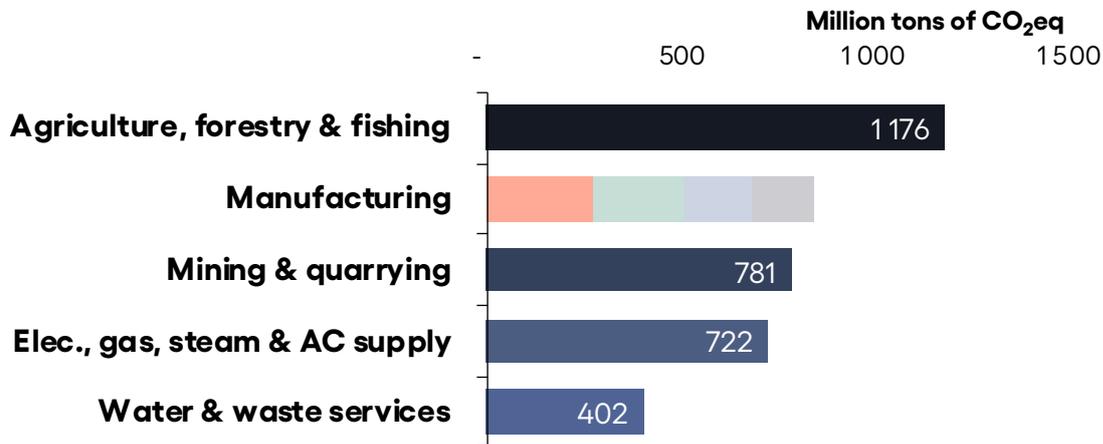
G20 countries also rely on the production of the rest of the world (RoW) for their own final consumption (8% of global emissions, one third of all traded emissions in the world except RoW). Imported emissions from the rest of the world represent 10% of G20's consumption-based emissions.

The five main sectors in non-G20 countries on which G20 countries rely for their own consumption are:

- **Agriculture, forestry and fishing** (27% of imported emissions)
- **Manufacturing** (19%), broken down into chemicals (33%), basic metals (28%), non-metallic minerals (21%) and others (19%)
- **Mining and quarrying** (18%)
- **Electricity, gas, steam and AC supply** (16%)
- Water and waste services (9%), i.e. direct emissions generated by waste and water collection, treatment, supply and sewerage.

These five sectors alone represent 89% of all G20's imported emissions.

Top imported emissions from outside G20



Imported emissions from outside G20 represent 4.3 billion tonnes of CO₂e (8% of global emissions). The top 5 sectors represent 89% of G20's imported emissions.

iii. Top exported emissions to outside G20

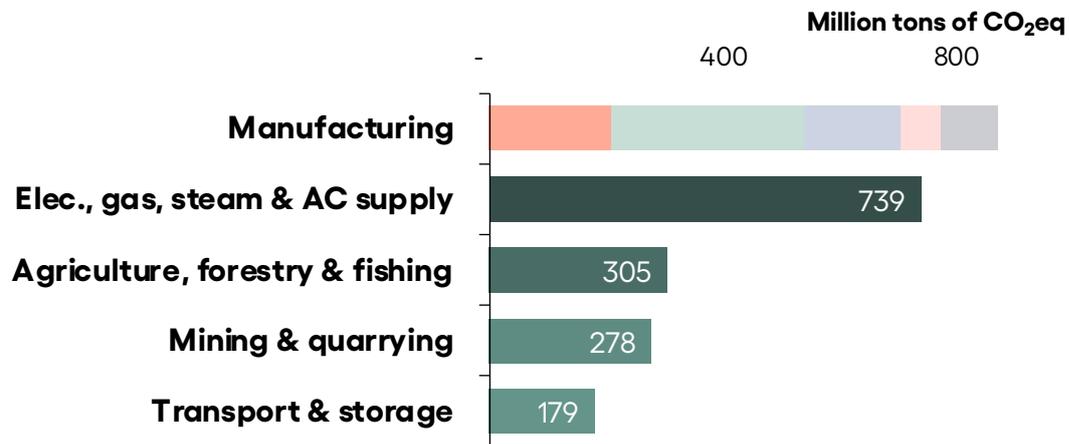
G20 countries are also emissions exporters to the rest of the world. These emissions take place inside G20 countries' boundaries and originate from G20's own industries and infrastructures. From the G20 perspective, these emissions are not related to trade since they are direct emissions occurring in their own territories and are therefore directly manageable through domestic policies. Exported emissions are part of G20's production-based emissions (territorial) emissions, but do not belong to the G20's consumption-based emissions since they are generated to produce goods and services that will eventually be consumed somewhere else in the world.

G20's five most important sectors in terms of exported emissions are:

- **Manufacturing** (35%), broken down into chemicals (24%), basic metals (38%), non-metallic minerals (19%), coke and petroleum products (8%) and others (11%).
- **Electricity, gas, steam and air conditioning** (30%)
- **Agriculture, forestry and fishing** (12%), which do not include land-use change emissions
- **Mining and quarrying** (11%)
- **Transport & storage** (7%)

These five sectors alone represent 95% of all G20's exported emissions.

Top exported emissions to outside G20



Exported emissions to outside G20 represent 2.5 billion tonnes of CO₂e (5% of global emissions). The top 5 sectors represent 95% of G20's exported emissions.

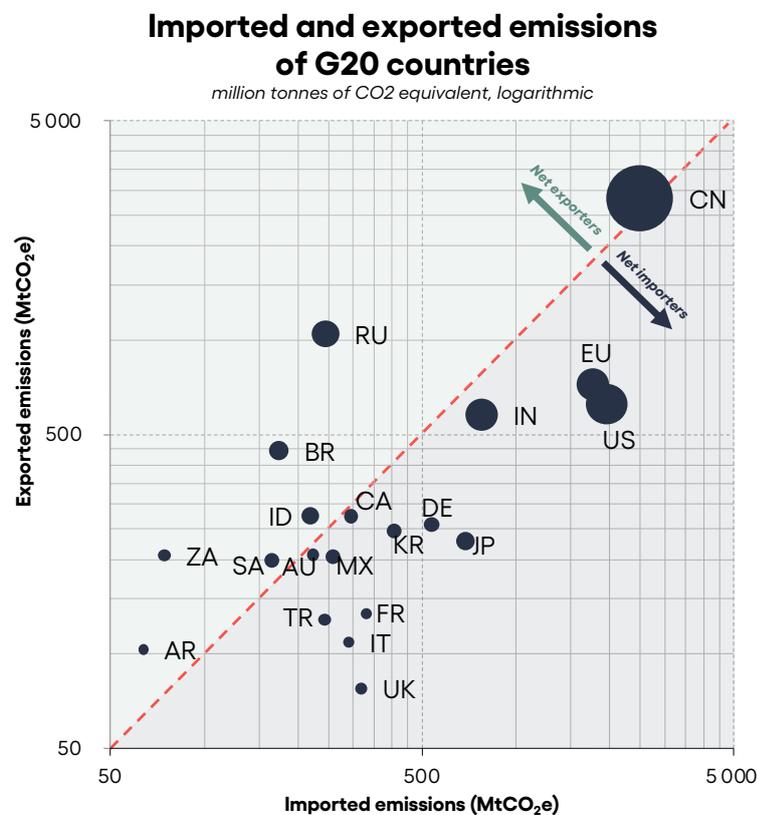


c. G20 countries do not have homogenous profiles

The G20 countries fall into three categories. The first group is made of countries that import significantly more emissions than they export (+20% more imports than exports). They can be identified on the graph below by looking at points that are the farthest down the red dotted line. The biggest importers compared to their exports are the UK (+308%), the US (+212%), Japan (+201%), the EU (+144%), Turkey (+89%), South Korea +64%), India (+34%) and Mexico (+27%).

The second group of countries is characterised by a relative balance between imports and exports. These countries are Canada, Australia and China.

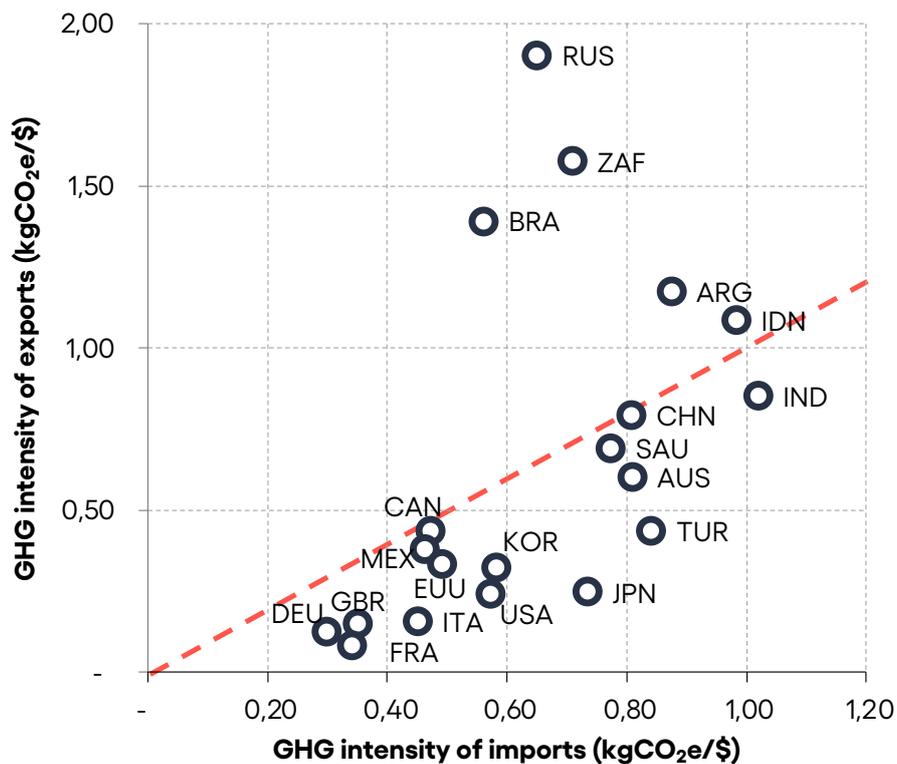
The third group is made of countries that export significantly more emissions than they import (+20% more exports than imports). They can be identified on the graph below by looking at points that are the farthest up the red dotted line. The biggest exporters compared to their imports are Russia (+327%), South Africa (+177%), Brazil (+156%), Argentina (+62%), Indonesia (+26%) and Saudi Arabia (+21%).



Countries are placed on a logarithmic scale showing imported (X-axis) and exported (Y-axis) emissions. All points above the red dotted line are net exporters of emissions, all points below are net importers. The size of each bubble represents the volume of domestic emissions.

Countries with large national emissions **tend to have large imported and exported emissions**, but there are some exceptions. The top countries for national emissions are China, the US (3 times less domestic emissions than China), the EU27, India and Russia. The top exporters are also the largest domestic emitters, with China (1st), the US (4th), the EU27 (3rd), India (5th) and Russia (2nd). These are almost the same countries that import the most emissions: China, the US, EU27 and India are the top 4 importers, and Japan is the fifth. Imports for these four countries alone account for over 13% of global emissions.

Overall, imports from G20 countries (including imports from one G20 country to another and imports from the rest of the world) **account for almost 20% of emissions**. The topic of greenhouse gas emissions embodied in trade can therefore be harnessed to drive global decarbonisation in a cooperative way between countries.

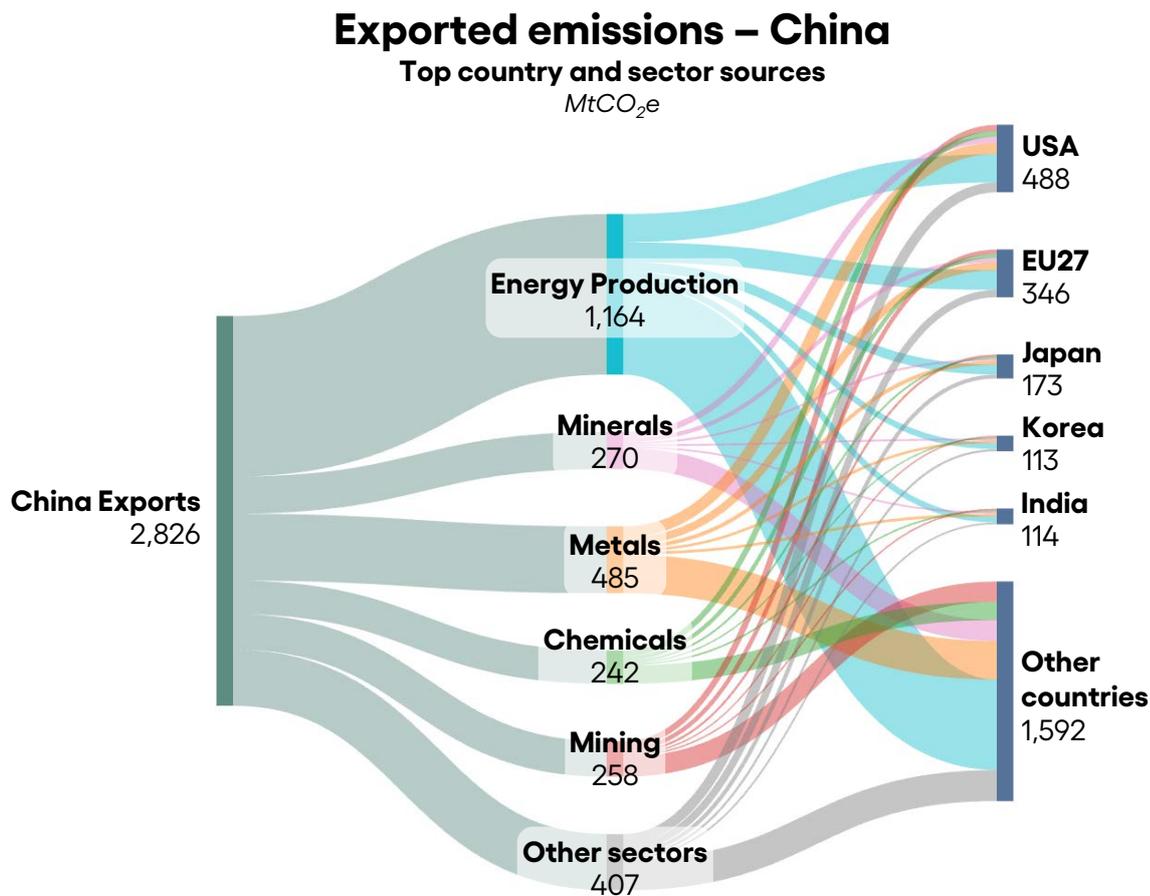


Comparison of G20 countries' carbon intensity of their imports and exports. Each point represents a G20 country. A point above the red dotted line means that the country's exports are more carbon-intensive per monetary value than their imports, showing that they provide more carbon-intensive products to the global economy than what they buy from their counterparts.

d. China is at the heart of industrial emissions exports

In addition to having large national emissions, **China is at the centre of important flows of embodied emissions, a reflection of its critical rule in global supply chains.** It fits the position of the country as the "factory of the World". Indeed, China notably produces goods that are consumed all over the world, accounting for an important share of imported emissions from China in most countries.

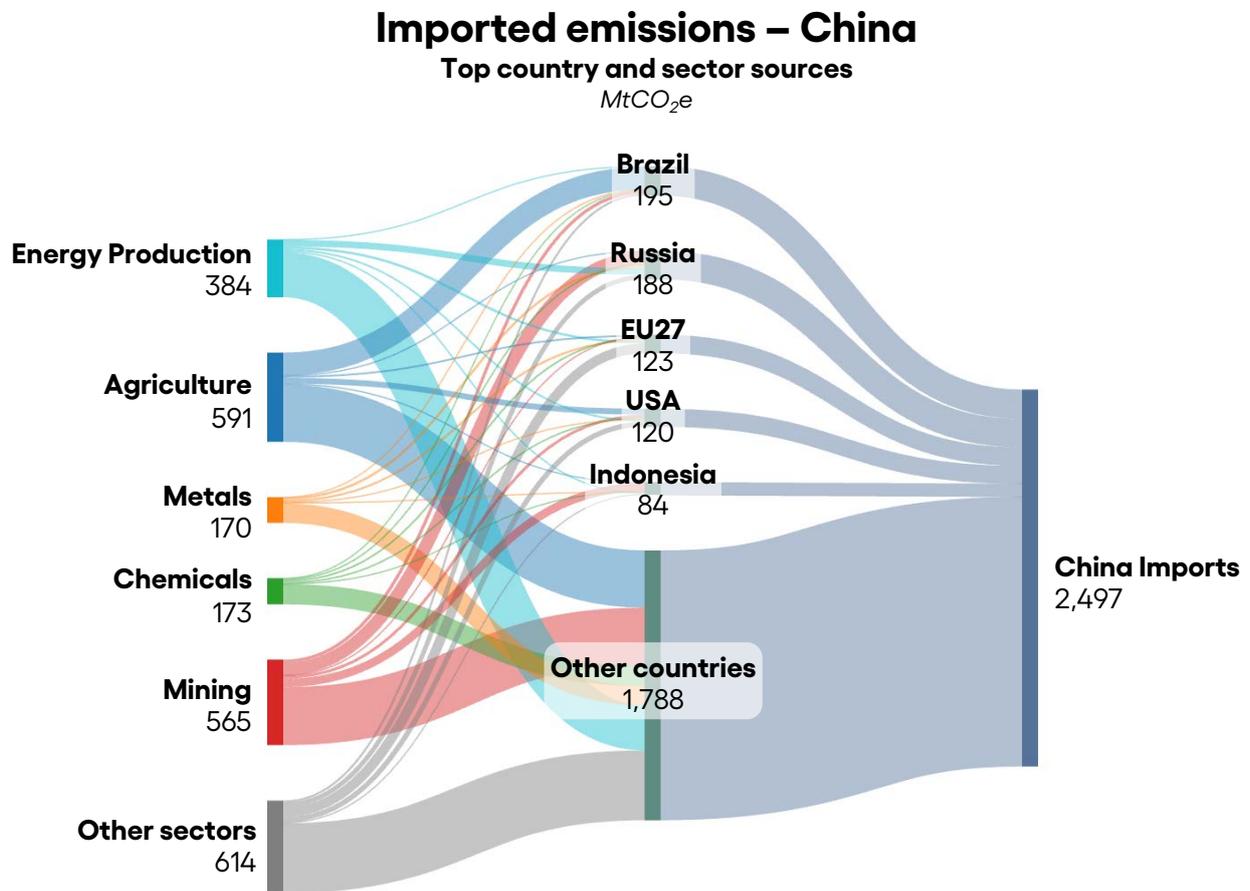
The biggest importers of Chinese emissions are the US, the EU, Japan, Korea and India. The US are the biggest importers of Chinese emissions, with imports representing 17% of all China's exported emissions (488 MtCO₂e). China is ranked #1 in the top sources of the USA's imported emissions (25% of US' imports), far ahead of Canada (7%) and the EU (7%). The EU is the second biggest importer of China's emissions in volume (346 MtCO₂e, 12% of China's exported emissions) and China is the EU's biggest source of imported emissions (20% of EU's imported emissions).



This Sankey graph shows the importance of the energy sector and raw materials (metals, minerals, mining, chemicals) in China's exports. The biggest importers of China's emissions are the US, followed by the EU27 and Japan.

The US, the EU, Japan and other countries that massively import Chinese emissions mostly import emissions from China’s energy production sector (41% of exported emissions). Chinese factories are indeed powered by carbon-intensive electricity, generated by coal-fired power plants. Every good produced in China and then exported to foreign countries therefore embeds a large share of carbon emissions originating from the Scope 2 emissions of Chinese factories.

In some countries, China represents a very significant share of their imported emissions. It is the case for Australia (33% of all Australia’s imported emissions come from China), Mexico (31%) and Russia (28%).

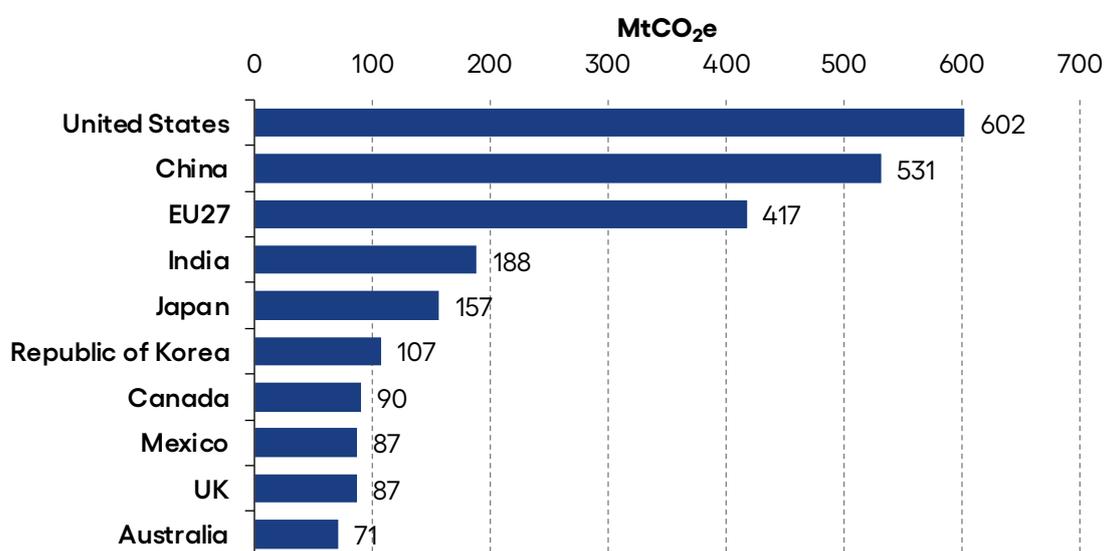


China’s top imported emissions by country and sector sources.

China is not only the largest emissions exporter (2,826 MtCO₂e), it is also the world’s largest emissions importer (2,497 MtCO₂e). This may appear counterintuitive at first glance, since China is mostly depicted as a provider of goods for the global economy. Actually, China also needs to import large volumes of emissions to fulfil its own domestic consumption,

and to provide raw materials to its industry. China is a very important importer of agricultural products (591 MtCO_{2e}, 24% of China's imports), mostly from non-G20 countries (56%), Brazil (25%) and the United States (7%). China also imports large amounts of emissions (565 MtCO_{2e}, 23% of China's imports) from the mining and quarrying sector from non-G20 countries (50%), Russia (15%) and Indonesia (10%). Thirdly, China imports significant emissions from manufactured goods (21% of imports), in particular chemical products (7%) and basic metals (7%). Through the management of its consumption-based emissions, China therefore has a significant power to influence the transition in other countries in the agricultural, mining and manufacturing sectors.

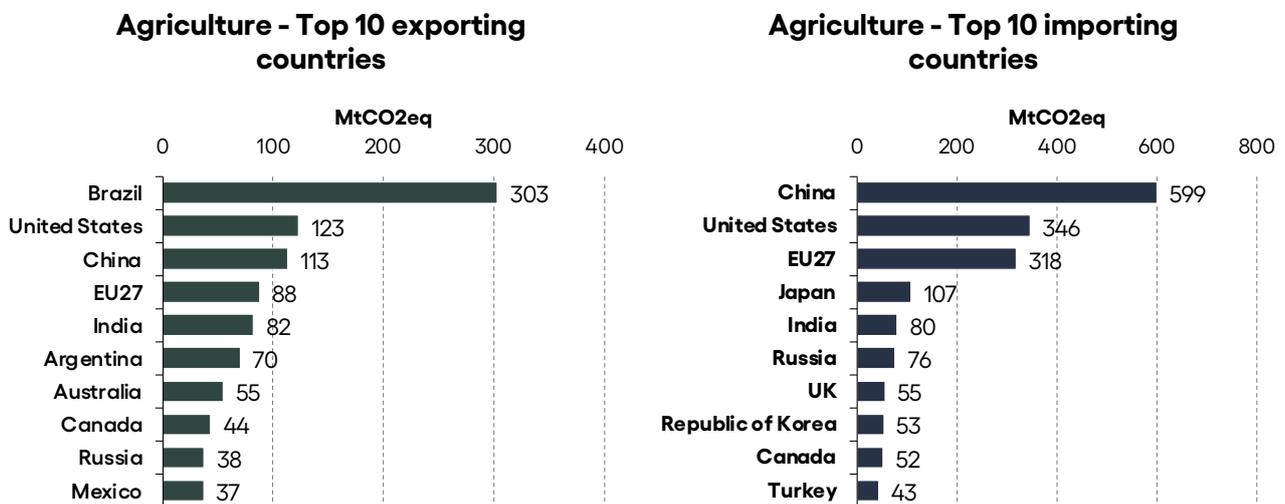
Manufacturing - Top 10 importing countries



Overall, **the manufacturing sector observed through the prism of embodied emissions appears very globalised.** Indeed, this sector is the main importing sector for 14 countries of the "Global North": Germany, France, Italy, UK, US, Turkey, Canada, Mexico, Korea, Brazil, South Africa, Australia, Saudi Arabia and Indonesia. These countries are thus strongly dependent on the manufacturing industries of other countries. Even when not in the first position, the manufacturing industry still ranks high in the imported/exported emissions of all countries, such as Russia (2nd place after Agriculture), Argentina (2nd after Energy Production) or India (2nd place after Mining & Quarrying).

e. Embodied emissions from agriculture: Brazil as main exporter, diversified importers

China, the US and the EU27 alone account for 60% of imported emissions in the sector of agriculture. With the relevant consumption-based policies, these three regions can therefore have a significant effect on global value chains related to agriculture, forestry and fishing. China is the biggest importer of agricultural products, with 599 MtCO₂eq (28% of global imported emissions in agriculture), followed by the US (346 MtCO₂e) and the EU27 (318 MtCO₂e).



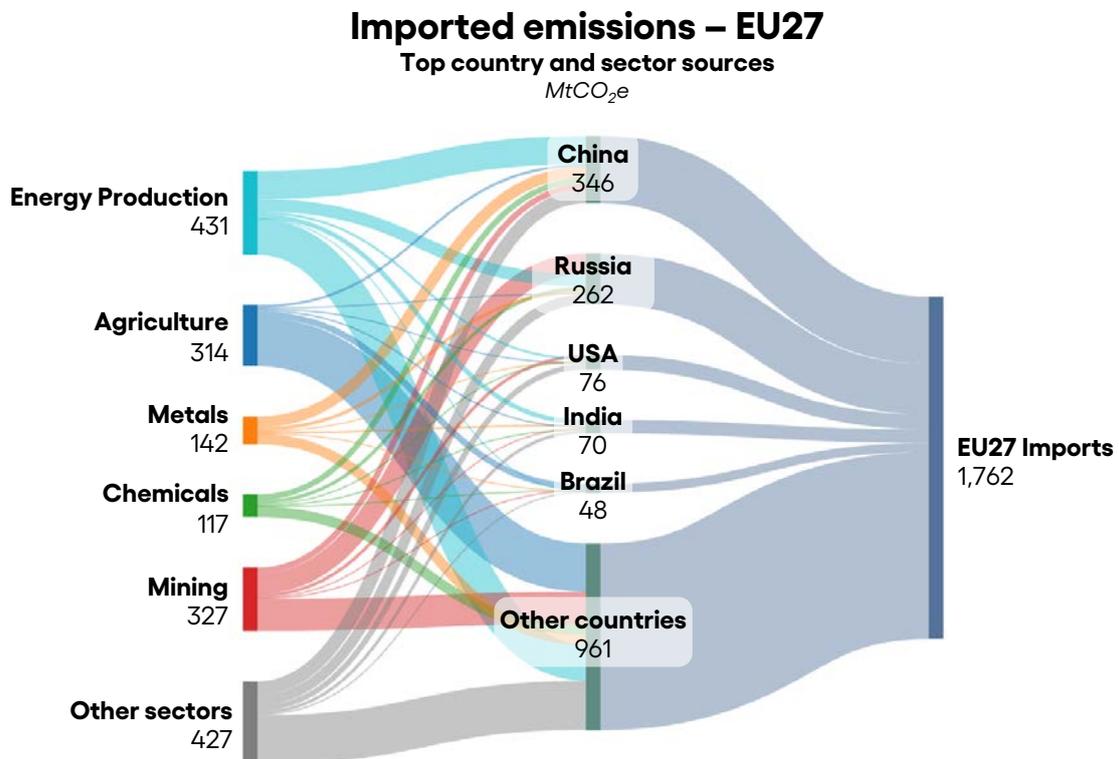
China is also the third largest exporter after Brazil and the US. Brazil, which does not even appear in the top 10 importers, is the largest exporter of emissions related to agriculture (303 MtCO₂e). Although the FIGARO database does not give any details on the breakdown of emissions, we can infer that cattle farming is a big contributor. It is also worth noting that FIGARO does not include land-use change emissions: if this was the case, the ongoing deforestation in Brazil would make the country's contribution to exported emissions even bigger.

f. The EU and the USA are the largest emissions importers after China

i. EU27

The EU27 is importing less emissions than China in volume (1 762 MtCO₂e for EU27 vs 2497 MtCO₂e for China), but much more in relative terms. EU27's imports represent nearly half of its territorial emissions, while China only imports the equivalent of 16% of it. Besides, the EU27 imports 2.5 times more emissions than it exports (+144%), while China is a net exporter (-12%).

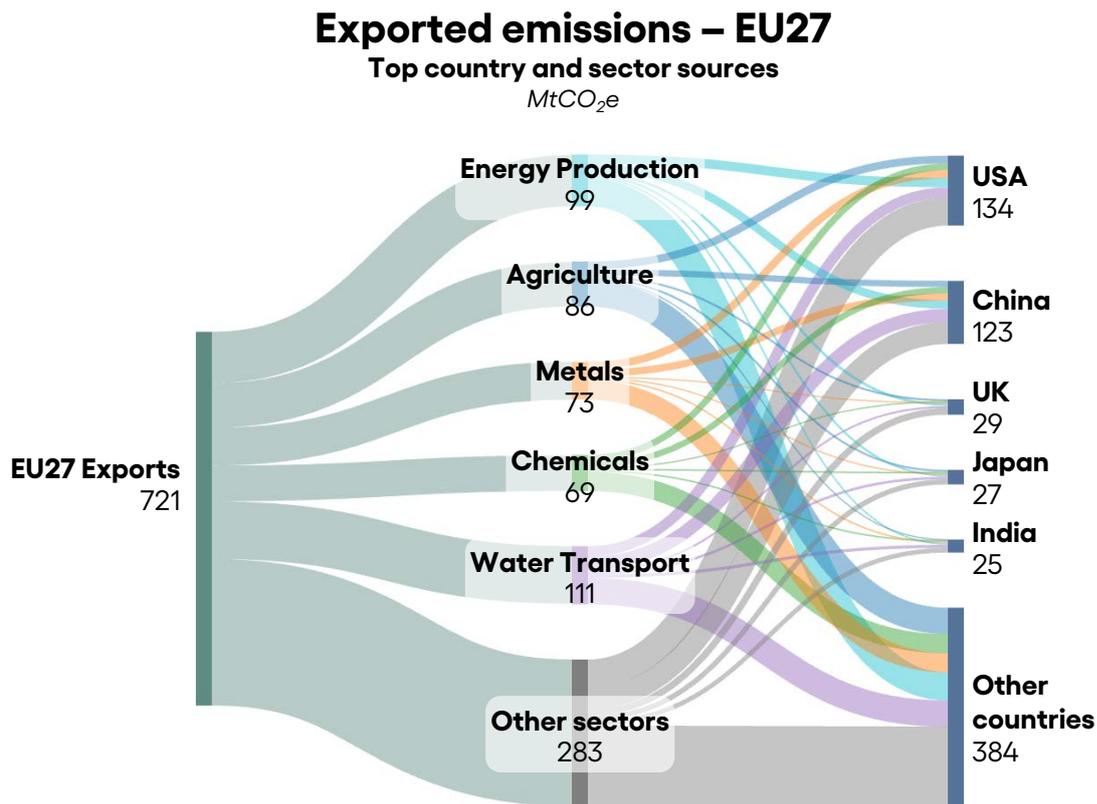
Looking at the EU27's imported emissions reveal a clear dependence on two foreign countries: China and Russia¹³. China represents 20% of EU's imported emissions (346 MtCO₂e), mainly from energy production and manufacturing (mostly metals and mining). Russia's exports account for 15% of the total EU imports, mainly from the mining sector (probably from the extraction of natural gas and other mining activities) and the energy production sector (probably from the manufacture, distribution and trade of gas).



EU27's top importing countries and sectors

¹³ All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine.

As for exported emissions, the two main partners of the EU27 are the US (19% of exported emissions) and China (17%). Interestingly, the top exporting sector for both destinations is water transport (15% of exported emissions): this probably corresponds to the international shipping services offered by European companies such as Maersk or MSC. Other top exporting sectors include energy production (14%), crop and animal production (12%), basic metals (10%) and chemical products (10%).



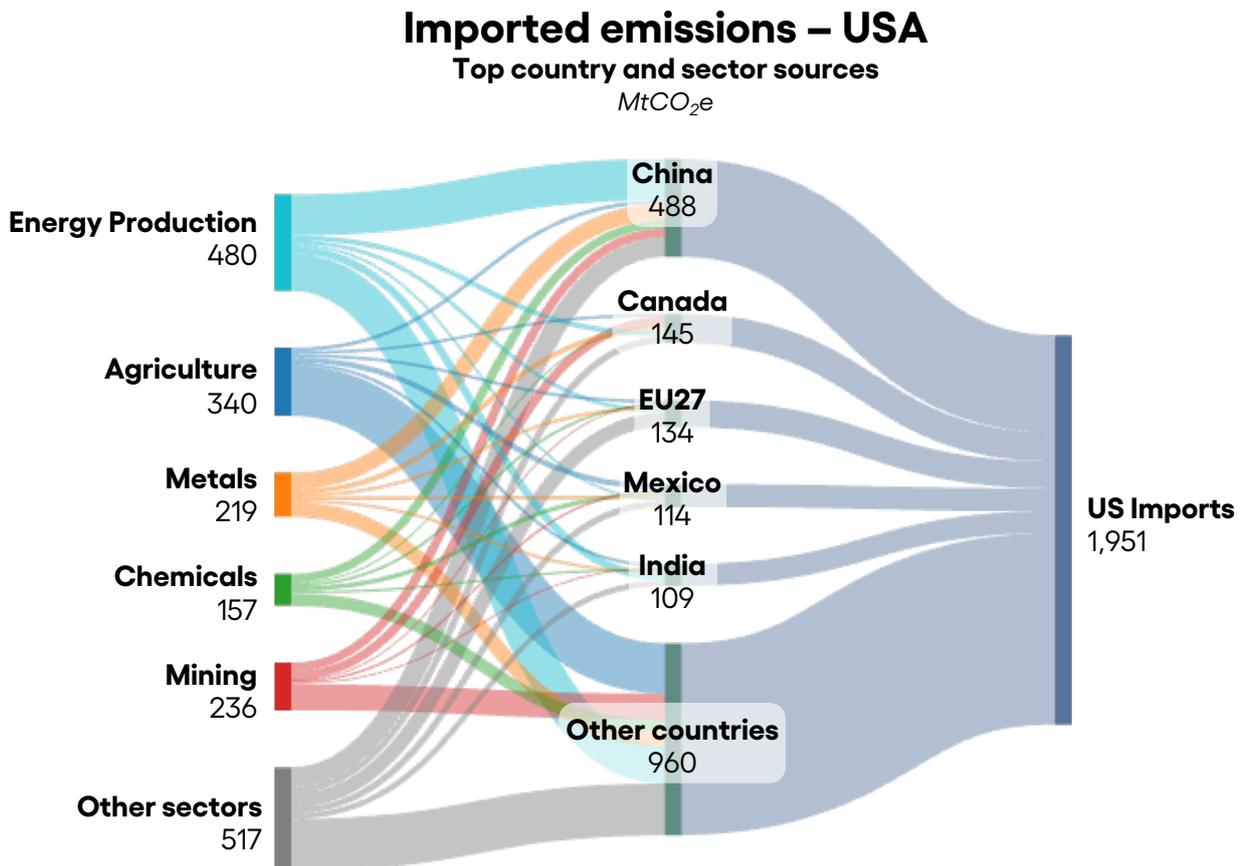
EU27's top exporting countries and sectors

ii. USA

The United States are the second biggest emitters in terms of domestic emissions, after China. They are net importers, with a volume of imported emissions more than three times bigger than their exported emissions.

One quarter of the US imported emissions come from China, nearly half of it originating from the Chinese energy production sector. Canada and the EU, its second and third biggest importing partners, are far behind, with 7% of imported emissions each.

China is also the US' most important destination of its exported emissions (19% of exported emissions, 120 MtCO₂e). One third of these exported emissions to China were generated by the agriculture sector.

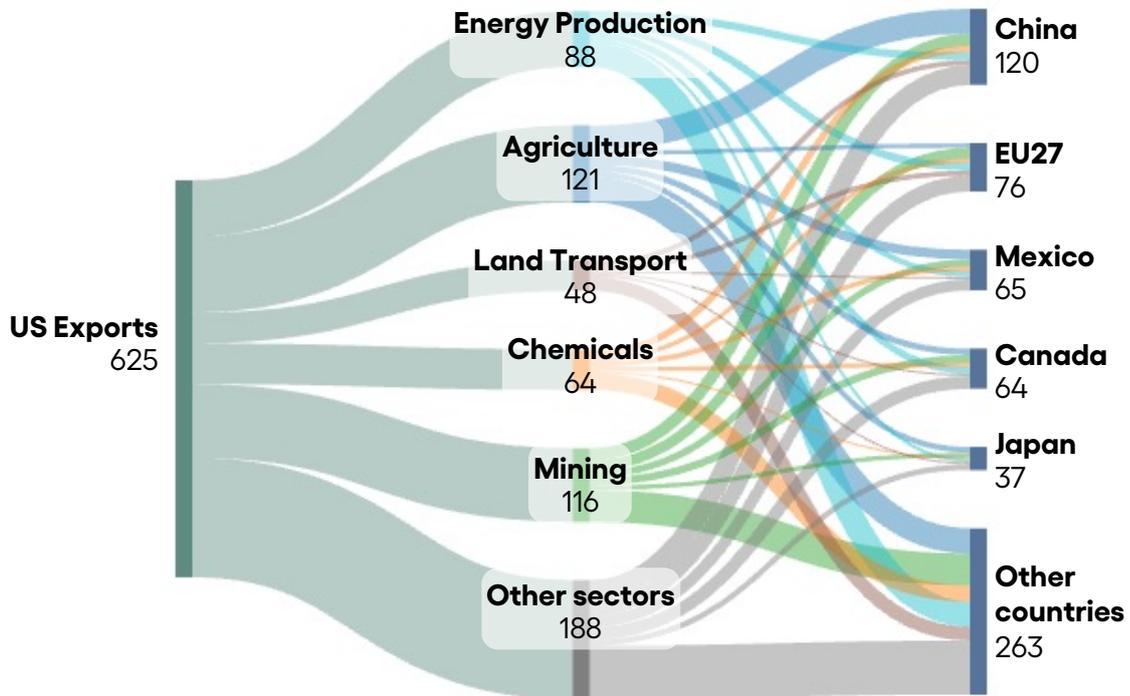


USA's top importing countries and sectors

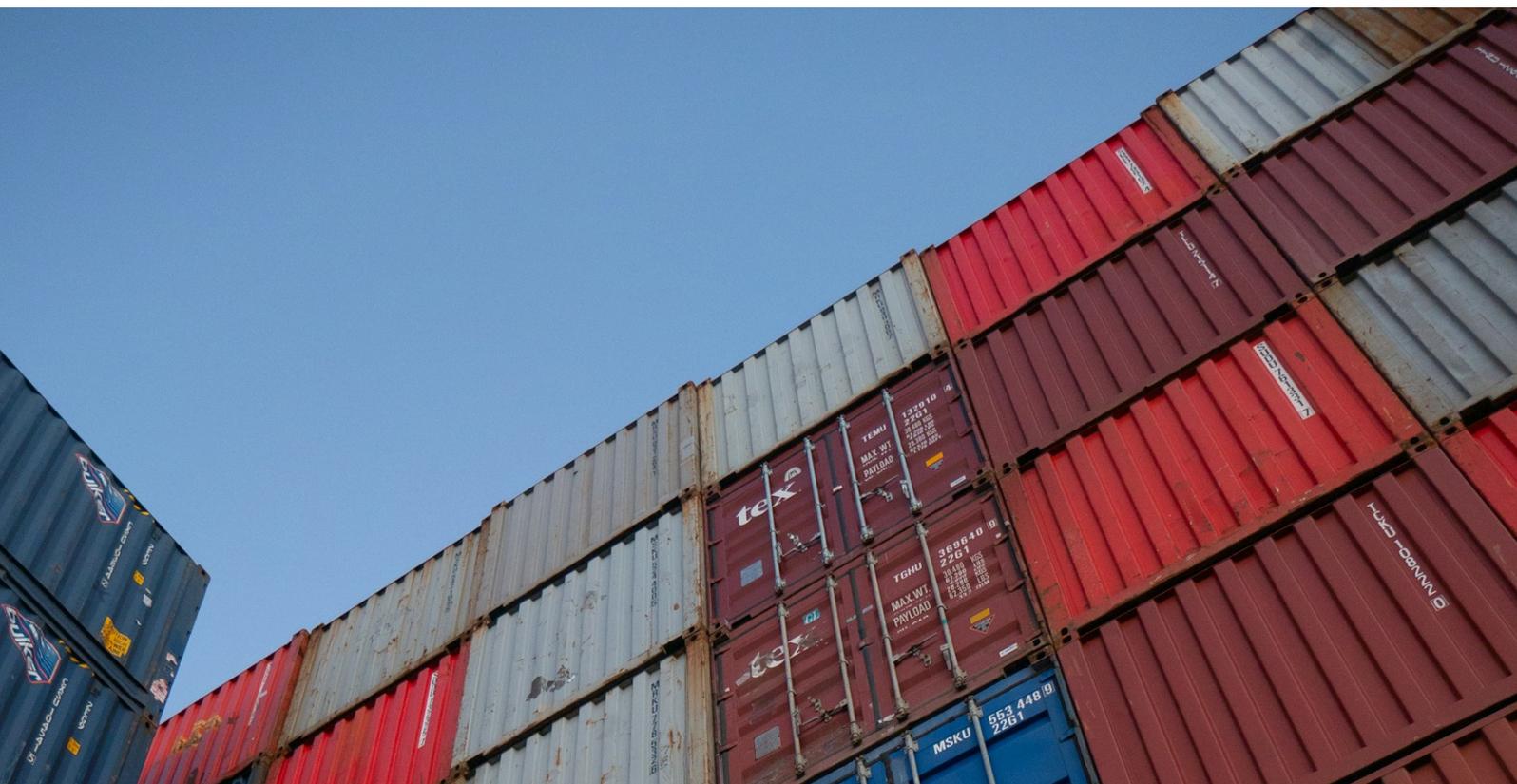
Exported emissions – USA

Top country and sector sources

MtCO₂e



USA's top exporting countries and sectors





II) Harnessing embodied emissions for enhanced mitigation through cooperation



G20 countries' high imported emissions point to their co-dependence on global climate action

Taking a purely technical look at the issue of imported emissions, the three options for mitigation are:

- a reduction of GHG-intensive imports, i.e. a lower consumption of the corresponding goods
- the reshoring of their production, which only makes climate sense if domestic production methods are less GHG-intensive
- a reduction of the GHG intensity of these imports with trade partners to encourage less carbon-intensive imports.

The first option, the reduction of imports, implies a combination of efficiency (e.g. lowering the amount of steel per car or building) and sufficiency (e.g. more recycling of steel from used cars, or lower number of cars on the road). Both are necessary to achieving the Paris

Agreement objective¹⁴, but it is hard to imagine a rapid shift in demand that would get rid of all imports of GHG-intensive goods.

Reshoring GHG-intensive imports also has its limits. Some countries may have a strategic interest in reshoring certain supply chains (e.g., key pharmaceuticals that were in limited supply during Covid years), governments are unlikely to mobilise enough incentives to be able to completely undo what private investment choices have built over decades. Trade in food commodities also shows how countries have specialised, based on their non-transferable geographic assets (land mass, precipitation and temperature). On the industry side, Europe relied on imports for 56% of its aluminium consumption between 2016 and it would need to refurbish and recommission its idling smelting capacity to substitute imports; this would represent an added challenge to the electricity sector, already in need to deliver growing amounts of cheap zero-carbon electricity to allow the continent's decarbonisation¹⁵. The European Union was also the world's largest importer of steel in 2023, for 23% (37 million tonnes, for a production of 152 Mt, with China, India and South Korea as the largest providers); as about 60% of its production is through the carbon-intensive blast furnace or basic oxygen furnace routes, reshoring imports would also add a serious challenge for the sector's decarbonisation roadmap¹⁶.

If it is not the only option, the reduction of the GHG intensity of imports appears the most promising. It could be accomplished through different routes, with varying degrees of bilateral or pluri-lateral cooperation.

a. Unilateral measures

The less cooperative route is probably the adoption of unilateral measures that seek to change access to domestic markets based on products' carbon footprint. The G20, in its 2024 Principles on Trade and Sustainable Development, acknowledges a "right to regulate (...) in pursuit of legitimate public policy objectives, including those related to sustainable development, in its economic, social, and environmental pillars."

The most visible, but by no means the only examples of unilateral measures include the EU's CBAM and the EUDR. The primary objective of the CBAM is to ensure that the strengthening of the EU emissions trading system will not trigger carbon leakage. But there is evidence from policy discussions in partner countries that CBAM has encouraged

¹⁴ See IPCC, 2022, Climate Change 2022. Mitigation of Climate Change. Summary for Policy Makers.

¹⁵ Europe adds aluminium to its critical raw materials list. Reuters, July 7, 2023. <https://www.reuters.com/markets/commodities/europe-adds-aluminium-its-critical-raw-materials-list-andy-home-2023-07-06/>

¹⁶ European steel in figures 2023, Eurofer. https://www.eurofer.eu/assets/publications/brochures-booklets-and-factsheets/european-steel-in-figures-2023/FINAL_EUROFER_Steel-in-Figures_2023.pdf. See also US International Trade Association: [https://www.trade.gov/media/5479#:~:text=The%20European%20Union%20\(E.U.\)%20is,million%20metric%20tons%20in%202022.](https://www.trade.gov/media/5479#:~:text=The%20European%20Union%20(E.U.)%20is,million%20metric%20tons%20in%202022.)

policies and measures to decarbonise the exposed industrial sectors in exporting countries (China, Turkey, among others). And, depending on the market conditions of the covered sectors, producers exporting to the EU may find it opportune to lower their carbon content to be more cost-competitive against EU producers on the European market, while also contributing to lowering their home country's GHG emissions. The EUDR should have a more direct effect, as it bans, and not merely taxes imports of certain agriculture commodities if their production has led to carbon emissions and biodiversity losses through deforestation¹⁷. Unilateral measures have not been welcome by EU trade partners, even if the European Commission makes a priority to design measures that are compatible with WTO rules. The jury is still out on these matters as no formal complaints have been filed at the WTO to date. Other examples of unilateral measures include the conditions for eligibility to a government subsidy for Battery Electric Vehicles in France, which include a carbon footprinting of vehicles including emissions embodied in basic materials, batteries, and international transport.

It is of course possible that several countries sharing the objective of reducing imported emissions could homogenise their unilateral measures to strengthen their impacts on global markets. Cooperation between several countries on similar unilateral measures would advance the definition of international standards and, depending on their market shares, greatly reduce practices that are particularly harmful to climate, such as deforestation. Any such initiative should follow the main principles of the WTO, notably non-discrimination, transparency and predictability. Such initiatives could include carbon content requirements for the most carbon-intensive traded products, including iron and steel, aluminum, livestock, chemicals, plastics or cement.

As COP informal discussions around unilateral trade measures make abundantly clear, it is critical that countries discuss these measures to ensure that trade partners standing to face these new requirements be traded fairly, especially when it comes to the administrative costs that they will necessarily impose¹⁸.

¹⁷ Regulation on Deforestation-free Products. https://environment.ec.europa.eu/topics/forests/deforestation/regulation-deforestation-free-products_en

¹⁸ See <https://www.europejacquesdelors.eu/publications/eu-cbam-a-green-development-tool> for a discussion on this point in the case of CBAM.

b. More cooperative sectoral initiatives

Barring a common approach of several countries and regions, unilateral measures, by design, are unlikely to engage trading partners in a race to the top for decarbonisation.

A cooperative decarbonisation agenda that starts from recognising the co-dependence of trade partners would be to the advantage of both¹⁹ sides. Through the facilitation of decarbonisation, cooperation would benefit the importer, who no longer fears the risk of carbon leakage, and the exporter who can accelerate its decarbonisation – conversely carbon leakage makes it harder to mitigate emissions on both sides, by undermining the reduction efforts of the importers, and increasing the exporters' emissions. Without minimising countries' self-interest in preserving their companies' international competitiveness, trade partners could find common ground to foster a win-win agenda whereby both national emissions and imported “embodied” emissions can be reduced.

Fortunately, countries are not entirely starting from scratch in this endeavour. More recently, the Climate Club has brought together 42 developed and emerging countries (China and India are notably absent) around the decarbonisation of heavy industry, recognising the need to open a transparent conversation on the issue of carbon leakage. The Club also includes a Global Matchmaking Platform²⁰. It had been preceded by many contributions in this area including the Industrial Deep Decarbonisation Initiative of the Clean Energy Ministerial, which brings together both public and private sectors stakeholders in industrial materials. The Leadership Group for Industry Transition (LeadIT), co-chaired by India and Sweden, is another important contribution, with its newly launched Industry Transition Partnership, focusing on supporting innovation, mobilising finance and advancing market-based mechanisms; the Brazil-UK Industry Decarbonisation Hub is another example²¹.

At this stage, it is fair to ask what may be needed to help all such initiatives to deliver a boost on global mitigation through the reduction of embodied emissions; the frameworks exist, but they lack political impetus necessary to bring sizeable real-world changes and investments at scale in industrial, crops, etc. decarbonisation. Given their important weight on embodied GHG emissions in trade, G20 countries could provide such impetus.

Overall, it is high time for countries on both sides (importers and exporters of embodied carbon) to acknowledge their responsibility and co-dependence, when it comes to minimising their carbon footprints.

¹⁹ https://downloads.unido.org/ot/30/40/30406411/27%20March_IDDI%20PPT.pdf

²⁰ <https://climate-club.org>

²¹ <https://www.industrytransition.org/industry-transition-partnership/>

c. Reflecting imported emissions in countries Nationally Determined Contributions?

The question of imported emissions is on the policy radar of a few countries. Norway, France, Sweden, the United Kingdom among others are beginning to recognise this dimension and have calculated their carbon footprints, without committing to their reduction. Several national scientific institutions, notably in the UK (Committee on Climate Change) and France (*Haut Conseil pour le Climat*), have called for the reduction of carbon footprints to be included in their countries' climate strategies²².

A few countries have reflected considerations of their full carbon footprint in official UNFCCC documents including the not-legally binding long-term low emissions development strategies. As stated earlier, the UNFCCC requires that countries commit to limiting emissions based on their territorial GHG inventories and to date no country has made a commitment, whether at international or national level, to limit its carbon footprint. Naturally, such initiatives are more likely to be effective if there is a pre-existing framework whereby countries recognise their co-dependence when it comes to their imported emissions and plan to undertake joint measures to address them. Re-opening the nature of UNFCCC Parties' mitigation commitments under the Paris Agreement to integrate imported emissions is probably an elusive goal. However, countries could start to systematically measure emissions embodied in their imports to create an avenue for international cooperation on mitigation. Some G20 countries could begin to make commitments to reduce their GHG emissions from imports and draw up reduction plans in conjunction with their partners.

²² <https://www.sei.org/publications/consumption-emissions-opportunities-eu-climate-mitigation/>





Conclusion

G20 countries account for the vast majority of imported emissions, and have the policy, market, and financial capability to accelerate the transition of all GHG-emitting activities. Their commitment to do so could now be enhanced through the recognition of their co-dependence with trade partners on their global GHG footprint. The data presented here shows the significance of the issue.

Clearly, countries interested in acting on this dimension will need far more granular information on the carbon content of traded goods, i.e. commonly agreed methodologies on the measurement of embodied carbon would greatly facilitate their policy discussions²³. Existing fora (IDDI, LeadIT, the Climate Club) should be harnessed to deliver this, as an essential building block of an accelerated global decarbonisation agenda.

²³ This point is also stressed in the G20 Principles on Trade and Sustainable Development (paragraph 4).

Glossary

CO₂e: CO₂-equivalent, also abbreviated “CO₂-eq”. It is a metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential.

Imported emissions: emissions that a country’s final consumption induces in another country.

Exported emissions: emissions generated by a country for the final consumption of another country.

Traded emissions: difference between imported and exported emissions.

Territorial emissions / Domestic emissions / Production-based emissions: emissions generated inside a country’s boundaries.

Consumption-based emissions/carbon footprint: emissions generated by the final consumption of a country. It is calculated by summing its domestic emissions and its imported emissions, minus its exported emissions.

Carbon leakage: phenomenon where efforts to reduce greenhouse gas emissions in one country (in terms of territorial emissions) lead to an increase in emissions in another country. This undermines the effectiveness of climate policies since the overall reduction in global emissions is diminished. In some cases, carbon leakage can even lead to a global increase in emissions if the new production location is more carbon intensive.

Scope 2 emissions: emissions related to the consumption of electricity, steam or heat of an entity, generated outside of the direct scope of the entity.





Annex : Country fact sheets



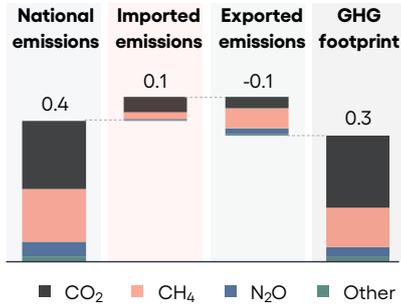
Argentina

GDP : \$488B

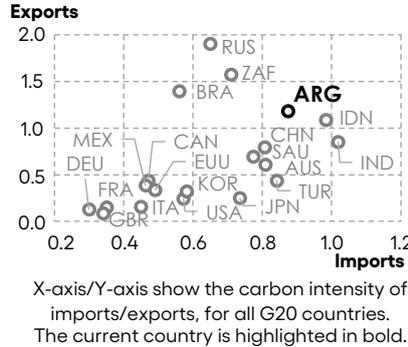
Imports : \$73B (15% of GDP)

Exports : \$88B (18% of GDP)

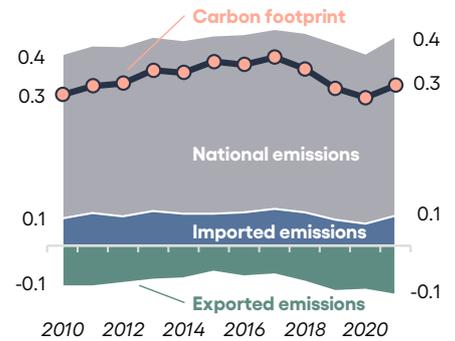
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



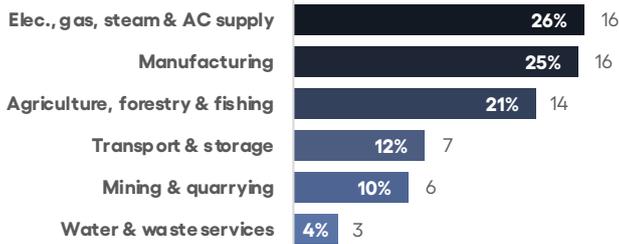
Trends (GtCO₂eq, 2010-2021)



Imports 64 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

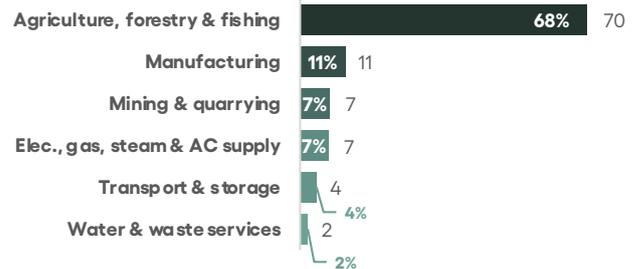
Argentina's imports generate emissions in the following sectors abroad



Exports 103 MtCO₂eq

Top 6 exports (% , MtCO₂eq)

Argentina's exports generate emissions in the following sectors on its territory

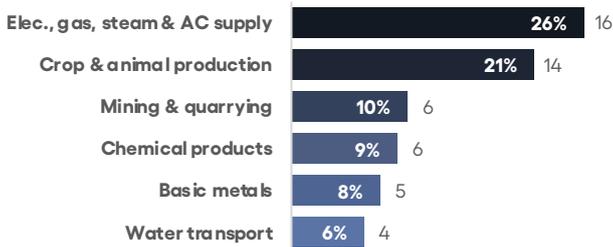


Main sectors

Main products and services

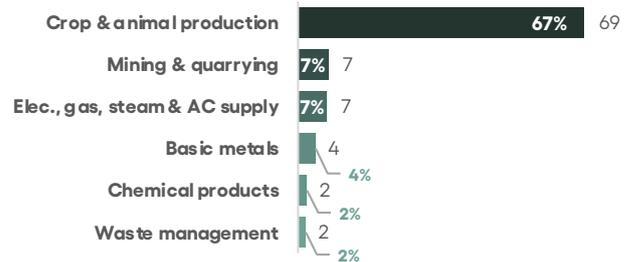
Top 6 imported (% , MtCO₂eq)

Argentina's imports generate emissions for the following products and services abroad



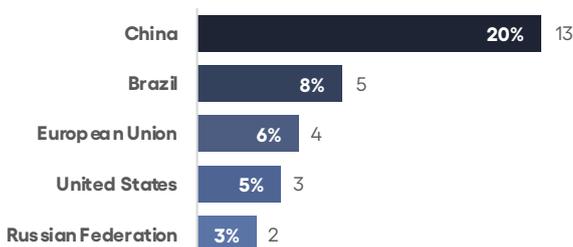
Top 6 exported (% , MtCO₂eq)

Argentina's exports generate emissions for the following products and services on its territory

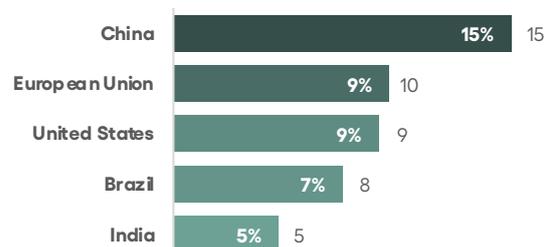


Main sources and destinations of emissions

Top 5 sources of Argentina's imports (% , MtCO₂eq)



Top 5 destinations of Argentina's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



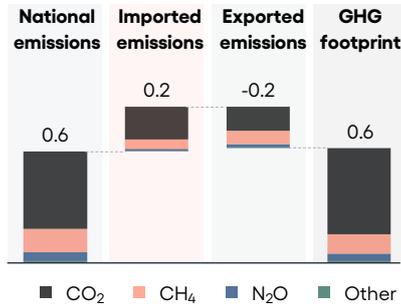
Australia

GDP : \$1,559B

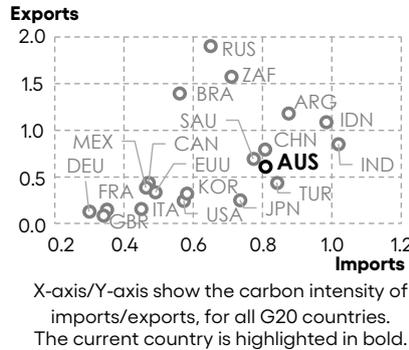
Imports : \$276B (18% of GDP)

Exports : \$343B (22% of GDP)

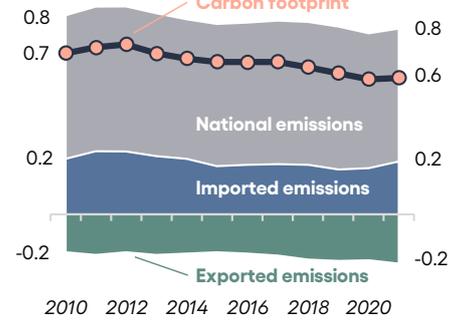
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



Trends (GtCO₂eq, 2010-2021)

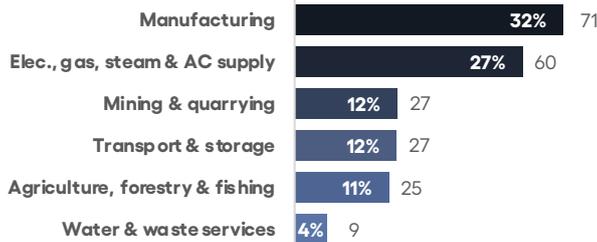


Imports

223 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

Australia's imports generate emissions in the following sectors abroad



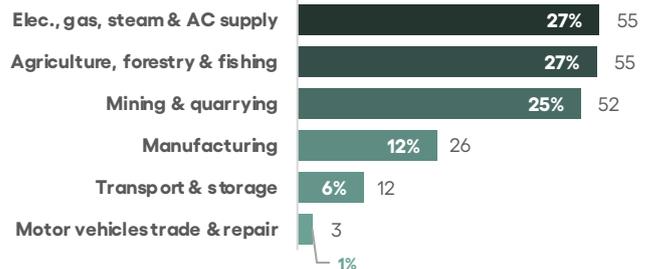
Exports

207 MtCO₂eq

Main sectors

Top 6 exports (% , MtCO₂eq)

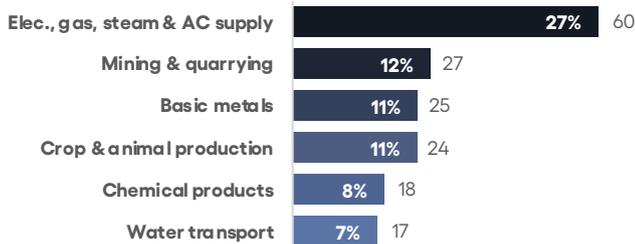
Australia's exports generate emissions in the following sectors on its territory



Main products and services

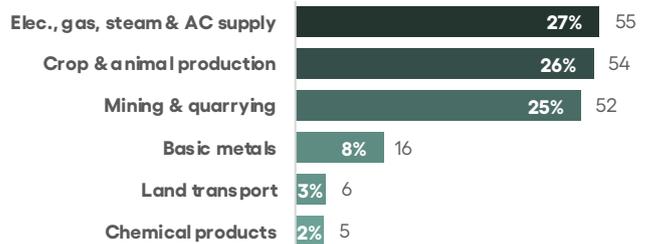
Top 6 imported (% , MtCO₂eq)

Australia's imports generate emissions for the following products and services abroad



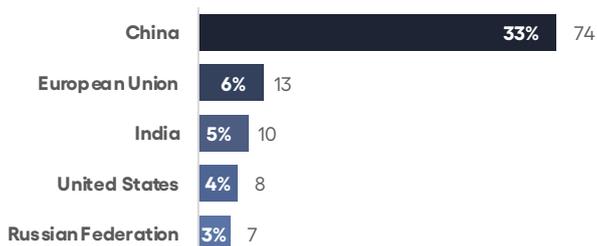
Top 6 exported (% , MtCO₂eq)

Australia's exports generate emissions for the following products and services on its territory

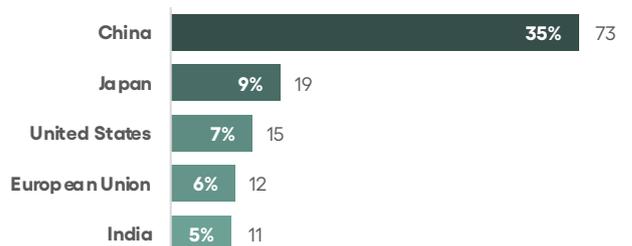


Main sources and destinations of emissions

Top 5 sources of Australia's imports (% , MtCO₂eq)



Top 5 destinations of Australia's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



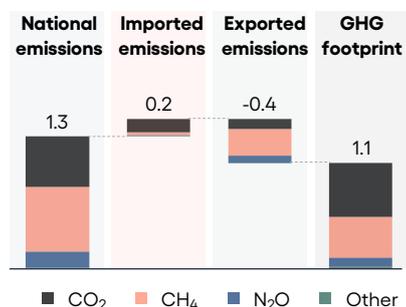
Brazil

GDP : \$1,671B

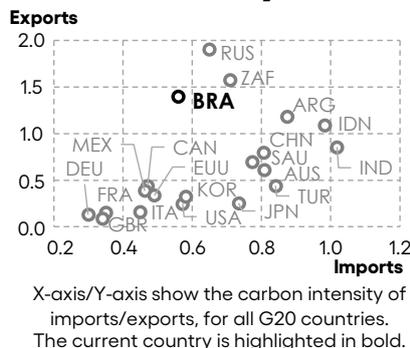
Imports : \$310B (19% of GDP)

Exports : \$319B (19% of GDP)

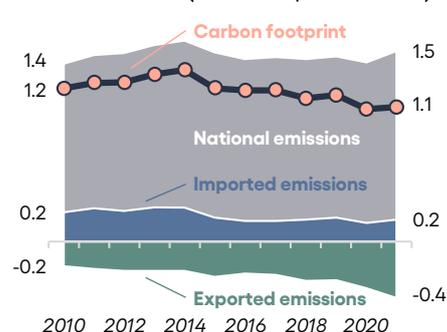
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



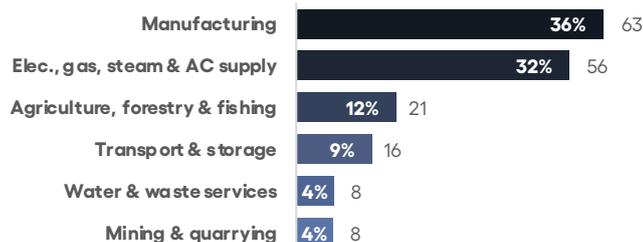
Trends (GtCO₂eq, 2010-2021)



Imports 174 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

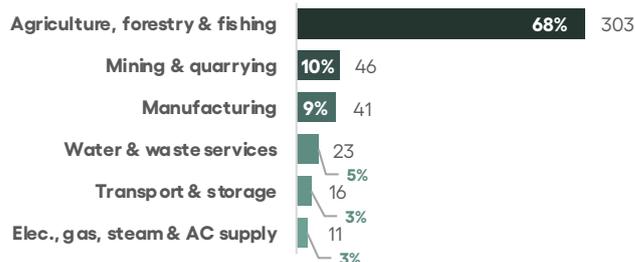
Brazil's imports generate emissions in the following sectors abroad



Exports 444 MtCO₂eq

Top 6 exports (% , MtCO₂eq)

Brazil's exports generate emissions in the following sectors on its territory

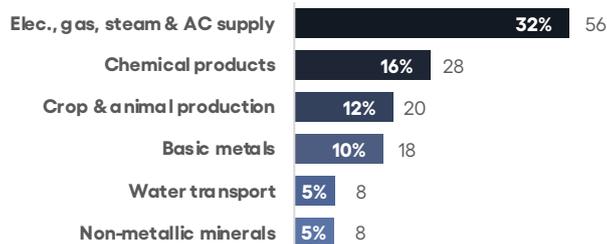


Main sectors

Main products and services

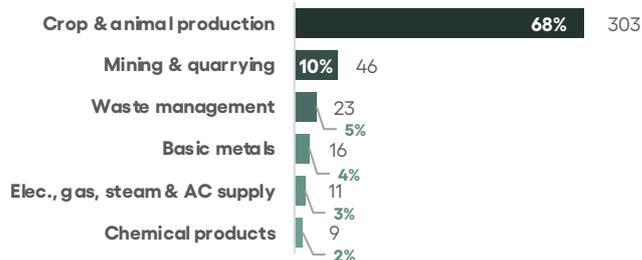
Top 6 imported (% , MtCO₂eq)

Brazil's imports generate emissions for the following products and services abroad



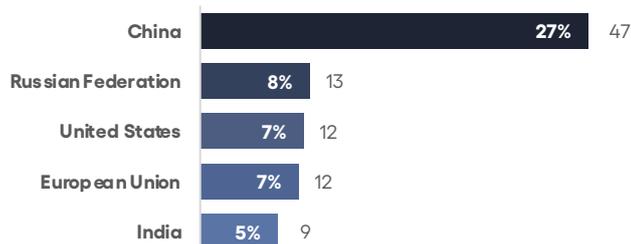
Top 6 exported (% , MtCO₂eq)

Brazil's exports generate emissions for the following products and services on its territory

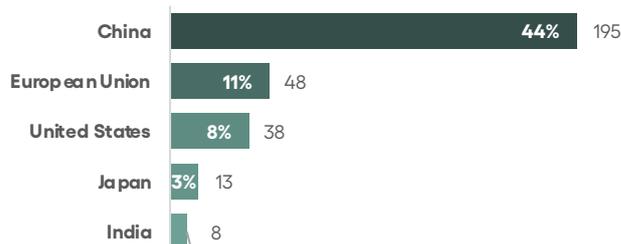


Main sources and destinations of emissions

Top 5 sources of Brazil's imports (% , MtCO₂eq)



Top 5 destinations of Brazil's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



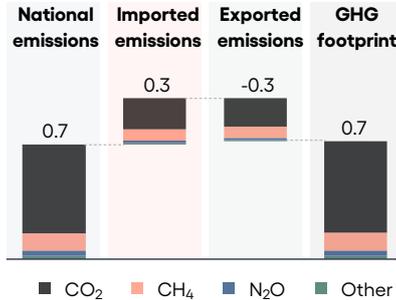
Canada

GDP : \$2,007B

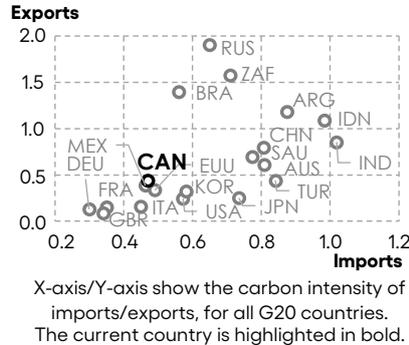
Imports : \$626B (31% of GDP)

Exports : \$627B (31% of GDP)

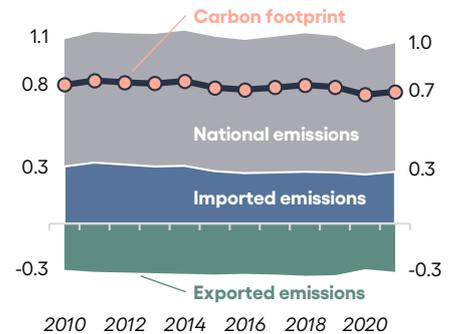
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



Trends (GtCO₂eq, 2010-2021)

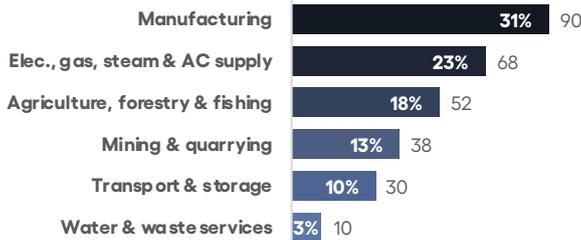


Imports

295 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

Canada's imports generate emissions in the following sectors abroad



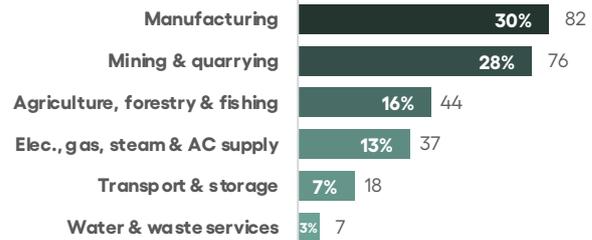
Exports

274 MtCO₂eq

Main sectors

Top 6 exports (% , MtCO₂eq)

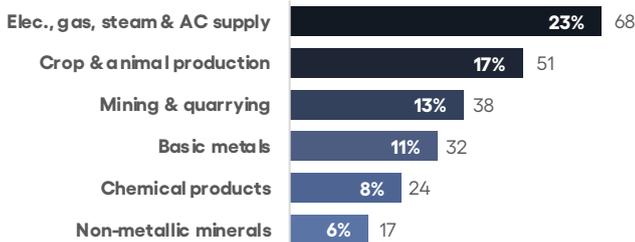
Canada's exports generate emissions in the following sectors on its territory



Main products and services

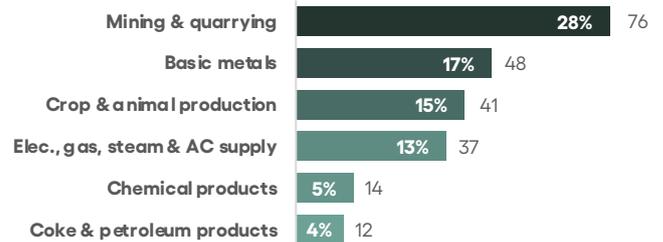
Top 6 imported (% , MtCO₂eq)

Canada's imports generate emissions for the following products and services abroad



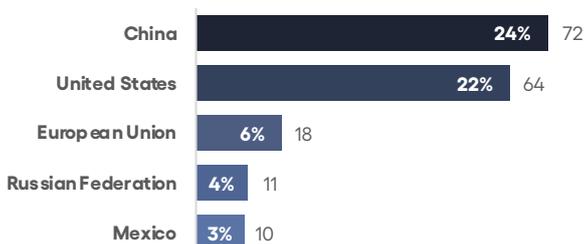
Top 6 exported (% , MtCO₂eq)

Canada's exports generate emissions for the following products and services on its territory

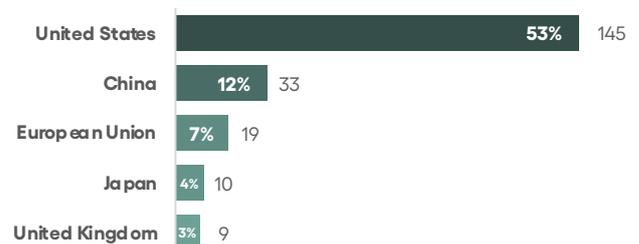


Main sources and destinations of emissions

Top 5 sources of Canada's imports (% , MtCO₂eq)



Top 5 destinations of Canada's exports (% , MtCO₂eq)



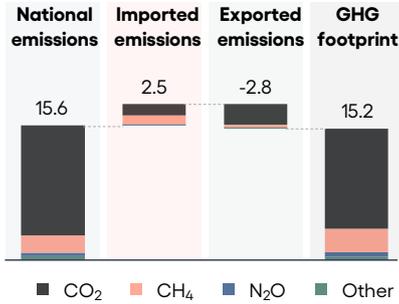
Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



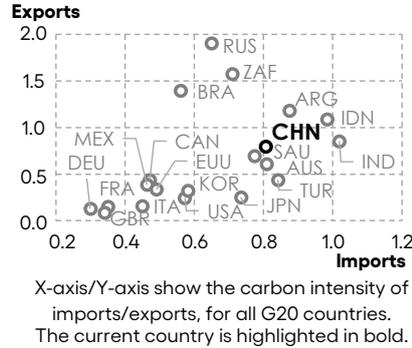
China

GDP : \$17,820B Imports : \$3,093B (17% of GDP) Exports : \$3,554B (20% of GDP)

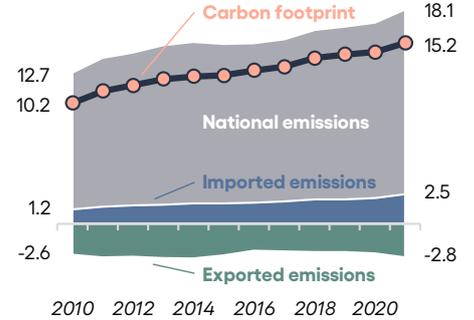
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



Trends (GtCO₂eq, 2010-2021)



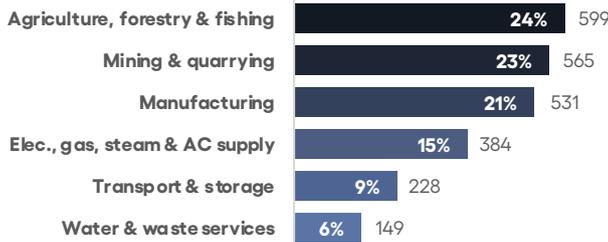
Imports

2,497 MtCO₂eq

Main sectors

Top 6 imports (% , MtCO₂eq)

China's imports generate emissions in the following sectors abroad

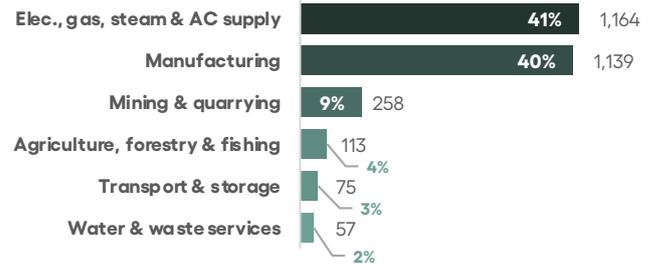


Exports

2,826 MtCO₂eq

Top 6 exports (% , MtCO₂eq)

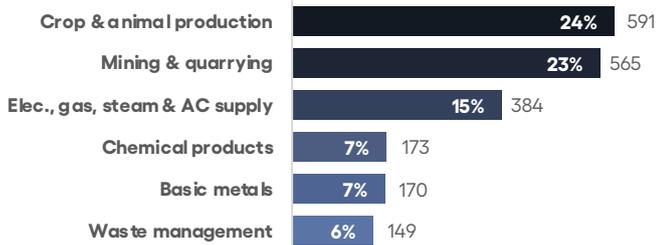
China's exports generate emissions in the following sectors on its territory



Main products and services

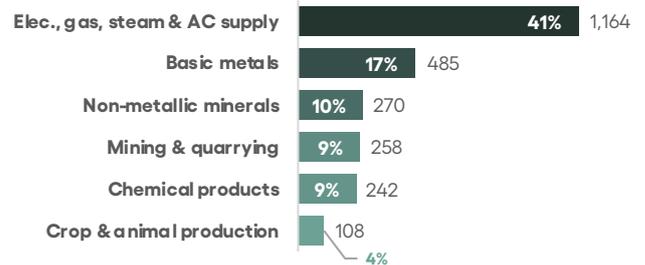
Top 6 imported (% , MtCO₂eq)

China's imports generate emissions for the following products and services abroad



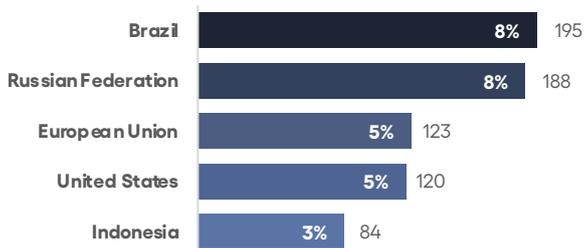
Top 6 exported (% , MtCO₂eq)

China's exports generate emissions for the following products and services on its territory

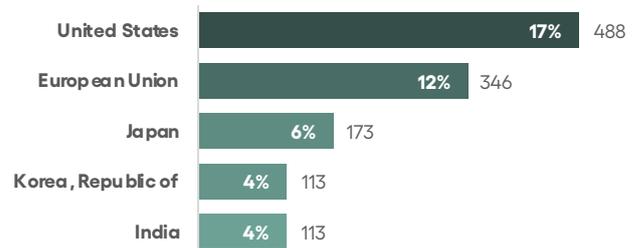


Main sources and destinations of emissions

Top 5 sources of China's imports (% , MtCO₂eq)



Top 5 destinations of China's exports (% , MtCO₂eq)



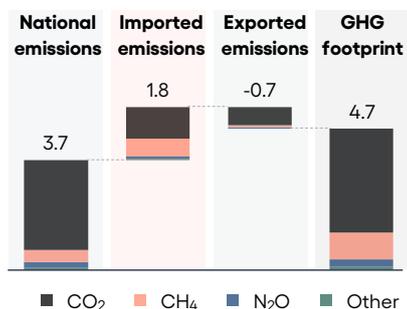
Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



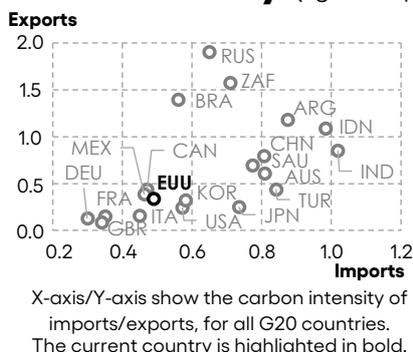
European Union

GDP : \$17,315B Imports : \$8,089B (47% of GDP) Exports : \$8,747B (51% of GDP)

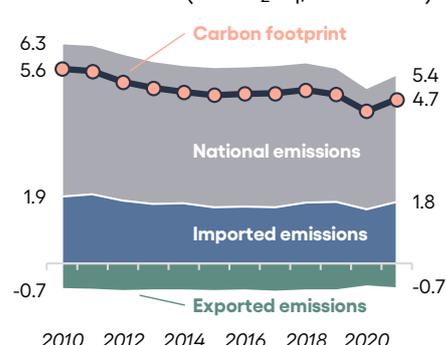
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



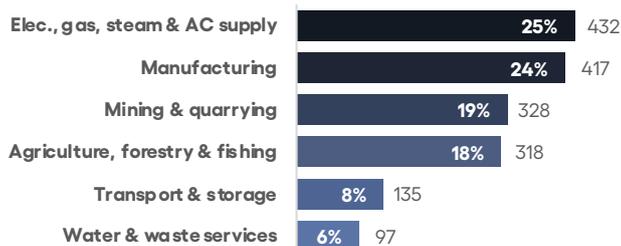
Trends (GtCO₂eq, 2010-2021)



Imports 1,762 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

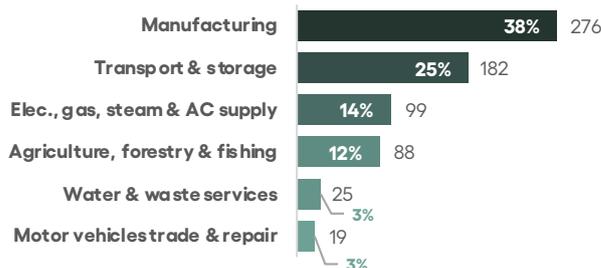
EU's imports generate emissions in the following sectors abroad



Exports 721 MtCO₂eq

Top 6 exports (% , MtCO₂eq)

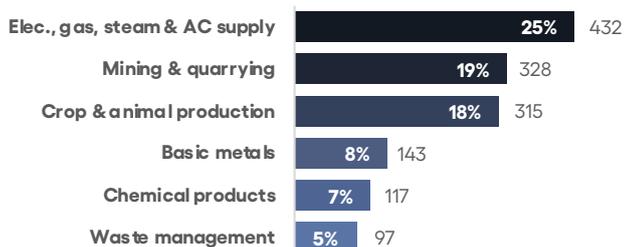
EU's exports generate emissions in the following sectors on its territory



Main products and services

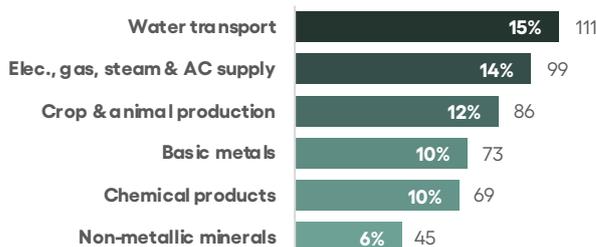
Top 6 imported (% , MtCO₂eq)

EU's imports generate emissions for the following products and services abroad



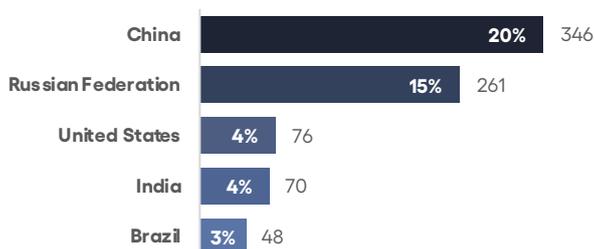
Top 6 exported (% , MtCO₂eq)

EU's exports generate emissions for the following products and services on its territory

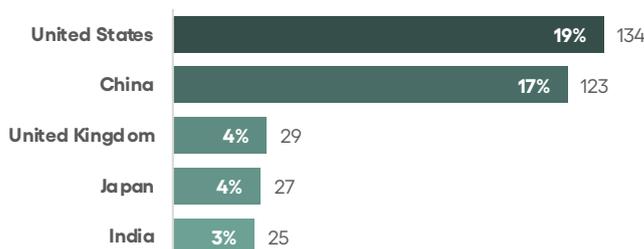


Main sources and destinations of emissions

Top 5 sources of EU's imports (% , MtCO₂eq)



Top 5 destinations of EU's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



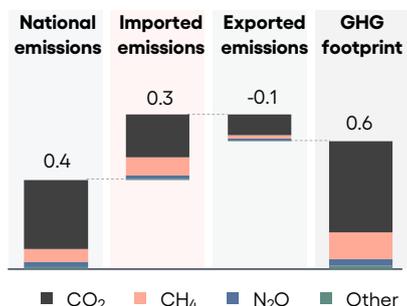
France – Including intra-EU trade

GDP : \$2,959B

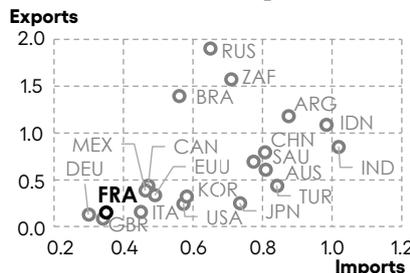
Imports : \$945B (32% of GDP)

Exports : \$889B (30% of GDP)

GHG footprint (GtCO₂eq)

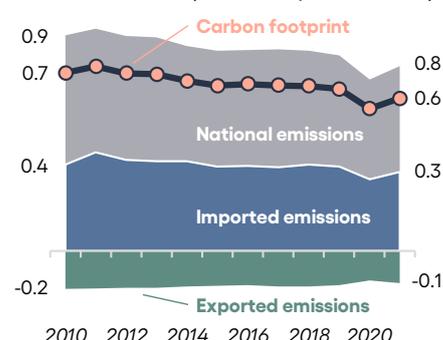


GHG intensity (kgCO₂eq/\$)



X-axis/Y-axis show the carbon intensity of imports/exports, for all G20 countries. The current country is highlighted in bold.

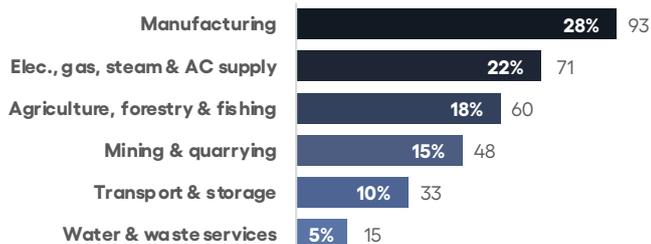
Trends (GtCO₂eq, 2010-2021)



Imports 330 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

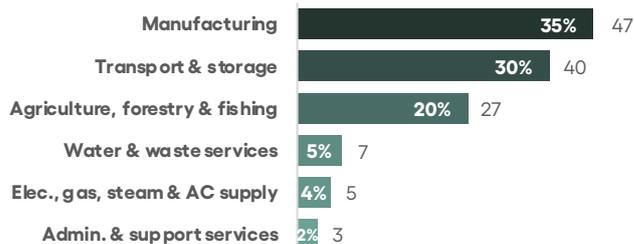
France's imports generate emissions in the following sectors abroad



Exports 134 MtCO₂eq

Top 6 exports (% , MtCO₂eq)

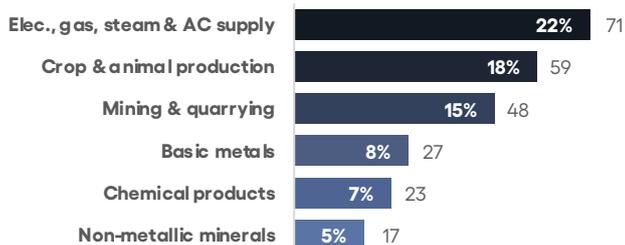
France's exports generate emissions in the following sectors on its territory



Main products and services

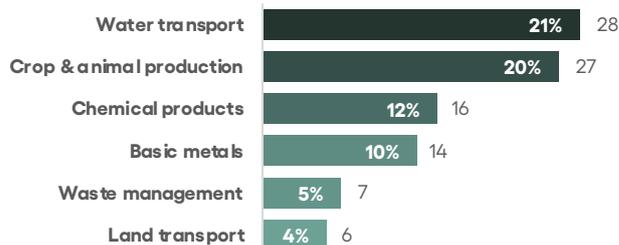
Top 6 imported (% , MtCO₂eq)

France's imports generate emissions for the following products and services abroad



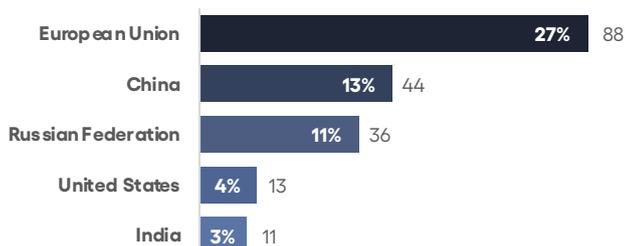
Top 6 exported (% , MtCO₂eq)

France's exports generate emissions for the following products and services on its territory

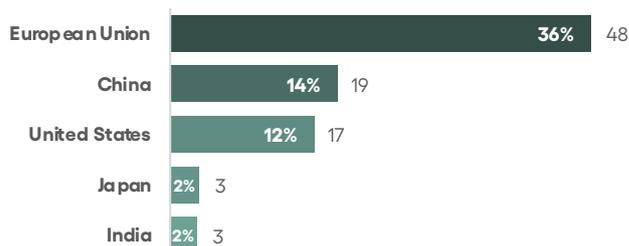


Main sources and destinations of emissions

Top 5 sources of France's imports (% , MtCO₂eq)



Top 5 destinations of France's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



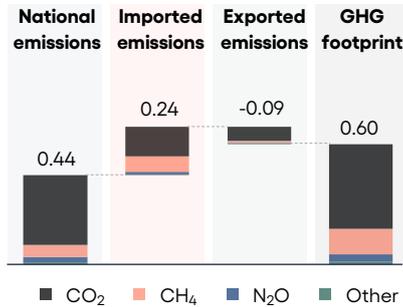
France – Excluding intra-EU trade

GDP : \$2,959B

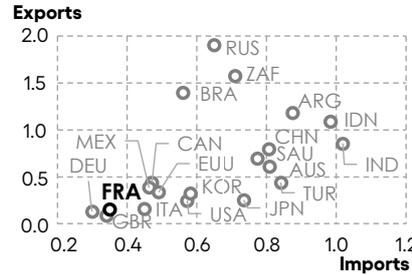
Imports : \$945B (32% of GDP)

Exports : \$889B (30% of GDP)

GHG footprint (GtCO₂eq)

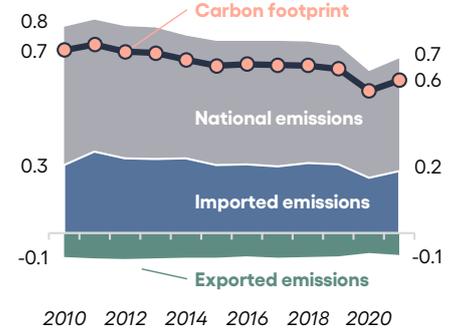


GHG intensity (kgCO₂eq/\$)



X-axis/Y-axis show the carbon intensity of imports/exports, for all G20 countries. The current country is highlighted in bold.

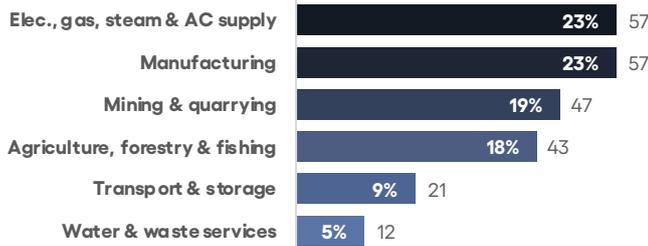
Trends (GtCO₂eq, 2010-2021)



Imports 242 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

France's imports generate emissions in the following sectors abroad

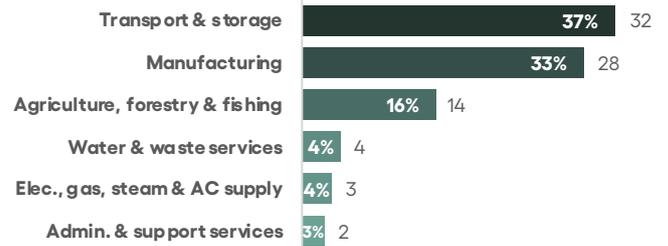


Exports 86 MtCO₂eq

Main sectors

Top 6 exports (% , MtCO₂eq)

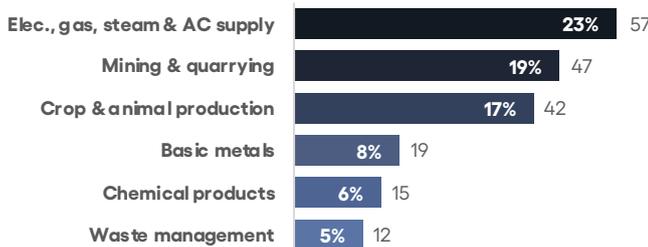
France's exports generate emissions in the following sectors on its territory



Main products and services

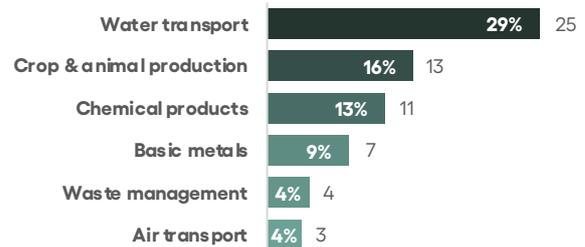
Top 6 imported (% , MtCO₂eq)

France's imports generate emissions for the following products and services abroad



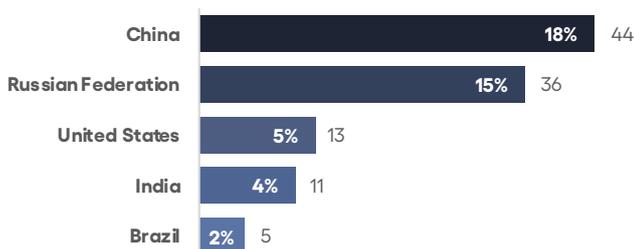
Top 6 exported (% , MtCO₂eq)

France's exports generate emissions for the following products and services on its territory

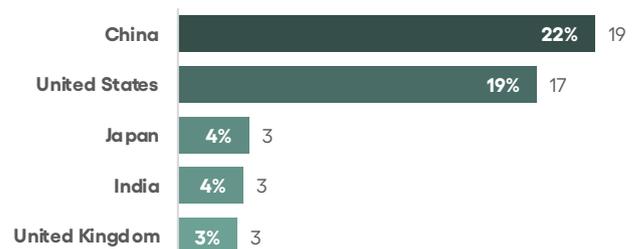


Main sources and destinations of emissions

Top 5 sources of France's imports (% , MtCO₂eq)



Top 5 destinations of France's exports (% , MtCO₂eq)



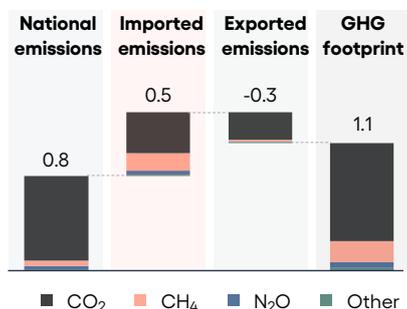
Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



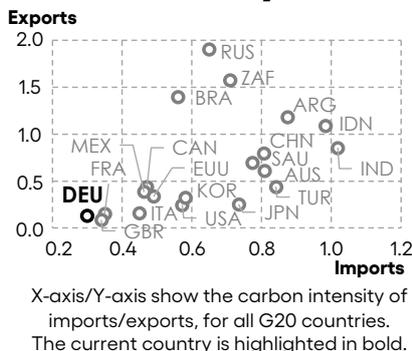
Germany – Including intra-EU trade

GDP : \$4,279B Imports : \$1,792B (42% of GDP) Exports : \$2,023B (47% of GDP)

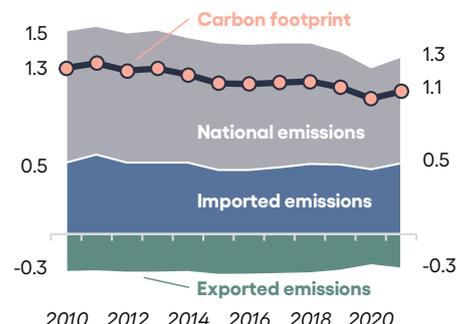
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



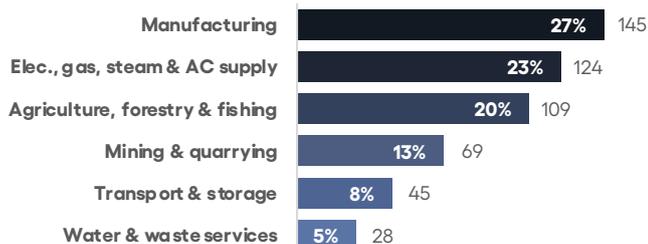
Trends (GtCO₂eq, 2010-2021)



Imports 535 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

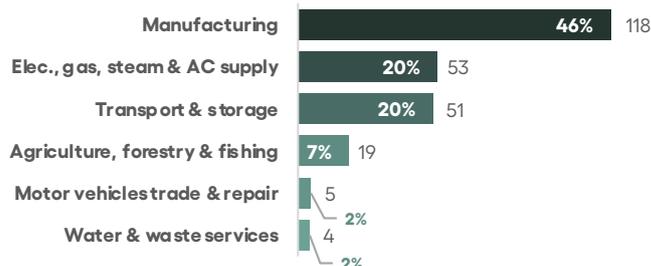
Germany's imports generate emissions in the following sectors abroad



Exports 258 MtCO₂eq

Top 6 exports (% , MtCO₂eq)

Germany's exports generate emissions in the following sectors on its territory

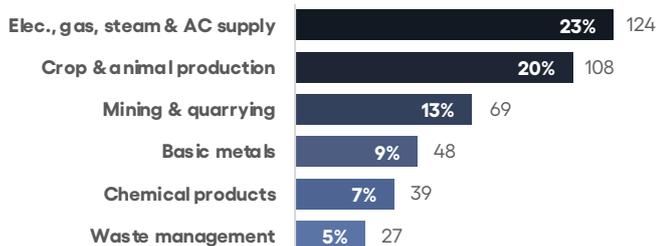


Main sectors

Main products and services

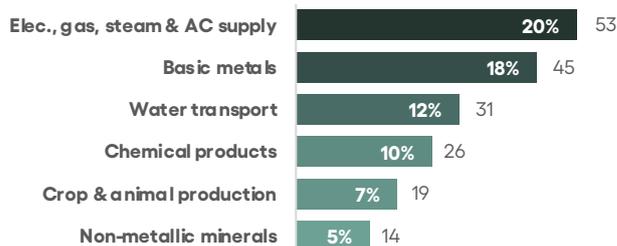
Top 6 imported (% , MtCO₂eq)

Germany's imports generate emissions for the following products and services abroad



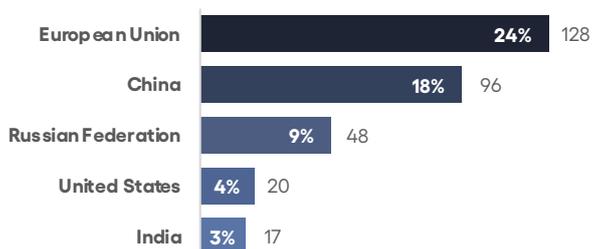
Top 6 exported (% , MtCO₂eq)

Germany's exports generate emissions for the following products and services on its territory

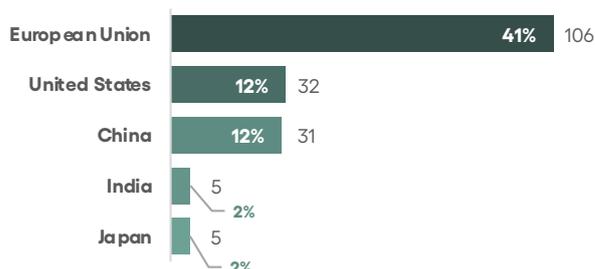


Main sources and destinations of emissions

Top 5 sources of Germany's imports (% , MtCO₂eq)



Top 5 destinations of Germany's exports (% , MtCO₂eq)



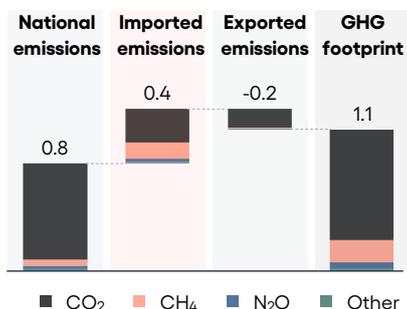
Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



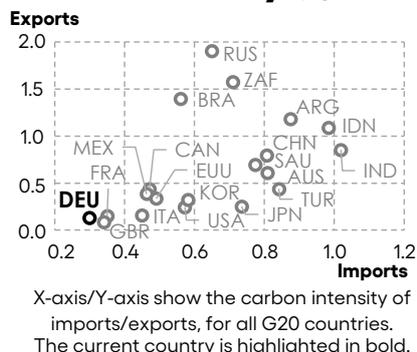
Germany – Excluding intra-EU trade

GDP : \$4,279B Imports : \$1,792B (42% of GDP) Exports : \$2,023B (47% of GDP)

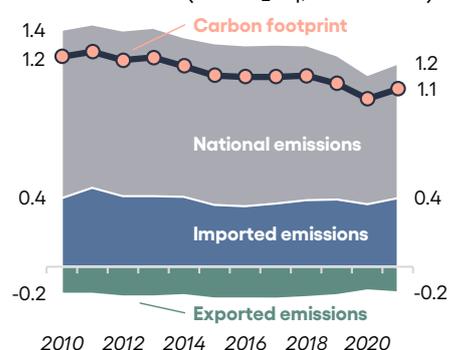
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



Trends (GtCO₂eq, 2010-2021)



Imports

407 MtCO₂eq

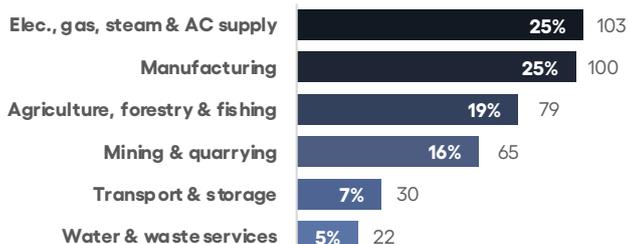
Exports

153 MtCO₂eq

Main sectors

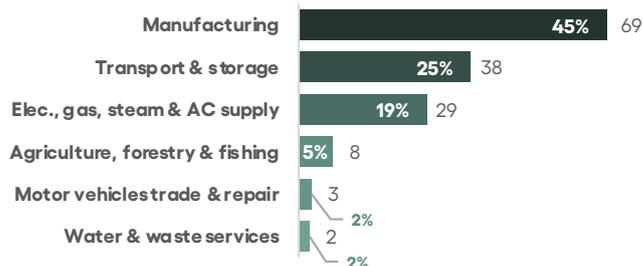
Top 6 imports (% , MtCO₂eq)

Germany's imports generate emissions in the following sectors abroad



Top 6 exports (% , MtCO₂eq)

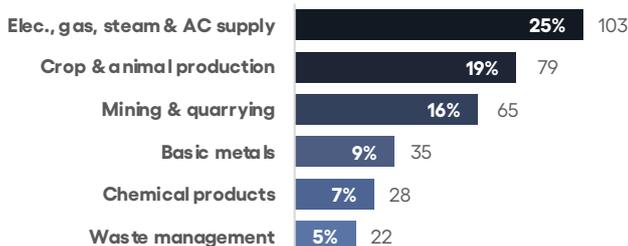
Germany's exports generate emissions in the following sectors on its territory



Main products and services

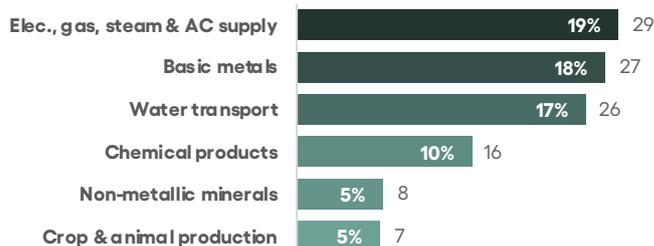
Top 6 imported (% , MtCO₂eq)

Germany's imports generate emissions for the following products and services abroad



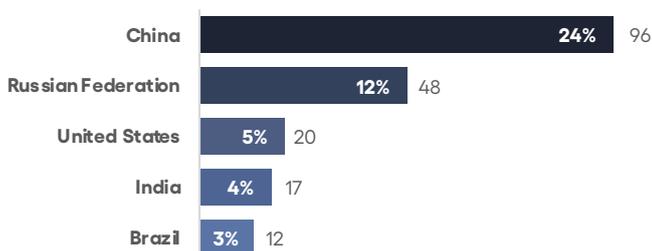
Top 6 exported (% , MtCO₂eq)

Germany's exports generate emissions for the following products and services on its territory

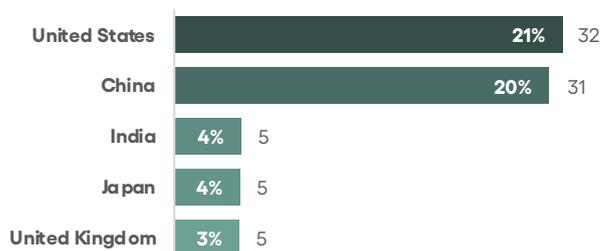


Main sources and destinations of emissions

Top 5 sources of Germany's imports (% , MtCO₂eq)



Top 5 destinations of Germany's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



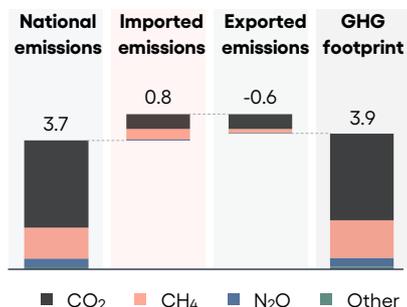
India

GDP : \$3,167B

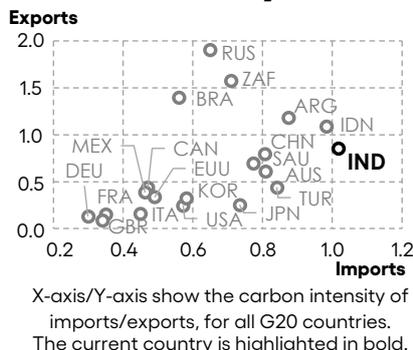
Imports : \$761B (24% of GDP)

Exports : \$678B (21% of GDP)

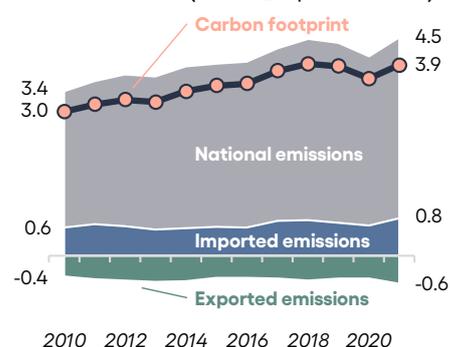
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



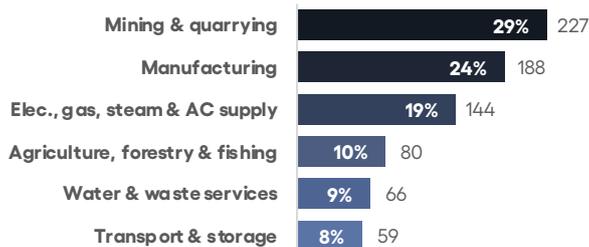
Trends (GtCO₂eq, 2010-2021)



Imports 775 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

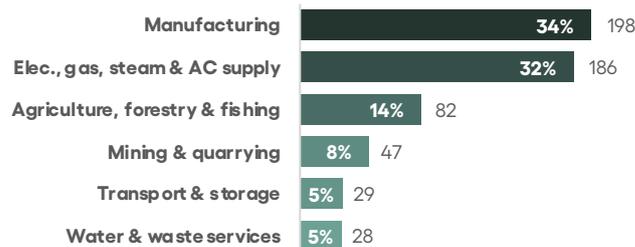
India's imports generate emissions in the following sectors abroad



Exports 579 MtCO₂eq

Top 6 exports (% , MtCO₂eq)

India's exports generate emissions in the following sectors on its territory

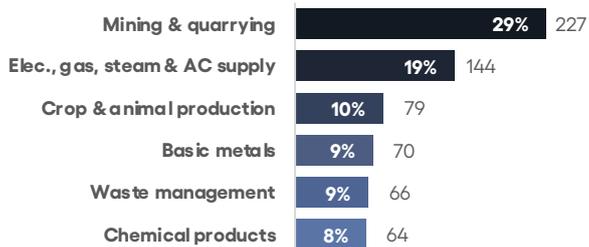


Main sectors

Main products and services

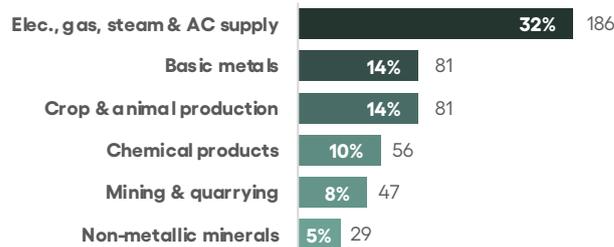
Top 6 imported (% , MtCO₂eq)

India's imports generate emissions for the following products and services abroad



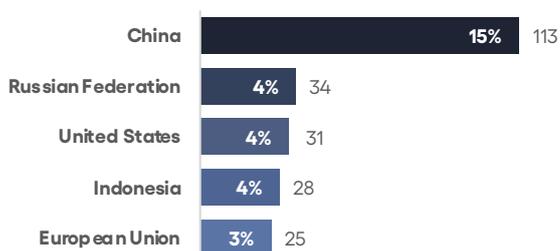
Top 6 exported (% , MtCO₂eq)

India's exports generate emissions for the following products and services on its territory

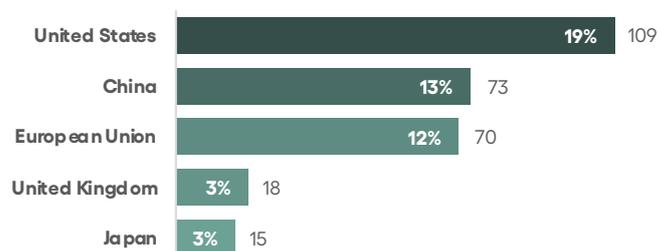


Main sources and destinations of emissions

Top 5 sources of India's imports (% , MtCO₂eq)



Top 5 destinations of India's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



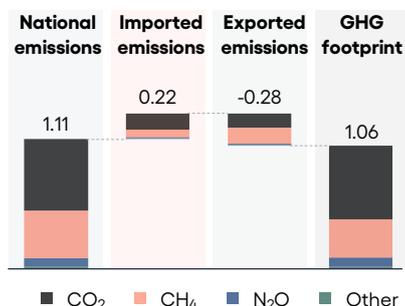
Indonesia

GDP : \$1,187B

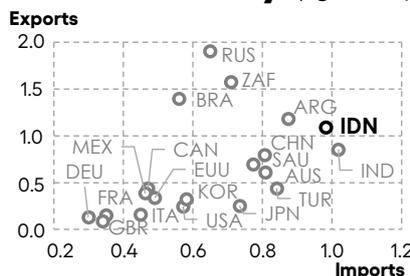
Imports : \$223B (19% of GDP)

Exports : \$254B (21% of GDP)

GHG footprint (GtCO₂eq)

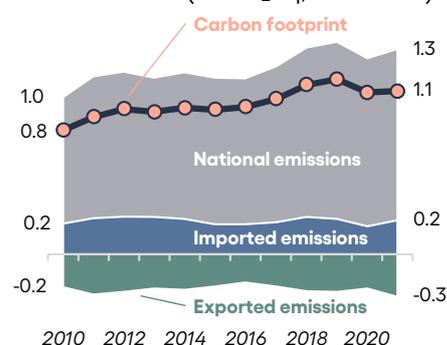


GHG intensity (kgCO₂eq/\$)



X-axis/Y-axis show the carbon intensity of imports/exports, for all G20 countries. The current country is highlighted in bold.

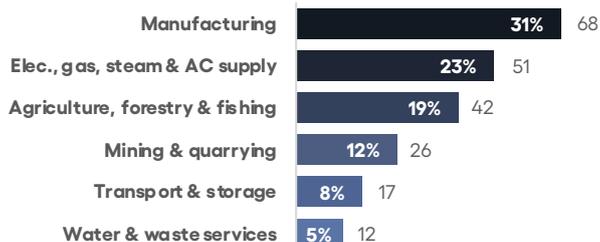
Trends (GtCO₂eq, 2010-2021)



Imports 219 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

Indonesia's imports generate emissions in the following sectors abroad

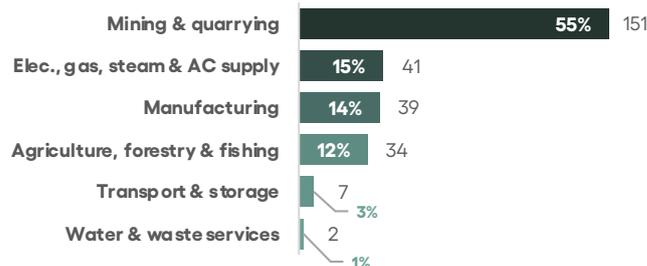


Exports 276 MtCO₂eq

Main sectors

Top 6 exports (% , MtCO₂eq)

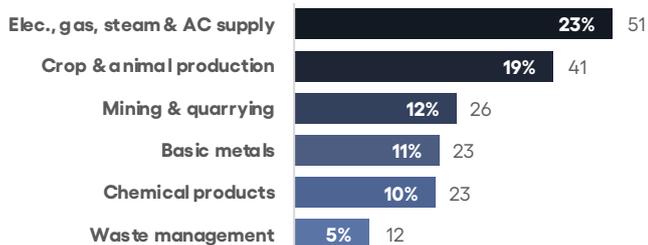
Indonesia's exports generate emissions in the following sectors on its territory



Main products and services

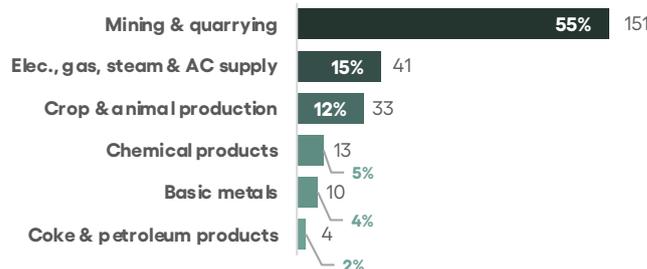
Top 6 imported (% , MtCO₂eq)

Indonesia's imports generate emissions for the following products and services abroad



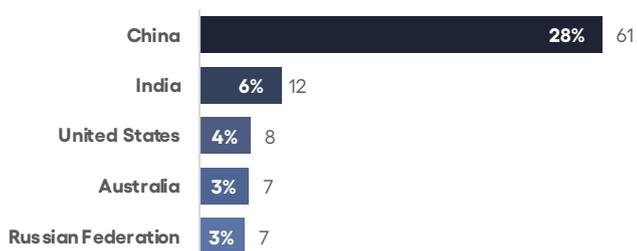
Top 6 exported (% , MtCO₂eq)

Indonesia's exports generate emissions for the following products and services on its territory

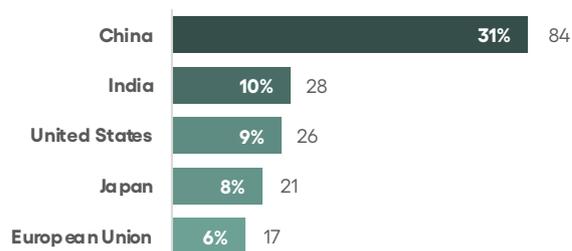


Main sources and destinations of emissions

Top 5 sources of Indonesia's imports (% , MtCO₂eq)



Top 5 destinations of Indonesia's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs.

Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



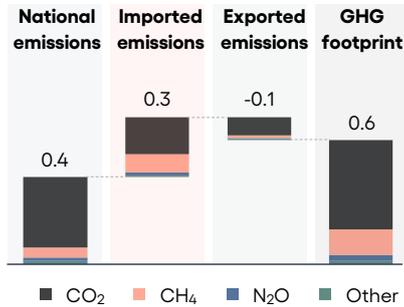
Italy – Including intra-EU trade

GDP : \$2,155B

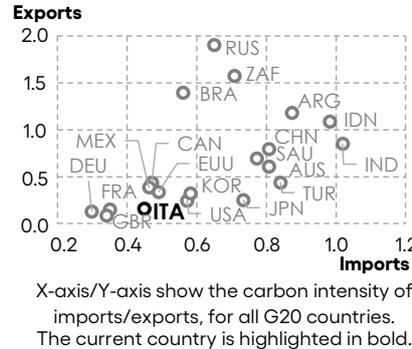
Imports : \$645B (30% of GDP)

Exports : \$692B (32% of GDP)

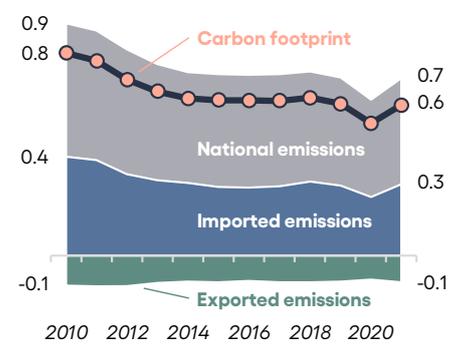
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



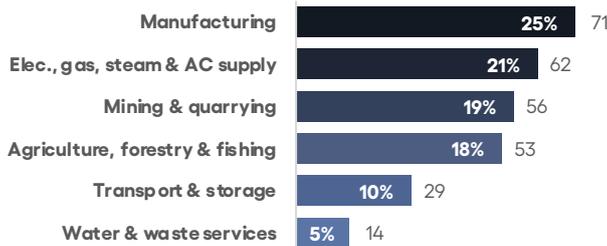
Trends (GtCO₂eq, 2010-2021)



Imports 290 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

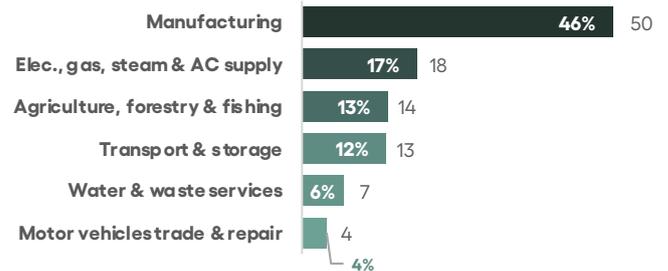
Italy's imports generate emissions in the following sectors abroad



Exports 109 MtCO₂eq

Top 6 exports (% , MtCO₂eq)

Italy's exports generate emissions in the following sectors on its territory

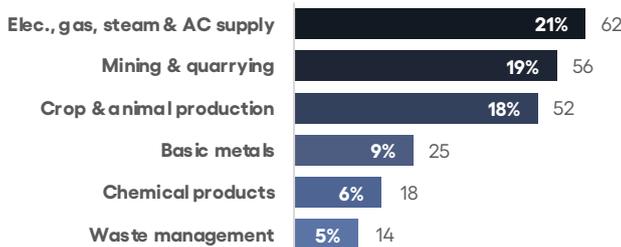


Main sectors

Main products and services

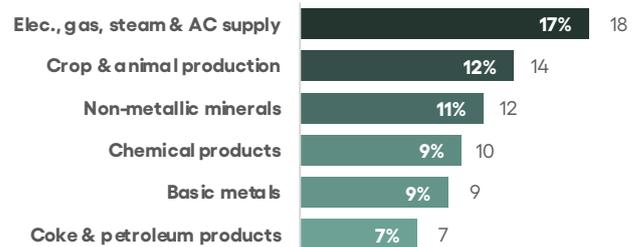
Top 6 imported (% , MtCO₂eq)

Italy's imports generate emissions for the following products and services abroad



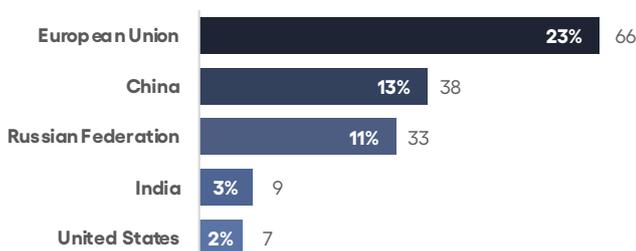
Top 6 exported (% , MtCO₂eq)

Italy's exports generate emissions for the following products and services on its territory

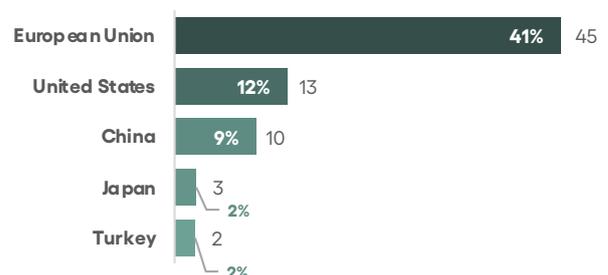


Main sources and destinations of emissions

Top 5 sources of Italy's imports (% , MtCO₂eq)



Top 5 destinations of Italy's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



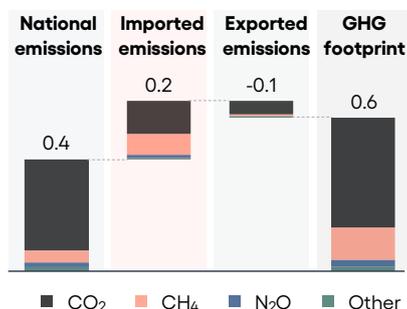
Italy – Excluding intra-EU trade

GDP : \$2,155B

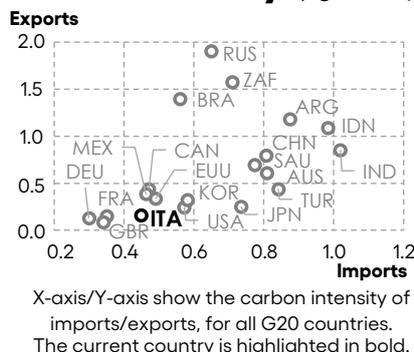
Imports : \$645B (30% of GDP)

Exports : \$692B (32% of GDP)

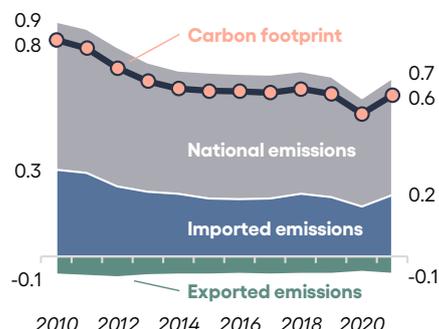
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



Trends (GtCO₂eq, 2010-2021)



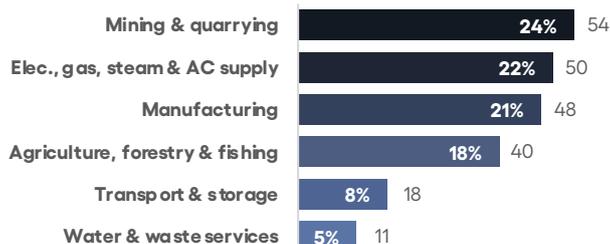
Imports 224 MtCO₂eq

Exports 64 MtCO₂eq

Main sectors

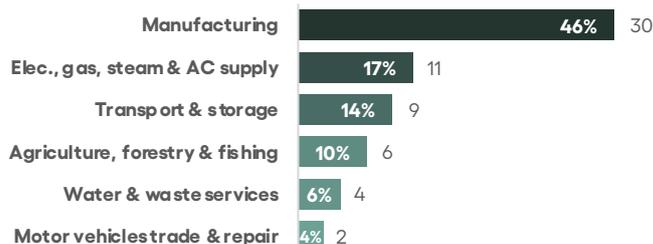
Top 6 imports (% , MtCO₂eq)

Italy's imports generate emissions in the following sectors abroad



Top 6 exports (% , MtCO₂eq)

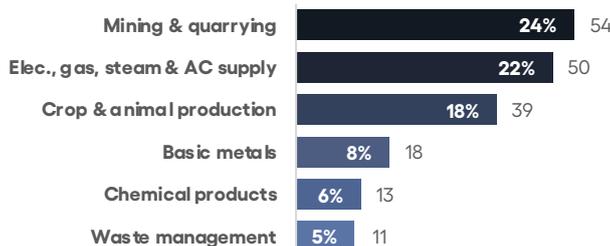
Italy's exports generate emissions in the following sectors on its territory



Main products and services

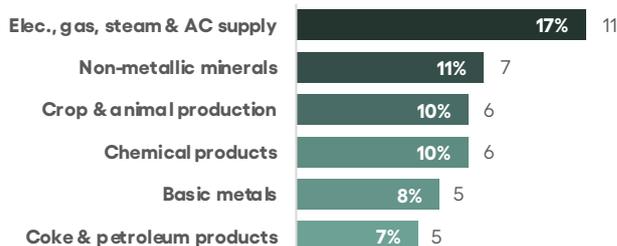
Top 6 imported (% , MtCO₂eq)

Italy's imports generate emissions for the following products and services abroad



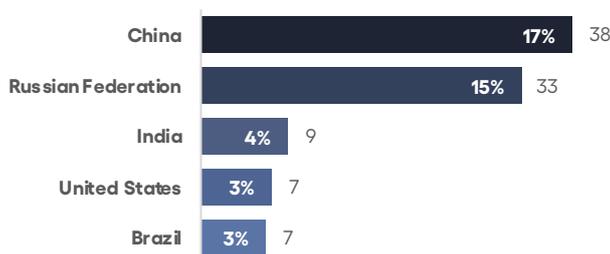
Top 6 exported (% , MtCO₂eq)

Italy's exports generate emissions for the following products and services on its territory

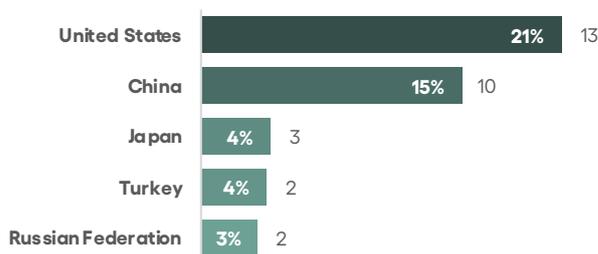


Main sources and destinations of emissions

Top 5 sources of Italy's imports (% , MtCO₂eq)



Top 5 destinations of Italy's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



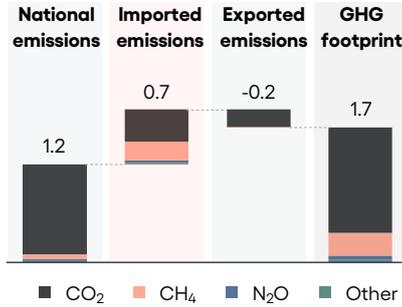
Japan

GDP : \$5,035B

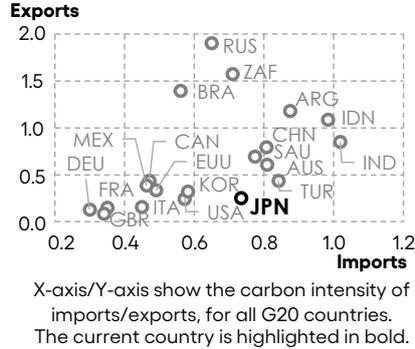
Imports : \$939B (19% of GDP)

Exports : \$913B (18% of GDP)

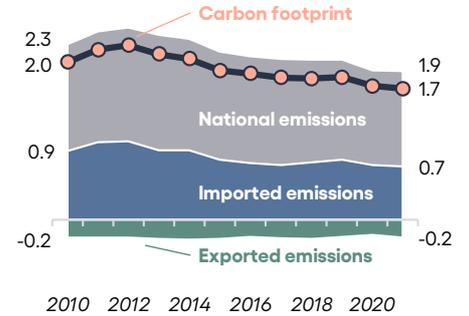
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



Trends (GtCO₂eq, 2010-2021)

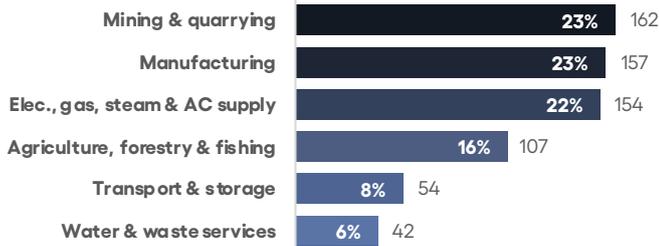


Imports

689 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

Japan's imports generate emissions in the following sectors abroad



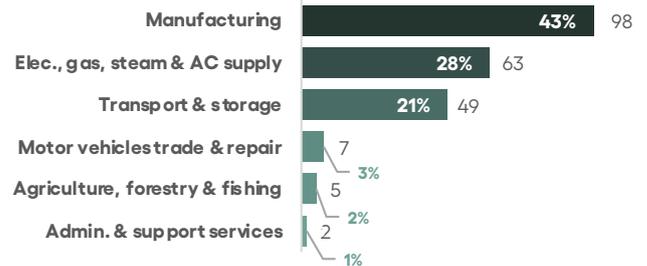
Exports

229 MtCO₂eq

Main sectors

Top 6 exports (% , MtCO₂eq)

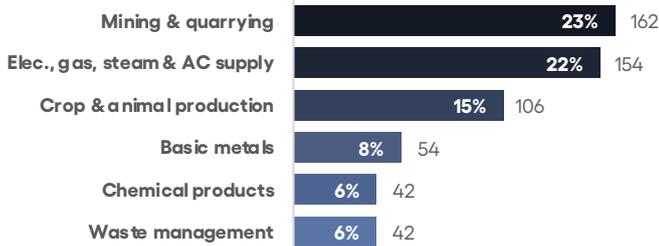
Japan's exports generate emissions in the following sectors on its territory



Main products and services

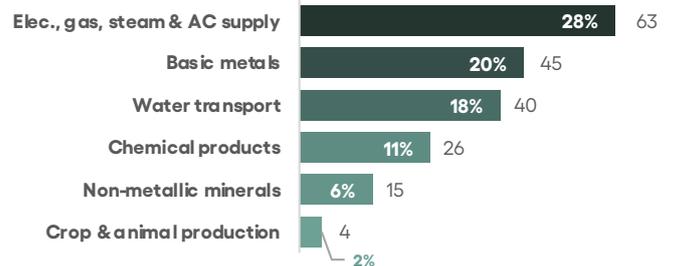
Top 6 imported (% , MtCO₂eq)

Japan's imports generate emissions for the following products and services abroad



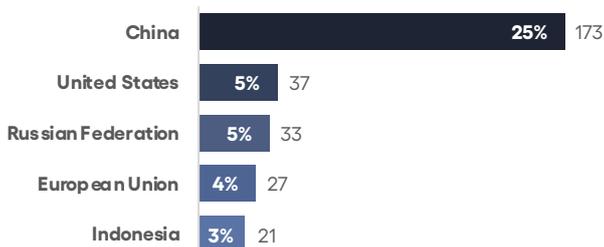
Top 6 exported (% , MtCO₂eq)

Japan's exports generate emissions for the following products and services on its territory

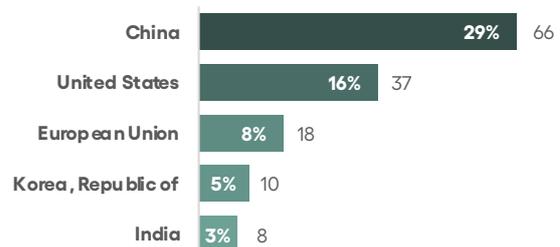


Main sources and destinations of emissions

Top 5 sources of Japan's imports (% , MtCO₂eq)



Top 5 destinations of Japan's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



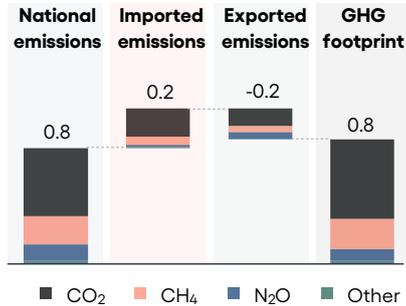
Mexico

GDP : \$1,313B

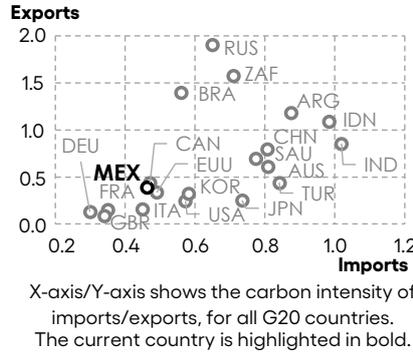
Imports : \$560B (43% of GDP)

Exports : \$534B (41% of GDP)

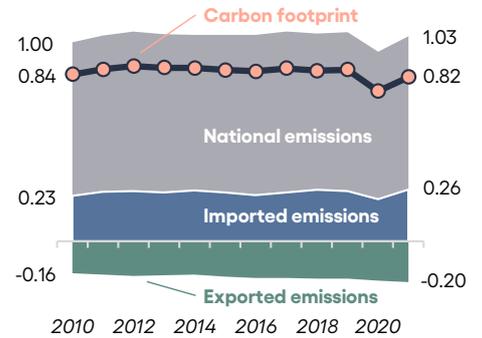
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



Trends (GtCO₂eq, 2010-2021)

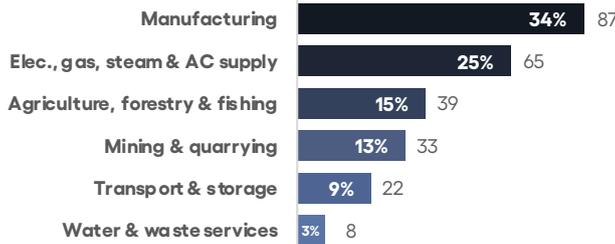


Imports

259 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

Mexico's imports induce emissions in the following sectors abroad



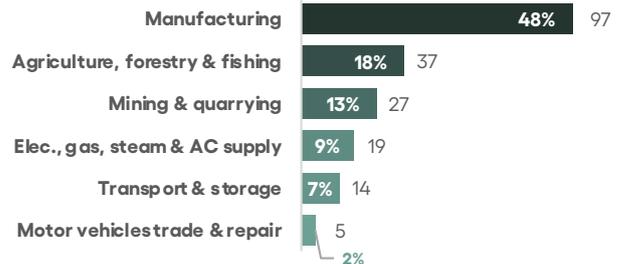
Exports

204 MtCO₂eq

Main sectors

Top 6 exports (% , MtCO₂eq)

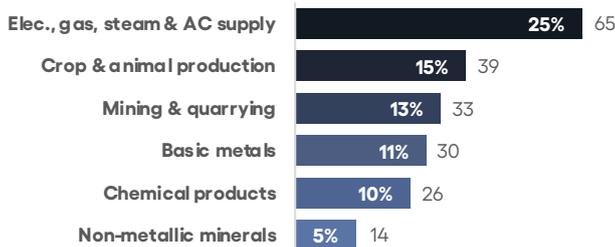
Mexico's exports induce emissions in the following sectors on its territory



Main products and services

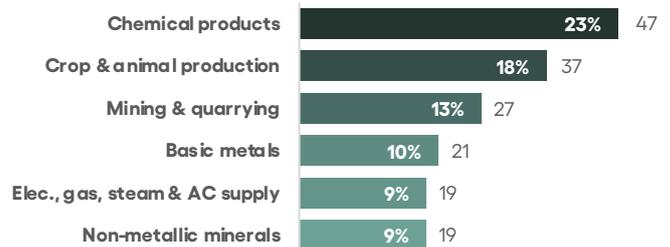
Top 6 imported (% , MtCO₂eq)

Mexico's imports induce emissions for the following products and services abroad



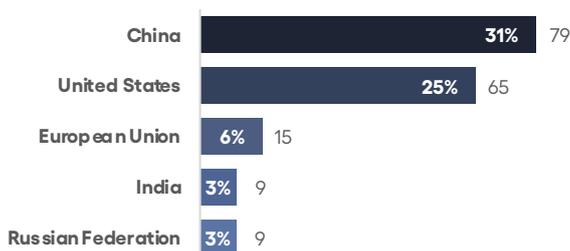
Top 6 exported (% , MtCO₂eq)

Mexico's exports induce emissions for the following products and services on its territory

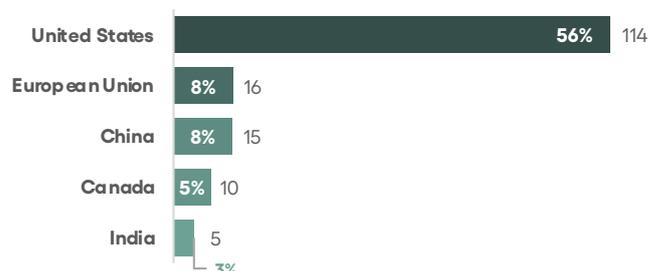


Main sources and destinations of emissions

Top 5 sources of Mexico's imports (% , MtCO₂eq)



Top 5 destinations of Mexico's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



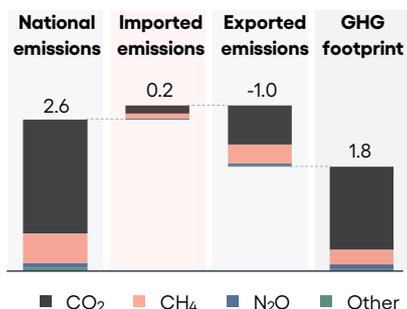
Russia

GDP : \$1,843B

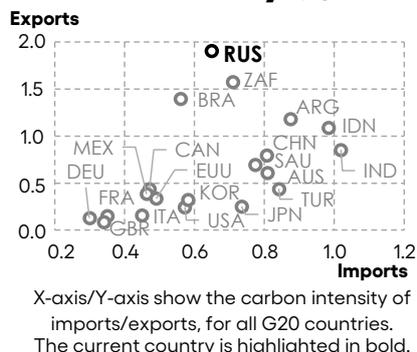
Imports : \$377B (20% of GDP)

Exports : \$549B (30% of GDP)

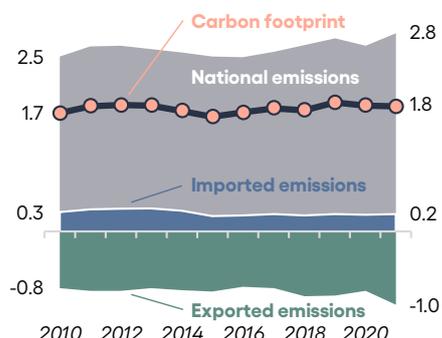
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



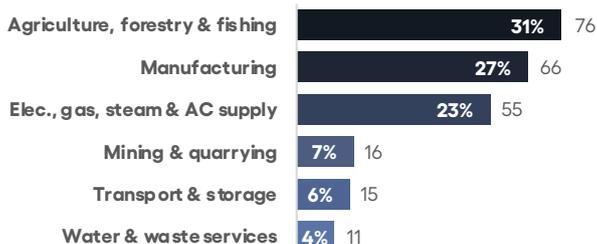
Trends (GtCO₂eq, 2010-2021)



Imports 245 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

Russia's imports generate emissions in the following sectors abroad

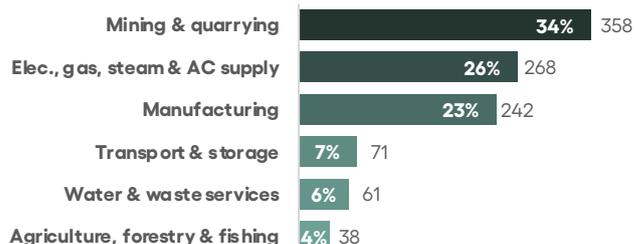


Exports 1,045 MtCO₂eq

Main sectors

Top 6 exports (% , MtCO₂eq)

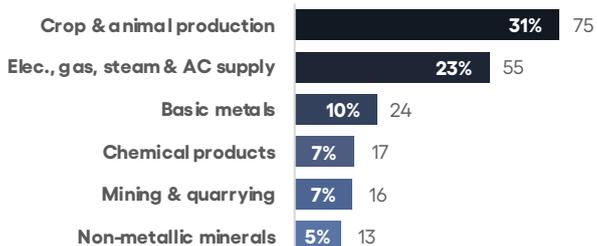
Russia's exports generate emissions in the following sectors on its territory



Main products and services

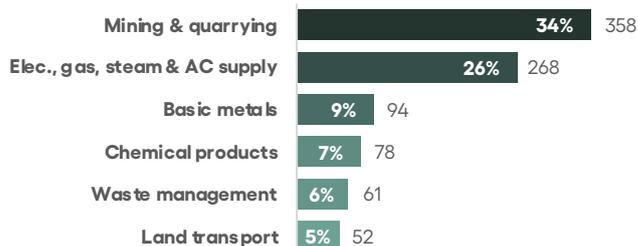
Top 6 imported (% , MtCO₂eq)

Russia's imports generate emissions for the following products and services abroad



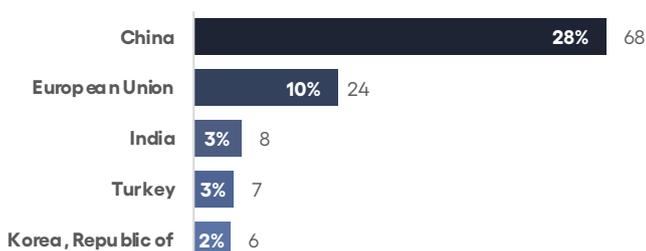
Top 6 exported (% , MtCO₂eq)

Russia's exports generate emissions for the following products and services on its territory

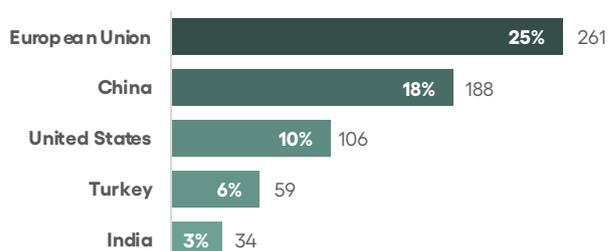


Main sources and destinations of emissions

Top 5 sources of Russia's imports (% , MtCO₂eq)



Top 5 destinations of Russia's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



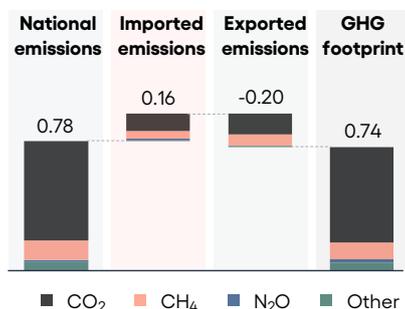
Saudi Arabia

GDP : \$874B

Imports : \$213B (24% of GDP)

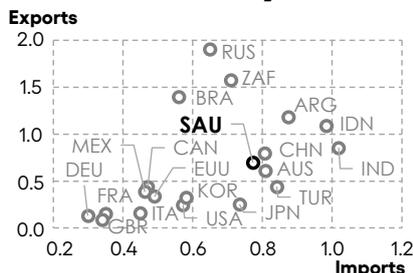
Exports : \$287B (33% of GDP)

GHG footprint (GtCO₂eq)



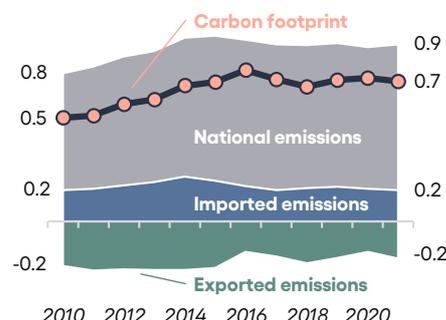
■ CO₂ ■ CH₄ ■ N₂O ■ Other

GHG intensity (kgCO₂eq/\$)



X-axis/Y-axis show the carbon intensity of imports/exports, for all G20 countries. The current country is highlighted in bold.

Trends (GtCO₂eq, 2010-2021)



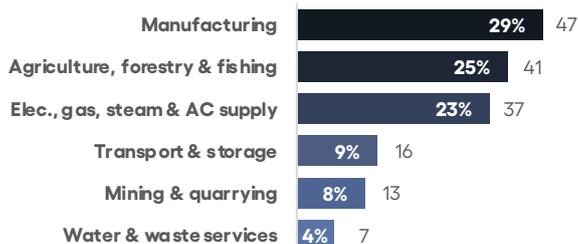
Imports

165 MtCO₂eq

Main sectors

Top 6 imports (% , MtCO₂eq)

Saudi Arabia's imports generate emissions in the following sectors abroad

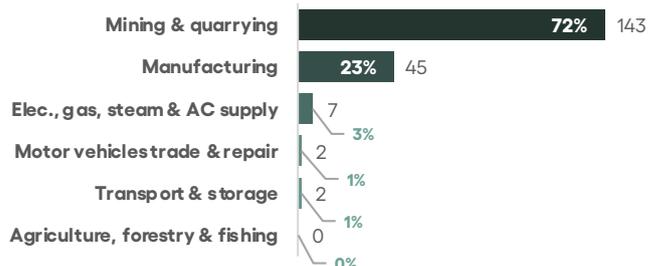


Exports

199 MtCO₂eq

Top 6 exports (% , MtCO₂eq)

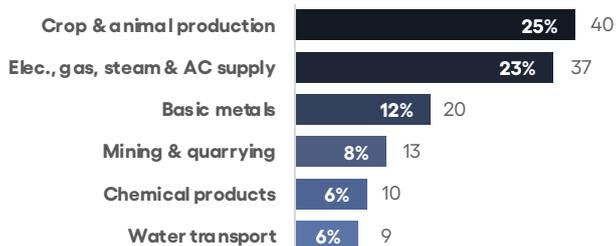
Saudi Arabia's exports generate emissions in the following sectors on its territory



Main products and services

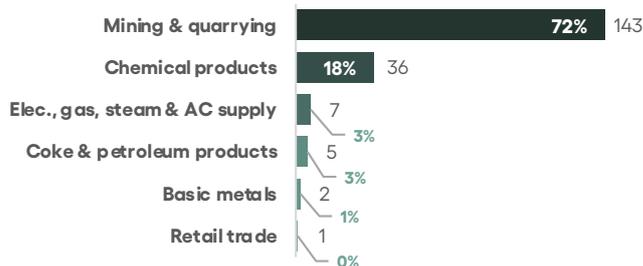
Top 6 imported (% , MtCO₂eq)

Saudi Arabia's imports generate emissions for the following products and services abroad



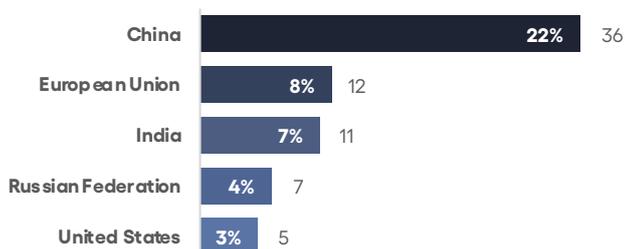
Top 6 exported (% , MtCO₂eq)

Saudi Arabia's exports generate emissions for the following products and services on its territory

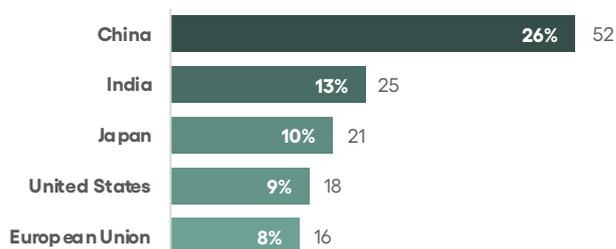


Main sources and destinations of emissions

Top 5 sources of Saudi Arabia's imports (% , MtCO₂eq)



Top 5 destinations of Saudi Arabia's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



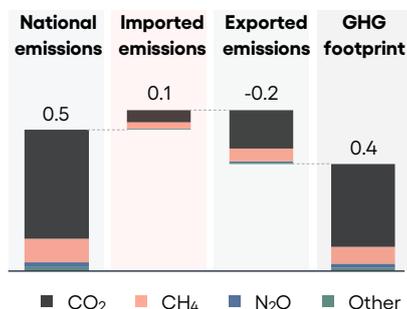
South Africa

GDP : \$420B

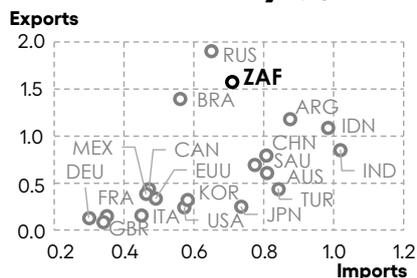
Imports : \$105B (25% of GDP)

Exports : \$131B (31% of GDP)

GHG footprint (GtCO₂eq)

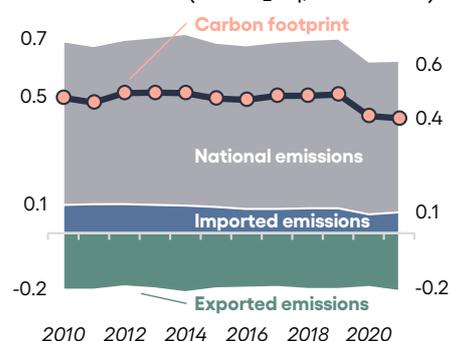


GHG intensity (kgCO₂eq/\$)



X-axis/Y-axis show the carbon intensity of imports/exports, for all G20 countries. The current country is highlighted in bold.

Trends (GtCO₂eq, 2010-2021)



Imports

74 MtCO₂eq

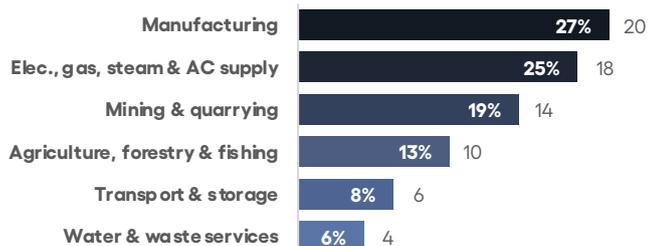
Exports

206 MtCO₂eq

Main sectors

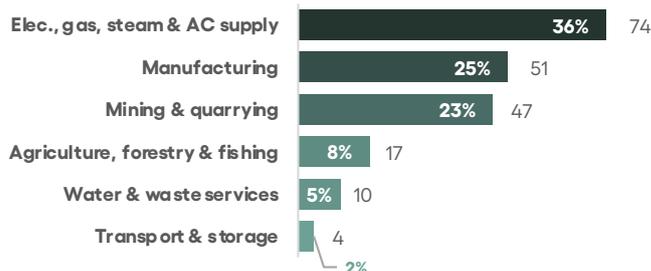
Top 6 imports (% , MtCO₂eq)

South Africa's imports generate emissions in the following sectors abroad



Top 6 exports (% , MtCO₂eq)

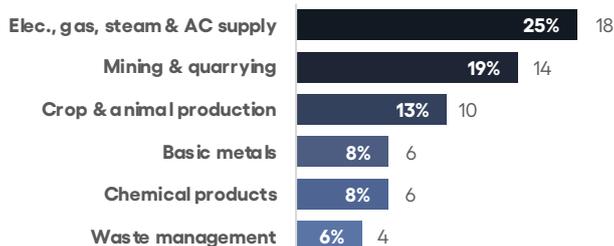
South Africa's exports generate emissions in the following sectors on its territory



Main products and services

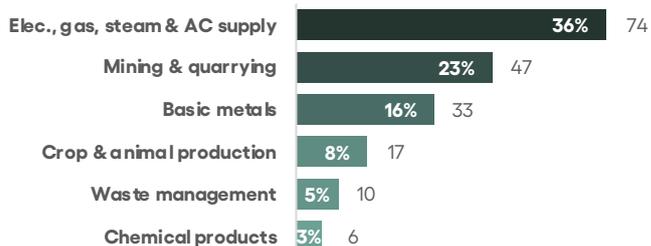
Top 6 imported (% , MtCO₂eq)

South Africa's imports generate emissions for the following products and services abroad



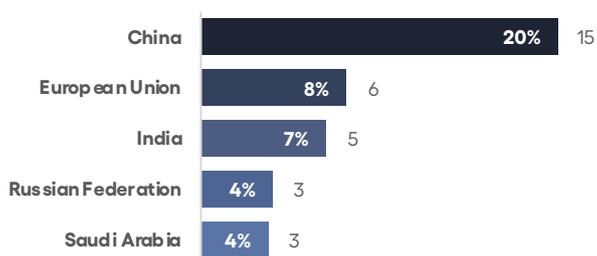
Top 6 exported (% , MtCO₂eq)

South Africa's exports generate emissions for the following products and services on its territory

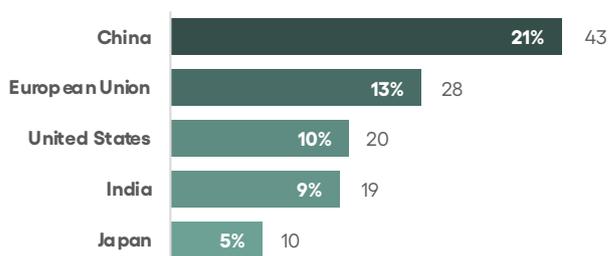


Main sources and destinations of emissions

Top 5 sources of South Africa's imports (% , MtCO₂eq)



Top 5 destinations of South Africa's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



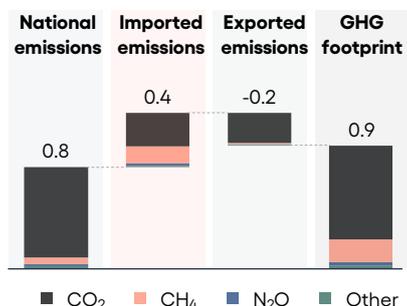
South Korea

GDP : \$1,818B

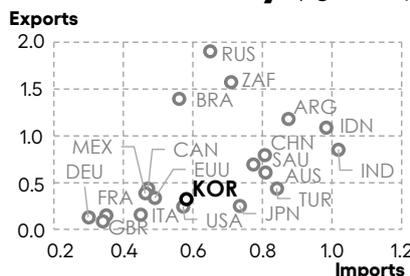
Imports : \$697B (38% of GDP)

Exports : \$762B (42% of GDP)

GHG footprint (GtCO₂eq)

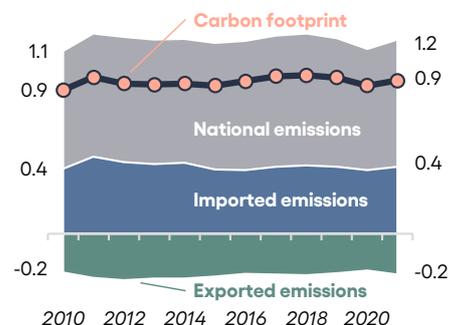


GHG intensity (kgCO₂eq/\$)



X-axis/Y-axis show the carbon intensity of imports/exports, for all G20 countries. The current country is highlighted in bold.

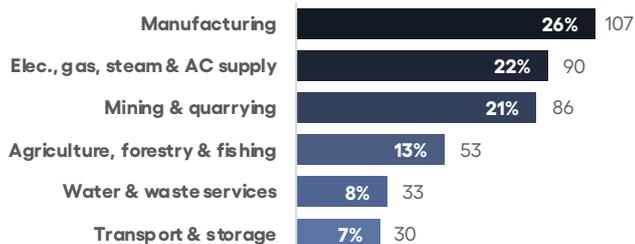
Trends (GtCO₂eq, 2010-2021)



Imports 405 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

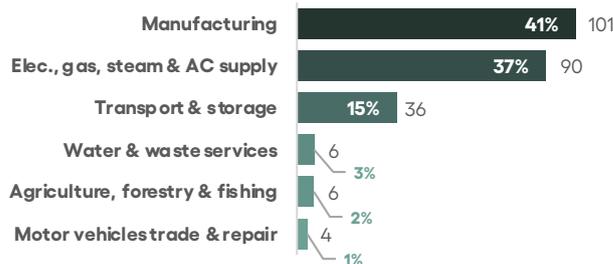
South Korea's imports generate emissions in the following sectors abroad



Exports 247 MtCO₂eq

Top 6 exports (% , MtCO₂eq)

South Korea's exports generate emissions in the following sectors on its territory

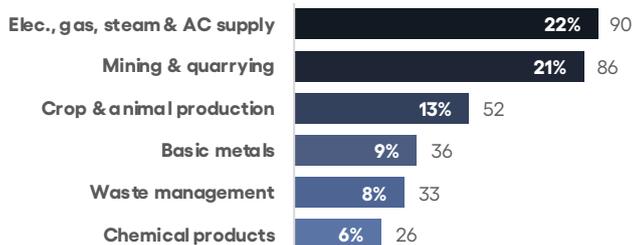


Main sectors

Main products and services

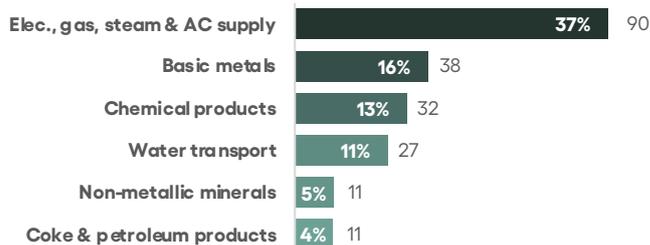
Top 6 imported (% , MtCO₂eq)

South Korea's imports generate emissions for the following products and services abroad



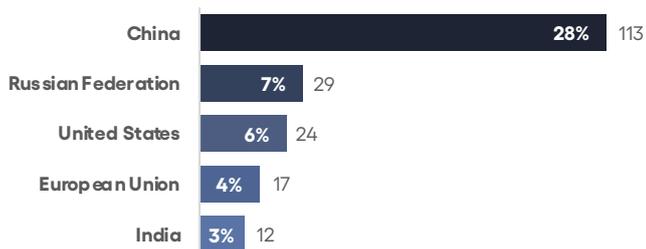
Top 6 exported (% , MtCO₂eq)

South Korea's exports generate emissions for the following products and services on its territory

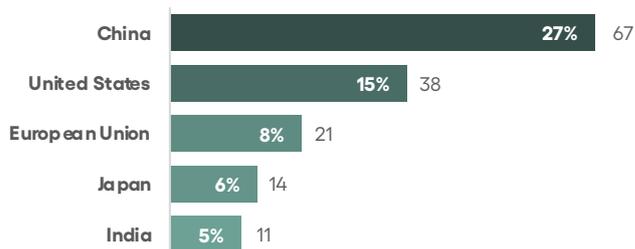


Main sources and destinations of emissions

Top 5 sources of South Korea's imports (% , MtCO₂eq)



Top 5 destinations of South Korea's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



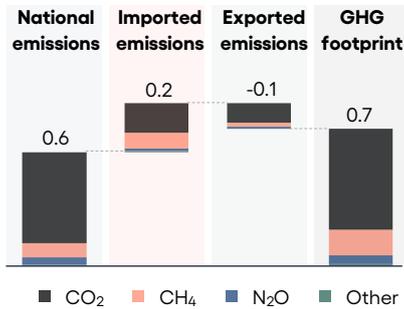
Turkey

GDP : \$820B

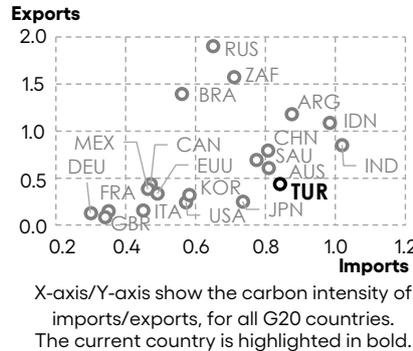
Imports : \$290B (35% of GDP)

Exports : \$293B (36% of GDP)

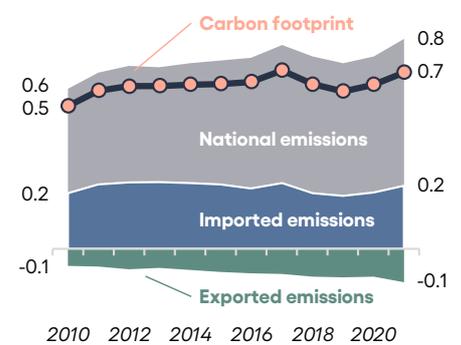
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



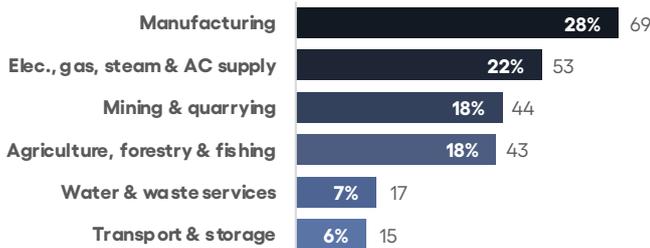
Trends (GtCO₂eq, 2010-2021)



Imports 244 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

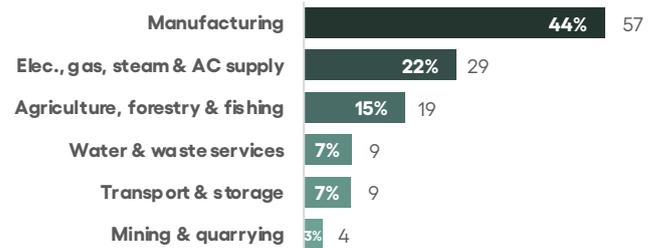
Turkey's imports generate emissions in the following sectors abroad



Exports 129 MtCO₂eq

Top 6 exports (% , MtCO₂eq)

Turkey's exports generate emissions in the following sectors on its territory

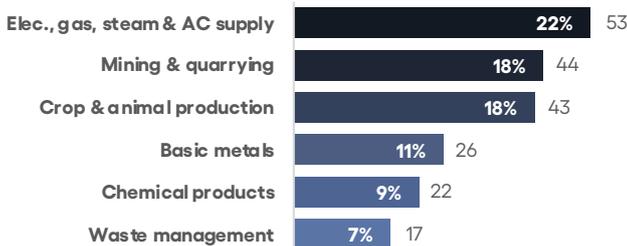


Main sectors

Main products and services

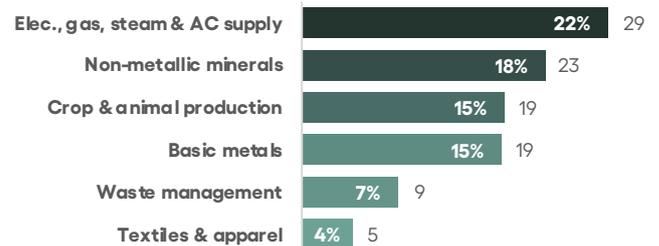
Top 6 imported (% , MtCO₂eq)

Turkey's imports generate emissions for the following products and services abroad



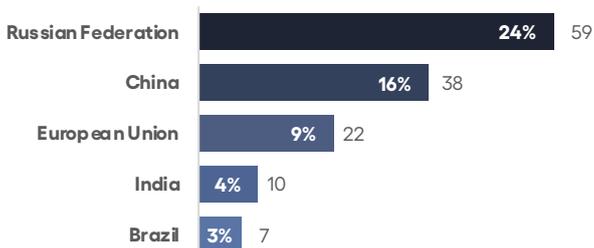
Top 6 exported (% , MtCO₂eq)

Turkey's exports generate emissions for the following products and services on its territory

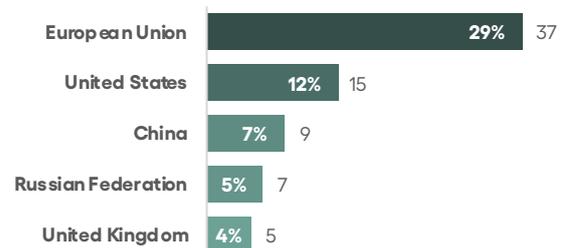


Main sources and destinations of emissions

Top 5 sources of Turkey's imports (% , MtCO₂eq)



Top 5 destinations of Turkey's exports (% , MtCO₂eq)



Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



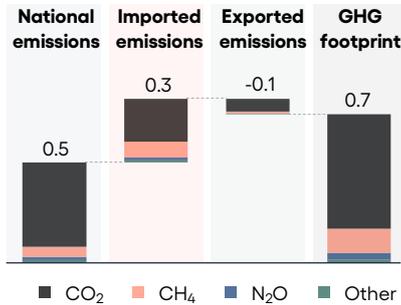
United Kingdom

GDP : \$3,142B

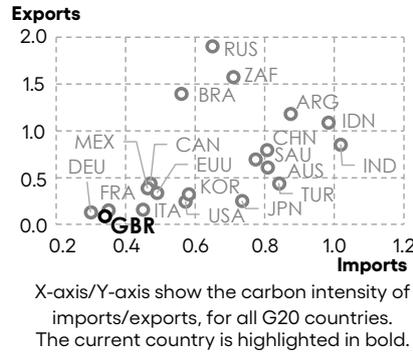
Imports : \$935B (30% of GDP)

Exports : \$930B (30% of GDP)

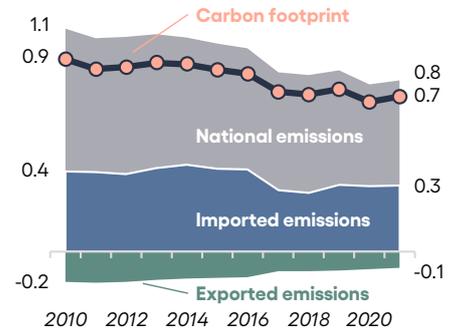
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



Trends (GtCO₂eq, 2010-2021)



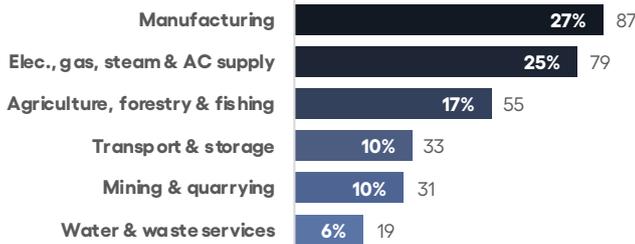
Imports 318 MtCO₂eq

Exports 78 MtCO₂eq

Main sectors

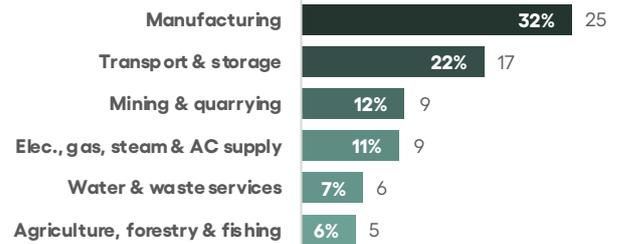
Top 6 imports (% , MtCO₂eq)

United Kingdom's imports generate emissions in the following sectors abroad



Top 6 exports (% , MtCO₂eq)

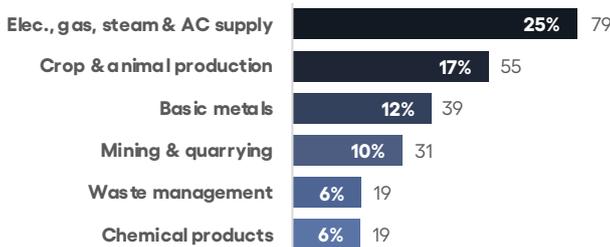
United Kingdom's exports generate emissions in the following sectors on its territory



Main products and services

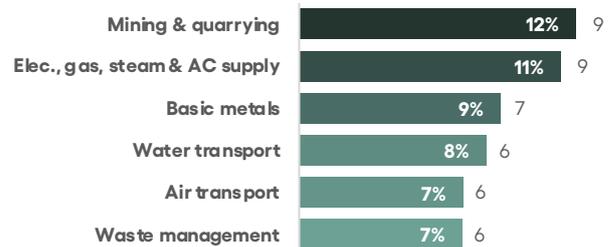
Top 6 imported (% , MtCO₂eq)

United Kingdom's imports generate emissions for the following products and services abroad



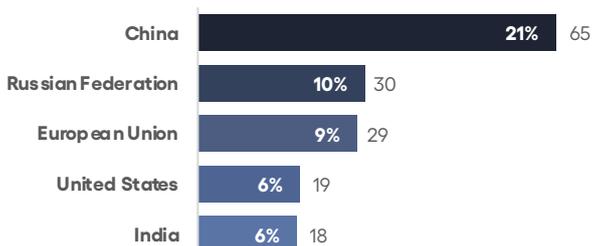
Top 6 exported (% , MtCO₂eq)

United Kingdom's exports generate emissions for the following products and services on its territory

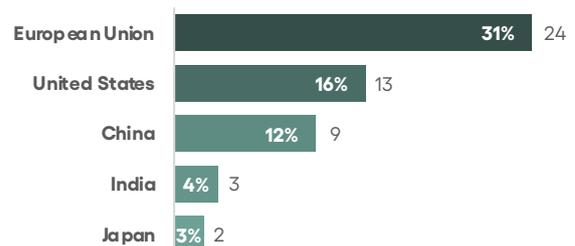


Main sources and destinations of emissions

Top 5 sources of the UK's imports (% , MtCO₂eq)



Top 5 destinations of the UK's exports (% , MtCO₂eq)



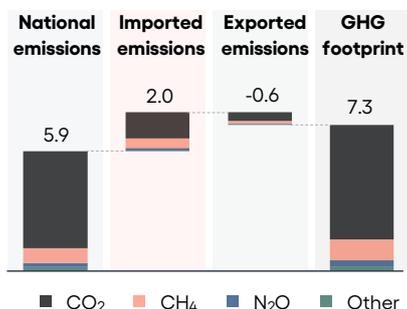
Notes: 1. All figures are for the year 2021, unless otherwise specified. They therefore do not reflect the sanctions against Russia following the start of the war in Ukraine. 2. The graphs above only display G20 countries. Some non-G20 trading partners could be significant for the country in question but are not shown in the graphs. Data sources: Eurostat-FIGARO, World Bank 2022. Adapted by Carbone 4.



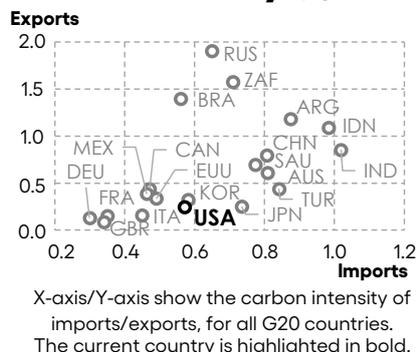
United States

GDP : \$23,594B Imports : \$3,408B (14% of GDP) Exports : \$2,550B (11% of GDP)

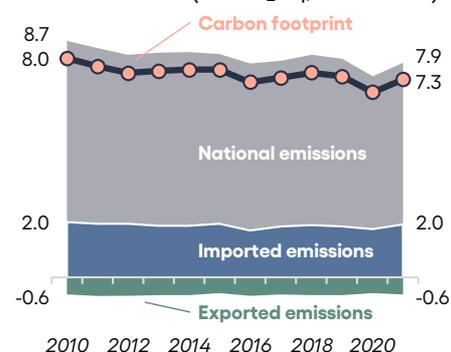
GHG footprint (GtCO₂eq)



GHG intensity (kgCO₂eq/\$)



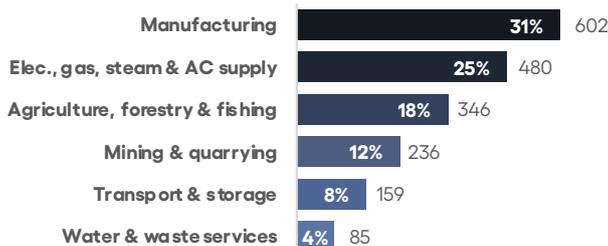
Trends (GtCO₂eq, 2010-2021)



Imports 1951 MtCO₂eq

Top 6 imports (% , MtCO₂eq)

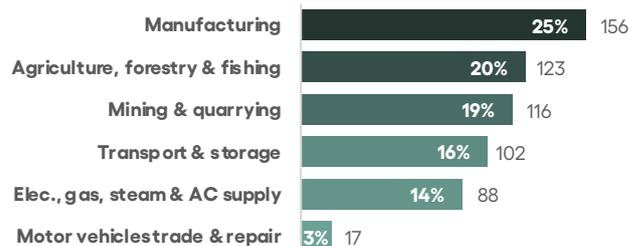
United States's imports generate emissions in the following sectors abroad



Exports 625 MtCO₂eq

Top 6 exports (% , MtCO₂eq)

United States's exports generate emissions in the following sectors on its territory

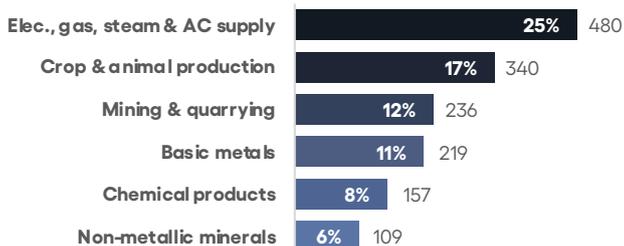


Main sectors

Main products and services

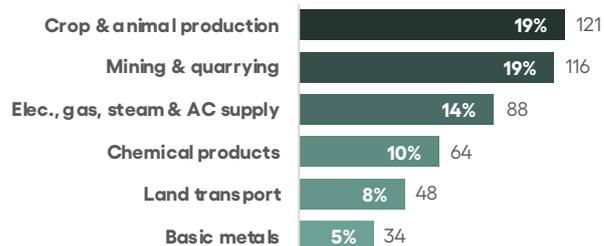
Top 6 imported (% , MtCO₂eq)

United States's imports generate emissions for the following products and services abroad



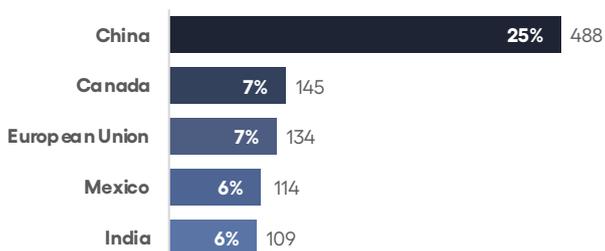
Top 6 exported (% , MtCO₂eq)

United States's exports generate emissions for the following products and services on its territory

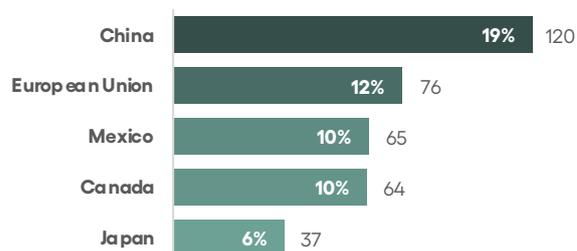


Main sources and destinations of emissions

Top 5 sources of United States's imports (% , MtCO₂eq)



Top 5 destinations of United States's exports (% , MtCO₂eq)



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Carbone 4

Carbone 4 is the first independent consultancy specialised in low carbon strategy and adaptation to climate change. Constantly on the lookout for low amplitude signals, we deploy a systemic view of the energy/climate issue and put all our rigour and creativity to work to transform our clients into leaders in the climate challenge.

ECF

The European Climate Foundation (ECF) is a major philanthropic initiative working to foster the net-zero transition and ensure a healthy, thriving planet for current and future generations. We support over 700 partner organisations to drive progress towards the goals of the Paris Agreement, promote practical policymaking in response to the climate crisis, and broaden political and public support for climate action. We strive for a positive, people-centred and socially responsible climate transition in Europe and around the world.